





# Plants For a Future 2021CE

## Hardiness Zone 6, Wet, Heavy Clay

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## Contents

<b>1 Introduction</b>	<b>3</b>
1.1 Pronunciation guide . . . . .	3
1.2 vocabulary . . . . .	3
<b>2 tlin</b>	<b>4</b>
2.1 bwon . . . . .	4
2.2 mran . . . . .	5
<b>3 tlin</b>	<b>12</b>
3.1 bwon . . . . .	12
3.2 mran . . . . .	14
<b>4 tlin</b>	<b>64</b>
4.1 bwon . . . . .	64
4.2 mran . . . . .	69
<b>5 tlin</b>	<b>166</b>
5.1 bwon . . . . .	166
5.2 mran . . . . .	167
<b>6 Alphabetical Index</b>	<b>233</b>

## 1 Introduction

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

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

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

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

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

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

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

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

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

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

## 1.1 Pronunciation guide

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

## 1.2 vocabulary

tlin /tlin/ cold hardiness, cyuc /tju/ heat hardiness, kcak /kʃak/ food (rating), tcan /tʃan/ other (uses rating), dwat /dwa/ medicinal (rating), hkuc /hku/ (adult) height, hsi2n /hsi.n/ (adult) width, ksan /ksan/ least (minimum).

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

hgat /hgat/ drought (tolerant), kyuc /kju/ dry, tcup /tʃup/ damp, hja7n /hʒa7n/ wet, hs6s /hsəs/ puddle, hwic /hwɪ/ water (requirement).

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

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

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

hmuc /hmu/ purpose, pcis /pʃɪs/ danger, trot /trot/ temperature, prop /prop/ fertile, tcan /tʃan/ other, hyum /hjum/ uses, dwat /dwa/ medicine, drut /drut/ description, kcec /kʃe/ region, tfo2n /tfo2n/ nitrogen-fixing, xlutkfam /xlut.kfam/ plant quantity, bwon /bwon/ bean, mran /mran/

corn/grain non-nitrogen-fixing plant, nrak /nrak/ content (of origin), ksac /ksa/ circumstances/habitat.

5 hmuctrotkcec, tcup hmuchwic, 0 ksancak, frip hmuchpa7t, lwis hmuchpa7tmwat, 486 xlutkfam.

## 2 2 tlin

### 2.1 bwon

#### 2.1.1 *Alnus sinuata*

Sitka Alder

tfo2n 2 tlin 9 cyuc 1 kcak 3 tcan 1 dwat 4 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flat-  
prikrlwis hpa7tmwatli hjonli

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

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

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

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

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

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

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

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. This species is closely related to *A. viridis* and is included as a sub-species of *A. viridis* by many botanists[11]. A fast-growing but short-lived species, rarely living longer than 50 years[229]. It is a pioneer species of logged or burnt land, often forming dense thickets in low wet areas[229]. This species has a symbiotic relationship with certain soil

micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 2.1.2 *Alnus rugosa*

Speckled Alder

tfo2n 2 tlin 6 cyuc 0 kcak 3 tcan 2 dwat 22 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flat-  
prikrlwis hpa7tmwatli hjonli

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

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

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

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

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

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

## 2.1.3 *Alnus incana*

Grey Alder, Speckled alder, Thinleaf alder, White Alder  
tfo2n 2 tlin 6 cyuc 0 kcaak 3 tcan 0 dwat 18 m hkuc  
hmmihmtut cyutli kyuctcuphja7n hwicli hysislutnyikfrp hpa7tli  
flatprukliwis hpa7tmwatli hjonli

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

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

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

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

nwatta Landscape Uses:Pollard, Specimen. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Thrives in drier soils than many other members of this genus[200]. Tolerates very infertile sites[200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Attractive foliage, Not North American native, Wetlands plant, Inconspicuous flowers or blooms. The plant is

heat tolerant in zones 6 through 11. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 2.2 *mran*

### 2.2.1 *Betula pubescens*

White Birch, Downy birch

2 tlin 9 cyuc 3 kcaak 5 tcan 3 dwat 20 m hkuc  
frut cyutli kyuctcuphja7n hwicli hysislrashratnyikfrp hpa7tli  
frusflatprukliwis hpa7tmwatli hjonli

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

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

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

tcanta Adhesive Besom Charcoal Compost Dye Essential Fibre Fungicide Miscellany Paper Pioneer Polish Repellent Tannin Thatching Waterproofing WoodThe bark is used to make drinking vessels, canoe skins, roofing tiles etc. It is waterproof, durable, tough and resinous[11, 61]. Only the outer bark is removed, this does not kill the tree. It is most easily removed in late spring to early summer. The bark was pressed flat and stored until the following spring. When required for making canoes it would be heated over a fire to make it pliable for shaping to the canoe frame[257]. A pio-

near species, it readily invades old fields, cleared or burnt-over land and creates conditions suitable for other woodland trees to become established. Since it is relatively short-lived and intolerant of shade, it is eventually out-competed by these trees[11, 186]. A tar-oil is obtained from the white bark in spring. It has fungicidal properties and is also used as an insect repellent[4, 14, 61, 100]. It makes a good shoe polish[61]. Another report says that an essential oil is obtained from the bark and this, called 'Russian Leather' has been used as a perfume[245]. A glue is made from the sap. Cordage can be made from the fibres of the inner bark. This inner bark can also be separated into thin layers and used as a substitute for oiled paper[4]. A decoction of the inner bark is used to preserve cordage, it is rich in tannin. The bark contains up to 16% tannin[223]. A brown dye is obtained from the inner bark. An oil similar to Wintergreen oil (obtained from *Gaultheria procumbens*) is obtained from the inner bark[21, 61]. It is used medicinally and also makes a refreshing tea[21]. The young branches are very flexible and are used to make whisks, besoms etc[6]. They are also used in thatching and to make wattles[4]. The leaves are a good addition to the compost heap, improving fermentation[20]. A black paint is obtained from the soot of the plant[61]. A high quality charcoal is obtained from the bark. It is used by artists, painters etc. Wood - soft, light, durable. It is used for a wide range of purposes including furniture, tool handles, carving, toys etc[100, 238]. It is a source of charcoal that is used by artists and is also pulped and used for making paper[238].

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

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

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

nwatta Succeeds in a well-drained light loamy soil in a sunny position[11, 200]. Grows well in heavy clay soils. Tolerates a wet position[11, 24], succeeding in poorly drained soils[186]. Fairly wind tolerant[200]. Prefers an acid soil. A very ornamental tree and fast growing, capable of growing 1 metre a year but it is short-lived[186]. It is one of the first trees to colonize open land and it creates a suitable envi-

ronment for other woodland trees to follow[11]. These trees eventually shade out the birch trees[186]. Trees take about 15 years from seed to produce their own seed[98]. Although closely related, it does not usually hybridize with *B. pendula*[11]. It hybridizes freely with *B. pendula* according to another report[186]. A superb tree for encouraging wildlife, it has over 200 associated insect species[24, 30]. A good plant to grow near the compost heap, aiding the fermentation process[14, 20]. It is also a good companion plant, its root activity working to improve the soil[14]. Trees are notably susceptible to honey fungus[200].

## 2.2.2 *Betula pendula*

Silver Birch, European white birch, Common Birch, Warty Birch, European White Birch  
2 tlin 6 cyuc 3 kcaac 5 tcan 3 dwat 20 m hkuc  
htut cyutli kyuctcup hwicli hyishrasljutnyikfrip hpa7tli frusflatprikliw hpa7tmwatti hjonli

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

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

kcakta Edible Parts: Flowers Inner bark Leaves SapEdible Uses: TeaInner bark - cooked or dried and ground into a meal[2, 15, 105]. It can be added as a thickener to soups etc or can be mixed with flour for making bread, biscuits etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[115, 177, K]. Sap - raw or cooked. A sweet flavour. It is harvested in early spring, before the leaves unfurl, by tapping the trunk. It makes a pleasant drink[115]. It is often concentrated into a syrup by boiling off the water[2, 9, 13, 15, 177]. Between 4 and 7 litres can be drawn off a mature tree in a day and this will not kill the tree so long as the tap hole is filled up afterwards[115]. However, prolonged or heavy tapping will kill the tree[115]. The flow is best on sunny days following a frost. The sap can be fermented into a beer. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum." [269]. Young leaves raw or cooked[15]. Young catkins[15]. No more details are given. A tea is made from the leaves[15, 161] and another tea is made from the essential oil in the inner bark[21].

tcanta Adhesive Besom Charcoal Compost Dye Essential Fibre Fungicide Hair Miscellany Paper Pioneer Polish Repellent Tannin Thatching Waterproofing WoodThe bark is used to make drinking vessels, canoe skins, roofing tiles etc[115]. It is waterproof, durable, tough and resinous. Only the outer bark is removed, this does not kill the tree. It is most easily removed in late spring to early summer. A pioneer species, it readily invades old fields, cleared or burnt-over land and creates conditions suitable for other woodland trees to become established. Since it is relatively short-lived and intolerant of shade, it is eventually out-competed by these trees[17, 186]. A tar-oil is obtained from the white bark in spring. It has fungicidal properties and is also used as an insect repellent[4, 13, 100]. It makes a good shoe polish[61]. Another report says that an essential oil is obtained from the bark and this, called 'Russian Leather' has been used as a perfume[245]. A decoction of the inner bark is used to preserve cordage[115], it contains up to 16% tannin[178, 223]. An oil similar to Wintergreen oil (obtained from *Gaultheria*

(cubens) is obtained from the inner bark[21, 61]. It is used medicinally and also makes a refreshing tea[21]. The resin glands (the report does not say where these glands are found) are used to make a hair lotion[226]. A brown dye is obtained from the inner bark. A glue is made from the sap[2, 9, 13, 15]. Cordage can be made from the fibres of the inner bark[115]. This inner bark can also be separated into thin layers and used as a substitute for oiled paper[4]. The young branches are very flexible and are used to make whisks, besoms etc[6]. They are also used in thatching[13, 100] and to make wattles[4]. The leaves are a good addition to the compost heap, improving fermentation[14]. Wood - soft, light, durable. It is used for a wide range of purposes including furniture, tool handles, toys and carving[13, 100, 238]. A high quality charcoal is obtained from the bark. It is used by artists, painters etc[13]. The wood is also pulped and used for making paper[238].

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

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

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

**nwatta** Landscape Uses:Firewood, Specimen. A very easily grown plant, it tolerates most soils including poor ones[1, 24], sandy soils[188] and heavy clays. It prefers a well-drained loamy soil in a sunny position[11, 200]. It is occasionally found on calcareous soils in the wild but it generally prefers a pH below 6.5, doing well on acid soils[186]. Fairly wind tolerant[200] though it becomes wind shaped when exposed to strong winds[K]. The silver birch is a very ornamental tree[1] with many named varieties[11, 200]. It also has a very wide range of economic uses. It is a fast growing tree, increasing by up to 1 metre a year, but is short-lived[17, 200]. It is often one of the first trees to colonize open land and it creates a suitable environment for other woodland trees to follow[17]. These trees eventually out-compete and shade out the birch trees[17, 186]. It makes an excellent nurse tree for seedling trees, though its fine branches can cause damage to nearby trees when blown into them by the wind. Trees take about 15 years from seed to produce their own seed[98]. Although closely related,

it does not usually hybridize with *B. pubescens*[11]. It often hybridizes with *B. pubescens* according to another report[186]. A superb tree for encouraging wildlife, it has 229 associated insect species[24]. A good plant to grow near the compost heap, aiding the fermentation process[14, 20]. It is also a good companion plant, its root action working to improve the soil[14]. Trees are notably susceptible to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms.

## 2.2.3 *Viburnum trilobum*

American Cranberry, Highbush Cranberry, Cranberrybush, American Cranberrybush *Viburnum*

2 tin 7 cyuc 3 kcaok 0 tcan 1 dwat 3 m hkc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-prikliw hpa7tmwatli fyifxre7t hjonli

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

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

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

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

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

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

**nwatta** Landscape Uses:Foundation, Massing, Screen, Specimen, Winter interest. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for

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

## 2.2.4 *Tagetes erecta*

African Marigold, Aztec marigold, Big Marigold, American Marigold

2 tin 11 cyuc 3 kca 3 tcan 3 dwat 1 m hkuc  
htut cyutli kyucutcp hwicli hrasjlutnykfrp hpa7tli flatprik-  
wis hpa7tmwlati xyfcre7t hjonli

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

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

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

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

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

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

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

## 2.2.5 *Malus baccata*

Chinese Crab, Siberian crab apple

2 tin 7 cyuc 2 kca 2 tcan 1 dwat 15 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprik-  
wis hpa7tmwlati xyfcre7t hjonli

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

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

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

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

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

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

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

nwatta Landscape Uses: Border, Espalier, Pest tolerant, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils including heavy ones[1, 98].



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

## 2.2.6 *Cornus sericea*

Red Osier Dogwood, Western dogwood  
 2 tlin 7 cyuc 2 kcaak 4 tcan 2 dwat 2.5 m hkuc  
 hmimhtut cyuti tcuphja7n hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

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

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

dwatta Analgesic Astringent Febrifuge Miscellany Poulitice Purgative Skin Stimulant Tonic Red osier dogwood was widely employed by several native North American Indian tribes who valued it especially for its astringent and tonic bark, using it both internally and externally to treat diarrhoea, fevers, skin problems etc[257]. It is little used in modern herbalism. The bark and the root bark are analgesic, astringent, febrifuge, purgative, slightly stimulant and tonic[4, 172, 257]. Drying the bark removes its tendency to purge[172]. A decoction has been used in the treatment of headaches, diarrhoea, coughs, colds and fevers[257]. Externally, the decoction has been used as a wash for sore eyes,

styes and other infections and also to treat skin complaints such as poison ivy rash and ulcers[257]. The bark shavings have been applied as a dressing on wounds to stop the bleeding[257]. A poultice of the soaked inner bark, combined with ashes, has been used to alleviate pain[257]. The plant is said to have cured hydrophobia[4].

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

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

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

## 2.2.7 *Tagetes tenuifolia*

Lemon Marigold, Striped Mexican Marigold, Signet Marigold  
 2 tlin 11 cyuc 2 kcaak 3 tcan 0 dwat 0.8 m hkuc  
 htut cyuti kyucutcp hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

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

tcanta Companion Landscape Uses: Border, Container, Specimen. There are some named forms, selected for their ornamental value[183]. Special Features: Attractive foliage, North American native, Fragrant foliage, Suitable for cut flowers, Suitable for dried flowers. Secretions from the roots of growing plants have an insecticidal effect on the soil, effective against nematodes and to some extent against keeled

slugs, they also have an effect against some persistent weeds such as couch grass[18, 20, 200]. The plant also has an effect on asparagus beetle and bean weevils. These secretions are produced about 3 - 4 months after sowing. A yellow dye is obtained from the flowers[169]. Dynamic accumulator.

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

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

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

## 2.2.8 Tagetes patula

French Marigold, Dwarf French Marigold

2 tlin 11 cyuc 2 kcak 4 tcan 2 dwat 0.5 m hkuc  
htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wissliphom hpa7tmwatli xre7t hjonli

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

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

tcanta Companion Dye Essential Insecticide Repellent-Landscape Uses: Border, Container, Foundation, Massing, Seashore, Specimen. A very ornamental plant[1]. Special Features: North American native, Fragrant foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. Secretions from the roots of growing plants have an insecticidal effect on the soil, effective against nematodes and to some extent against keeled slugs[18, 20, 200, 218].

These secretions are produced about 3 - 4 months after sowing[200]. The whole plant is harvested when in flower and distilled for its essential oil[218, 238].The oil is used in perfumery, it is blended with sandalwood oil to produce 'attar genda' perfume[238]. About 35 kilos of oil can be extracted from 1 hectare of the plant (yielding 2,500 kilos of flowers and 25,000 kilos of herbage)[218]. The whole plant contains substances that are toxic to cockroaches[218]. The growing plant repels whitefly and can be grown near tomatoes to keep that crop free of the insect[18, 20]. A yellow dye is obtained from the flowers[169]. It is used to colour foods and textiles[238]. The flowers are sometimes used as an adulterant of saffron (obtained from *Crocus sativus*)[238]. Dynamic accumulator.

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

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

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

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

## 2.2.9 Tamarix ramosissima

Tamarisk, Saltcedar

2 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4.5 m hkuc  
htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wissliphom hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

## 2.2.10 Convallaria majalis

Lily Of The Valley, European lily of the valley

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

kwattmimhttt cytlil kyuctuphja7n hwicli hyishrasjlyntyrk-frip hpa7tli flatprikwlwis hpa7tmwatli fyifxre7t hjonli

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

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

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

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

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

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

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

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

## 2.2.11 Populus fremontii

Cottonwood, Fremont cottonwood, Fremont Poplar, Western Cottonwood

2 tin 9 cyuc 1 kcak 3 tcan 2 hwat 25 m hkuc htut cytlil kyuctup hwa7n hwicli hyishrasjlyntyrk-frip hpa7tli flatprikwlwis hpa7tmwatli nyanhjen hjonli

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

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

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

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

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

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in

the cold frame. If sufficient ground is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

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

## 3 3 tlin

### 3.1 bwon

#### 3.1.1 *Alnus glutinosa*

Alder, European alder , Common Alder, Black Alder  
tfo2n 3 tlin 7 cyuc 0 kcaak 5 tcan 3 dwat 25 m hkc  
hmmihtut cyutli tcuphja7n hwicli huijylutnyikfrp hpa7tli flat-  
prikliwis hpa7tmwatli hjonli

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

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

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

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

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

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

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

pH above 6[186]. Very tolerant of maritime exposure[49, 45, 166]. Alder is estimated to tolerate an annual precipitation of 40 to 200cm, an annual average temperature of 8 to 14°C and a pH of 6 to 8[269]. The leaves often remain green on the tree until November, or even later on young seedlings. The seeds contain a margin of air-filled tissue and are capable of floating in water for 30 days before becoming waterlogged[186]. This enables distribution of the seed by water. The alder has a very rapid early growth[98], specimens 5 years old from seed were 4 metres tall even though growing in a very windy site in Cornwall[K]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[98, 200]. Nitrogen-fixation by trees up to 8 years old has been put at 125 kg/ha/yr., for 20 years at 56 - 130 kg/ha/yr.[269]. Trees often produce adventitious roots from near the base of the stem and these give additional support in unstable soils[186]. Trees are very tolerant of cutting and were at one time much coppiced for their wood which had a variety of uses[4, 186]. Alders are an important food plant for the caterpillars of many butterfly and moth species[30] and also for small birds in winter[24]. There are 90 insect species associated with this tree[24]. There are some named varieties, selected for their ornamental value[200]. Special Features: Not North American native, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 3.1.2 *Alnus hirsuta*

tfo2n 3 tlin 7 cyuc 0 kcak 0 tcan 0 dwat 18 m hkuc  
hnmhtut cyutli tcuphja7n hwicli hysislutnyikfrp hpa7tli flatprk  
lkwis hpa7tmwatli hjonli

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

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

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

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

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

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

### 3.1.3 *Alnus maritima*

Seaside Alder, Beach Alder  
tfo2n 3 tlin 7 cyuc 0 kcak 0 tcan 0 dwat m hkuc  
htut cyutli tcuphja7n hwicli hysislutnyikfrp hpa7tli flatprk  
lkwis hpa7tmwatli hjonli

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

tcanta Biomass WoodThis species has the potential to be used as a biomass crop[269]. Wood - light, soft, close-grained. Light brown in colour with thick, hardly distinguishable heartwood[82].

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

propta Seed -

nwatta Landscape Uses:Erosion control, Massing. Prefers a heavy soil and a damp situation, but it succeeds in ordinary garden soil[11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. Trees are tolerant of frost, poor soil, and some salinity and water-logging[269]. Seaside alder is reported to tolerate an annual precipitation in the range of 95 to 400cm, an average annual temperature of 13.5 to 18°C, and a pH in the range of 6.1 to 8.1[269]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 3.1.4 *Alnus serrulata*

Smooth Alder, Hazel alder  
tfo2n 3 tlin 9 cyuc 0 kcak 2 tcan 2 dwat 4.5 m hkuc  
htut cyutli tcuphja7n hwicli hysislutnyikfrp hpa7tli flatprk  
lkwis hpa7tmwatli hjonli

drutta *Alnus serrulata* is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 3. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

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

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

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

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

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

## 3.2 mran

### 3.2.1 *Malus domestica*

Apple  
3 tlin 8 cyuc 5 kcaok 4 tcan 2 dwat 9 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

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

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

kcakta Edible Parts: Fruit Oil OilEdible Uses: Oil Oil PectinFruit - raw, cooked or dried for later use. Apples are one of the most common and widely grown fruits of the temperate zone. There are a great many named varieties with differing flavours ranging from sour to sweet and textures from dry and mealy to crisp and juicy. There is also a wide range in the seasons of ripening with the first fruits being

ready in late July whilst other cultivars are not picked until late autumn and will store for 12 months or sometimes more. See individual records for more details. The fruit of some cultivars is rich in pectin and can be used in helping other fruits to set when making jam etc[61, 142]. Pectin is also said to protect the body against radiation[201]. An edible oil can be obtained from the seed[4]. It would only really be viable to use these seeds as an oil source if the fruit was being used for some purpose such as making cider and then the seeds could be extracted from the remaining pulp[K].

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

dwatta Antibacterial Antidiarrhoeal Astringent Laxative Odontalgic StomachicThe fruit is astringent and laxative[4, 9]. The bark, and especially the root bark, is antelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[4, 240]. The leaves contain up to 2.4% of an antibacterial substance called 'phlorethin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240]. A ripe raw apple is one of the easiest foods for the stomach to deal with, the whole process of digestion taking about 85 minutes[4]. The apple juice will reduce the acidity of the stomach, it becomes changed into alkaline carbonates and thus corrects sour fermentation[4]. The apple is also an excellent dentifrice, the mechanical action of eating a fruit serving to clean both the teeth and the gums[4].

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

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils, though if these are poorly drained there could be problems with diseases such as canker[200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Tolerates a pH range from 6 to 7, preferring a range of 6.5 to 6.8[200]. The apple is one of the most commonly cultivated fruit crops in the temperate zone. The primary climatic requirements for the production of good quality fruit are warm summer temperatures, relative freedom from spring frosts, reasonable protection from the wind (especially cold north and east winds) and an evenly distributed rainfall of about 600 - 800mm per annum[200]. Good apple production has been achieved as far north as 65°, whilst about 1000 hours of winter temperatures below 7°C are necessary to initiate flower production[269]. However good quality apples can still be produced in other areas with careful management and choice of cultivars[200]. Even in tropical latitudes, the plant has succeeded at high elevations, producing fruit at elevations over 3000 metres in Ecuador for example[269]. Where space is at a premium, or at the limits of their climatic range, apples can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall, an east facing wall will suit many of the tougher cultivars and even a north facing wall can be used for early culinary cultivars[219]. A hybrid of mixed origins, including *M. dasy-*

M. praeox, M. pumila, M. siewersii and M. yelvestris, this species is very commonly cultivated in temperate areas for its edible fruit[11]. There are very many named varieties[46, 183, 200] and with careful choice of these varieties it is possible to provide freshly harvested fruit from July to December and stored fruit for the rest of the year. When chives (*Allium schoenoprasum*) or other alliums are grown under apple trees it can prevent or cure scab[18]. A spray of the infused leaves of *Equisetum* spp can also be used against scab[18, 201]. If climbing nasturtiums (*Tropaeolum majus*) are grown into the tree they can repel woolly aphids[18, 201]. Apples lose their flavour if they are stored with potatoes[18]. They will also impart a bitter flavour to carrots or potatoes if they are stored in the same area[201]. Growing apples near potatoes makes the potatoes more susceptible to blight[201]. Wrapping maple leaves (*Acer* spp) around apples in store helps to preserve the apples[18, 20]. Apples store better if they are grown in a sward that contains a high percentage of clover[201]. Apple trees grow better and produce better quality fruit when foxgloves (*Digitalis* spp) and wallflowers (*Erysimum cheiri*) are growing in the orchard[201]. Dandelions (*Taraxacum* spp) produce ethylene gas and this can cause earlier ripening of fruit if plants are growing in an orchard[18]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.2 Rosa rugosa

Ramanas Rose, Rugosa rose

3 11n 9 cyuc 5 kcaak 3 tcan 2 dwat 2 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfril hpa7tli flat-  
priklwis hpa7tmwatli fyfxire7t hjonli

drutta *Rosa rugosa* is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed Stem Edible Uses: Tea Fruit - raw or cooked[1, 2, 62]. They are very sweet and pleasant to eat, though it takes quite a bit of patience to eat any quantity[K]. The fruit is a fairly large size for a rose with a relatively thick layer of flesh[K]. The fruit is about 25mm in diameter[200]. Rich in vitamin C[3, 14], containing up to 2.75% dry weight[74]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Flowers - raw or cooked[183]. An aromatic flavour, they are also used in jellies and preserves[74, 183]. Remove the bitter white base of the petals before using them. Young shoots - cooked and used as a potherb[183]. Harvested as they come through the ground in spring and are still tender. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. A pleasant tasting fruity-flavoured tea is made from the fruit, it is rich in vitamin C[21]. A tea is also made from the leaves[218].

tcanta Hedge Hedge The plant makes a good low hedge[1, 29]. It is very tolerant of maritime exposure, but is very bare in winter[K].

dwatta Cancer Hepatic Vitamin C The leaves are used in the treatment of fevers[218]. The flowers act on the spleen and liver, promoting blood circulation[147, 218]. They are used internally in the treatment of poor appetite and digestion, and menstrual complaints arising from constricted liver energy[238]. The root is used in the treatment of coughs[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavonoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which

is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - N. China, Japan, Korea. Naturalized in several places in Britain[17]. ksacta Sandy sea shores[58].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet (1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Prefers a light well-drained soil but succeeds in most soils including dry ones[11, 14, 200]. Grows well in heavy clay soils[200]. Prefers a circumneutral soil and a sunny position[200]. Dislikes water-logged soils[200]. Tolerates maritime exposure[14, K]. Plants are said to withstand temperatures down to -50°C without damage[160]. The foliage is said to resist disease[11]. A very ornamental plant[1], it suckers freely but these are fairly easily controlled[K]. There are a number of named varieties[11]. 'Scabrosa' is said to be larger in all its parts, including the fruit[200], though it has not proved to be much larger with us[K]. The flowers have a clove-like perfume[245]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Dislikes boxwood[18]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

### 3.2.3 Hemerocallis fulva

Common Day Lily, Orange daylily, Tawny Daylily, Double Daylily

3 11n 10 cyuc 5 kcaak 2 tcan 2 dwat 1 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfril hpa7tli flat-  
priklwis hpa7tmwatli dyatre7t hjonli

drutta *Hemerocallis fulva* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is

hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**pcista** Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

**kcakta** Edible Parts: Flowers Leaves Root Shoots Edible Uses: Leaves and young shoots - cooked[85, 116, 179, 183]. An asparagus or celery substitute. An excellent sweet tasting vegetable[179, K], though some caution is recommended[127, 137]. The leaves need to be eaten whilst still very young since they quickly become fibrous[K]. Flowers - raw or cooked[62, 100]. The petals are thick and crunchy, making very pleasant eating raw, with a nice sweetness at the base because of the nectar[K]. The flowers can also be dried and used as a thickener in soups etc[62, 183]. In this case, they are picked when somewhat withered and closed[85]. A rich source of iron[218]. Flower buds - raw or cooked[62, 100, 105, 116]. A pea-like flavour[85]. Can be dried and used as a relish[178]. The dried flower contains about 9.3% protein. 25% fat!?, 60% carbohydrate (rich in sugar), 0.9% ash. It is rich in vitamin A[179]. Tubers - raw or cooked[183]. A nutty flavour[62]. Young tubers are best, though the central portion of older tubers is also good[85].

**tcanta** Weaving The tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 90cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. The cultivar 'Kwanso Flore Pleno' has been especially mentioned[208].

**dwatta** Anodyne Anthelmintic Antidote Antiemetic Antispasmodic Blood purifier Cancer Depurative Diuretic Febrifuge Laxative Sedative Diuretic, febrifuge, laxative (mild)[62, 178, 205]. The flowers are anodyne, antiemetic, antispasmodic, depurative, febrifuge and sedative[218]. In China they are used as an anodyne for women in childbirth[240]. An extract of the flowers is used as a blood purifier[240]. The rhizome has shown antimicrobial activity, it is also tuberculostatic and has an action against the parasitic worms that cause filariasis[279]. It is used in Korea to treat opilation, jaundice, constipation and pneumonia[279]. The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205, 218].

**nrakta** Of uncertain origin. A garden escape in Britain. **ksacta** Common and widespread in the wild[205], probably as an escape from cultivation.

**propta** Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta** Landscape Uses: Border, Erosion control, Ground cover, Massing. Succeeds in most soils[1], including dry ones, though it prefers a rich moist soil[111] and a sunny position but tolerating partial shade[88, 111]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -20°C[187]. Plants take a year or two to become established after being moved[200]. The roots have spindle-shaped swellings and spread freely, the plant can become invasive[205]. A very ornamental plant[1], it is cultivated in China and Japan for its edible flowers and leaves, there are many named varieties[200]. Individual flowers are short-lived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a

period of about 6 weeks[205]. The sterile cultivar 'Kwanso' has double flowers, it has been especially mentioned for these flowers which are said to be crunchy with a nutty aftertaste[137]. 'Flore Pleno' is another form with double-flowers that have a delicious taste[K]. The sterile cultivar 'Europa' is very vigorous, with long stolons, and each piece of root is capable of growing into a new plant[205]. This cultivar, which is the form usually supplied from nurseries, succeeds in lawns and has even been known to grow through tarmac[205]. Hybridizes freely with other members of this genus[200]. Many forms of this plant are sterile triploids, probably of garden origin, and do not set seed[205]. The pollen, however, is fertile and can be used to fertilize other plants[205]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Special Features: Naturalizing, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

### 3.2.4 Camassia quamash

Quamash, Small camas, Utah small camas, Walpole's small camas

3 tlin 7 cyuc 5 kcac 3 tcant 1 dwat 0.3 m hkuc hmimhtuc cytuli tcup hwicli hrasljutnykifrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

**drutta** Camassia quamash is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**kcakta** Edible Parts: Root Edible Uses: Bulb - raw or cooked[62, 95]. The bulb, which can be up to 5cm in diameter[270], has a mild, starchy flavour when eaten raw, but a gummy texture that reduces the enjoyment of it somewhat[K]. When cooked, however, it develops a delicious sweet flavour somewhat like sweet chestnuts[92], and is a highly nutritious food[2]. Excellent when slow baked, it can also be dried and made into a powder which can be used as a thickener in stews or mixed with cereal flours when making bread, cakes etc[K]. The bulbs can be boiled down to make a molasses, this was used on festival occasions by various Indian tribes[2, 183]. The bulbs can be harvested at any time of the year[85], but are probably best in early summer when the seeds are ripe[94]. One report says that the bulbs contain inulin (a starch that cannot be digested by humans) but that this breaks down when the bulb is cooked slowly to form the sugar fructose which is sweet and easily digested[256]. Quamash bulbs were a staple food of the N. American Indians[42, 92]. The tribes would move to the Quamash fields in the early autumn and, whilst some people harvested the bulbs, others would dig a pit, line it with boulders then fill it with wood and set fire to it. The fire would heat the boulders and the harvested bulbs would then be placed in the pit and the whole thing covered with earth and the bulbs left to cook slowly for 2 days. The pit would then be opened and the Indians would feast on the bulbs until they could no longer fit any more in their stomachs. Whatever was left would be dried and stored for winter use.



tcanta Notable Products: Nectar, pollen, edible bulb. Attracts Wildlife - flowers attract beneficial insects. Grown as an ornamental plant.

dwatta Birthing aid OxytoxicA decoction of the roots has been used to induce labour[257]. An infusion of the leaves has been used to treat vaginal bleeding after birth and to help expel the placenta[257].

nrakta Western N. America - Washington to California, east to Montana and Utah. ksacta Coastal mountain forests and wet meadows inland[60, 62]. Marshy meadows in coniferous forest, to 2300 metres[90].

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

nwatta Succeeds in almost any soil[42]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Prefers full sun but tolerates partial shade[138, 200]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°C[214]. Quamash is a very pretty flowering bulb that has quite a large potential as an edible ornamental plant[K]. It grows very well in the flower border but can also be naturalised in damp grass[134]. We are intending to grow it in a grassed-down orchard in our Cornish trial ground. The bulbs flower in late spring and early summer and have completely died down by early July so they do not interfere with harvesting the apple crop. The grass in the orchard will be cut in early spring before the quamash comes into growth, but will not be cut again until July. The bulbs will be harvested at any time from July to December and, since it is impossible to find all the bulbs, it is hoped that those remaining will be able to increase and supply bulbs for future years[K]. A polymorphic and very ornamental plant[1], there are some named varieties[200]. The subspecies *C. quamash maxima* has larger bulbs than the type, up to 65mm in diameter[270]. A good bee plant[108]. This species can be confused with certain poisonous bulbs in the genus *Zigadenus*[85]. Plant the bulbs 7 - 10cm deep in early autumn and then leave undisturbed[1]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a bulb.

### 3.2.5 *Pyrus ussuriensis*

Harbin Pear, Chinese pear, Ussurian Pear  
3 tlin 7 cyuc 4 kcak 2 can 0 dwat 15 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta *Pyrus ussuriensis* is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[183]. Size and quality varies tremendously from tree to tree. Good forms have somewhat dry but pleasantly flavoured fruits up to 4cm in diameter, other forms are less pleasant and often smaller[K].

tcanta Rootstock WoodUsed as a rootstock[183] for *P. pyrifolia* culta in Korea[151], it is very frost resistant[74].

nrakta E. Asia - N.E. China, Korea. ksacta Forests and river valleys in lower mountain zones[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. A very frost resistant tree[74], tolerating temperatures down to below -15°C[200], it is a possible rootstock for northern areas[74]. It is used as a rootstock for *P. pyrifolia* culta in Korea. This species is a parent of the cultivated Asian pears[200]. Special Features: Not North American native, Blooms are very showy.

### 3.2.6 *Malus prunifolia*

Chinese Apple, Plumleaf crab apple  
3 tlin 7 cyuc 4 kcak 0 tcan 0 dwat 8 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta *Malus prunifolia* is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[183]. A bitter flavour[K]. Fruits we have tasted have been astringent rather than bitter, though some cultivars and forms are not at all bitter. A fruit of the species, tasted at Kew in October 1991, had a sweet pleasant taste, was mealy and of low acidity[K]. The fruit can be used fresh or in preserves etc. The fruit is about 20mm in diameter[200], though some forms are considerably larger[K].

tcanta Rootstock This species is an excellent stock for grafting apple trees[266].

nrakta E. Asia - northern China. ksacta Slopes and plains from sea level to 1300 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large

to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

**mwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Highly resistant to frost and drought, this species is being used to a limited extent in breeding programmes for cultivated apples[183]. The cultivar 'Hyslop' has edible fruits 4cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.7 *Malus pumila*

Paradise Apple, Common Apple, Apple Tree

3 tlin 9 cyuc 4 ckak 3 tcan 2 dwat 7 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

**drutta** *Malus pumila* is a deciduous Tree growing to 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

**kcakta** Edible Parts: Fruit Edible Uses: Fruit - raw, cooked in pies, cakes etc or fermented into cider[183]. The taste can be sweet and pleasant. The fruit can be up to 6cm in diameter[200].

**tcanta** Dye Rootstock Wood Used as a rootstock for the cultivated apples, there are several named varieties[50]. A yellow dye is obtained from the bark[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses: Container, Espalier, Specimen.

**dwatta** Anthelmintic Antibacterial Bach Hypnotic Refrigerant The bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[240]. The fruit is said to dispel gas, dissolve mucous, cure flux and be a tonic for anaemia, bilious disorders and colic[218]. The leaves contain up to 2.4% of an antibacterial substance called 'phloretin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'The cleansing remedy', 'Despondency' and 'Despair'[209].

**nrakta** Europe, including Britain, from Scandinavia south and east to Spain, Greece and S.W. Asia. ksacta Not known in a truly wild situation[74].

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

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

**nwatta** An overstory and understory tree (can grow and fruit in some shade). An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. A parent of the cultivated apple[200], it is occasionally cultivated for its edible fruit and also as a dwarfing rootstock[50]. There are some named forms[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, Not North American native, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

### 3.2.8 *Sambucus nigra* spp canadensis

American Elder

3 tlin 9 cyuc 4 ckak 3 tcan 3 dwat 4 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

**drutta** *Sambucus nigra* spp canadensis is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**pcista** The leaves and stems of this species are poisonous[9, 76]. The fruit has been known to cause stomach upsets to some people[65, 76]. The unripe fruit contains a toxic alkaloid and cyanogenic glycosides[274]. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

**kcakta** Edible Parts: Flowers Fruit Shoots Edible Uses: Drink Tea Fruit - raw or cooked[2, 3, 55, 85, 257]. A bitter-sweet flavour, the fruits are about 5mm in diameter and are borne in large clusters[200, 227]. They are at their best after being dried[62], the fresh raw fruit has a rather rank taste[101]. The fruit is normally cooked and used in pies, jams, jellies, sauces, bread etc[62, 159, 183]. Rich in vitamin C[183]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked. They are often covered in batter and made into fritters[105]. The flowers can be picked when unopened, pickled and then used as a flavouring in candies etc[149, 227]. They can also be soaked in water to make a drink[149]. A pleasant tasting tea is made from the dried flowers[21, 159, 183, 257]. Young shoots are said to be edible when cooked and to be used as an asparagus substitute[55, 105] though, since the leaves are also said to be poisonous, this report should be viewed with some doubt.

**tcanta** Compost Dye Hedge Insecticide Musical Pipes Plant breeding Repellent Agroforestry Uses: When grown near a compost heap, the root activity of this plant encourages fermentation in the compost heap[18]. Other Uses: The leaves and inner bark of young shoots are used as an insect repellent[6, 101, 149, 159, 257], the dried flowering shoots are said to repel insects and rodents[101]. A decoction of the leaves can be used as an insecticide[201]. It is prepared by boiling 3 - 4 handfuls of leaves in a litre of water, then straining and allowing to cool before applying. Effective against many insects, it also treats various fungal infections such as leaf rot and powdery mildew[201]. A black dye is obtained from the bark[149]. When grown near a compost

heap, the root activity of this plant encourages fermentation in the compost heap[18]. The stems can be easily hollowed out to be used as drains in tapping the sap from trees such as the Sugar Maples (*Acer spp.*). The stems can also be used as whistles and flutes[149, 159].

**dwatta** Antidiarrhoeal Antiseptic Cholera Diaphoretic Diuretic Emetic Febrifuge Kidney Laxative Poulitice Purgative Skin Stimulant Vitamin C American elder was widely employed as a medicinal herb by many native North American tribes who used it to treat a wide range of complaints[257]. It is still commonly used as a domestic remedy. A tea made from the inner bark and root bark is diuretic, emetic and a strong laxative[222, 257]. A tea made from the root bark is used to promote labour in childbirth and in treating headaches, kidney problems and mucous congestion[21, 257]. The inner bark is also applied as a poultice to cuts, sore or swollen limbs etc in order to relieve pain and swelling[222, 257]. A poultice of the leaves is applied to bruises and to cuts in order to stop the bleeding[222]. An infusion of the leaf buds is strongly purgative[21]. Elder flowers are stimulant, diaphoretic and diuretic[213, 257]. A warm tea of the flowers is stimulant and induces sweating, taken cold it is diuretic[21]. It is used in the treatment of fevers and infant colic[257]. An infusion of the leaves and flowers is used as an antiseptic wash for skin problems, wounds etc[21]. The fresh juice of the fruit, evaporated into a syrup, is laxative. It also makes a good ointment for treating burns when mixed with an oily base[21]. The dried fruit can be made into a tea that is useful in the treatment of cholera and diarrhoea[21]. Some caution should be exercised if using any part of the plant fresh since it can cause poisoning[21].

**nrakta** Eastern N. America - Nova Scotia to Florida, west to Manitoba and Texas. ksacta Rich moist soils along streams and rivers, woodland margins and waste ground[229].

**propta** Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

**nwatta** Agroforestry Services: Contour hedgerow Industrial Crop: Dye Industrial Crop: Medicinal Management: Standard Regional Crop/Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A very hardy plant, when dormant it tolerates temperatures down to about -34°C[200]. The flowers have a muscatel smell[245]. A fast-growing but short-lived plant[229], it often forms thickets by means of root suckers[200]. It is occasionally cultivated for its edible fruit, there are several named varieties[183], though these have mainly been developed for their ornamental value[182]. Yields of up to 7kg of fruit per tree have been recorded[160]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is sucker-

ing with new plants from underground runners away from the plant [1-2].

### 3.2.9 *Rheum x cultorum*

**Rhubarb**

3 tin 7 cyuc 4 kcak 2 tcan 3 dwat 1.5 m hkuc hmimhut cyuti tcup hwicli jlitnyikfriip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

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

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

### 3.2.10 *Camassia leichtlinii*

Wild Hyacinth, Large camas, Suksdorf's large camas  
3 tlin 7 cyuc 4 kcaak 0 tcan 0 dwat 1 m hkuc  
hnmihmtut cyutli tcup hwicli hrasj|lutnykifrip hpa7tli flatprikliw  
is hpa7tmwatli xre7t hjonli

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

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

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

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

nwatta A very easily grown plant, it succeeds in almost any soil[42] and is tolerant of considerable neglect once it is established[K]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Prefers full sun but tolerates partial shade[138, 200]. A very ornamental plant[1], there are many named varieties[200]. Plants often self-sow[K]. A good bee plant[108]. Plants can be naturalized in damp grass, this should not be trimmed until mid to late summer when the bulbs have flowered and the leaves have died down[134]. This species can be confused with certain poisonous bulbs in the genus *Zigadenus*[85]. Plant the bulbs 7 - 10cm deep in early autumn and then leave undisturbed[1]. The bulbs should be planted about 20cm deep[233]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a bulb.

### 3.2.11 *Brassica oleracea botrytis*

Cauliflower  
3 tlin 10 cyuc 4 kcaak 3 tcan 0 dwat 0.8 m hkuc  
hnmihmtut cyutli tcup hwicli hrasj|lutnykifrip hpa7tli flatprikliw  
is hpa7tmwatli fyfixre7t hjonli

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

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

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

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

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

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

### 3.2.12 *Mentha x piperita vulgaris*

Black Peppermint

3 tlin 7 cyuc 4 kcak 3 tcan 5 dwat 0.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlnutykfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Mentha x piperita vulgaris* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so should not be used by pregnant women.

kcakta Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked. A strong peppermint flavour, they are used as a flavouring in salads or cooked foods[2, 27, 105]. This plant should not be used by pregnant women, see the notes above on toxicity. An essential oil from the leaves and flowers is used as a flavouring in sweets, chewing gum, ice cream etc[183]. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent Strewing An essential oil is obtained from the whole plant. It is used medicinally and as a food flavouring[2, 46, 57]. It is also an ingredient of oral hygiene preparations, toiletries etc[238]. Peppermint leaves are used as an ingredient of pot-pourri[238]. They were formerly used as a strewing herb[14]. The plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. Dynamic accumulator.

dwatta Abortifacient Anodyne Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Refrig-

erant Stomachic Tonic Vasodilator Black peppermint is a very important and commonly used herbal remedy, being employed by allopathic doctors as well as herbalists[9]. It is also widely used as a domestic remedy. This cultivar is considered to be stronger acting than white peppermint (*Mentha x piperita officinalis*). A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders (especially flatulence) and various minor ailments[222, 238]. The herb is abortifacient, anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic and vasodilator[4, 9, 21, 165, 238]. An infusion is used in the treatment of irritable bowel syndrome, digestive problems, spastic colon etc[254]. Externally a lotion is applied to the skin to relieve pain and reduce sensitivity[254]. The leaves and stems can be used fresh or dried, they are harvested for drying in August as the flowers start to open[4]. The essential oil in the leaves is antiseptic and strongly antibacterial, though it is toxic in large doses[222, 254]. When diluted it can be used as an inhalant and chest rub for respiratory infections[254]. The essential oil is used in aromatherapy. Its keyword is 'Cooling'[210].

nrakta Britain. ksakta A natural hybrid, *M. aquatica x M. spicata*, found in moist soils in ditches, waste places etc[9].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but plants also succeed in partial shade. Prefers a slightly acid soil[16]. A commonly grown herb[4], it is often cultivated commercially for its essential oil[61]. This is the black form of peppermint and it is said to produce a superior essential oil, making it the preferred choice as a food flavouring and for medicinal purposes. The oil is of better quality when the plant is grown on dry soils[115]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 3.2.13 *Mentha spicata*

Spearmint

3 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 0.6 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlnutykfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

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

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

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

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant, the yield is about 4K of oil from 1 tonne of leaves[46, 57]. The oil is used commercially as a food flavouring and oral hygiene preparation[238]. The plant repels insects and was formerly used as a strewing herb[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiemetic Antiseptic Antispasmodic Cancer Carminative Diuretic Poultice Restorative Stimulant StomachicSpearmint is a commonly used domestic herbal remedy. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The herb is antiemetic, antispasmodic, carminative, diuretic, restorative, stimulant and stomachic[4, 21, 46, 218]. The leaves should be harvested when the plant is just coming into flower, and can be dried for later use[4]. The stems are macerated and used as a poultice on bruises[218]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222]. Both the essential oil and the stems are used in folk remedies for cancer[218]. A poultice prepared from the leaves is said to remedy tumours[218].

nrakta C. Europe. Naturalized in Britain. ksacta Roadsides and waste places, usually in damp soils and sunny positions[4, 16, 17, 37].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade[4]. Prefers partial shade and a slightly acid soil[4, 16]. Often grown as a culinary herb in the herb garden, spearmint is also commercially cultivated for its essential oil, the yields are about 3.5 to 4.5 kilos per tonne of leaves. There are some named varieties[200, 238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a strong spearmint smell. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates

that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. Can be grown in containers.

### 3.2.14 Acer saccharinum

Silver Maple, River Maple, Soft Maple

3 tin 9 cyuc 3 kcaak 4 tcant 1 dwat 30 m hkuc hmimhtu cyutli tcup hwicli hrasjutnykifrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Acer saccharinum is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from February to March, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains sugar and can be used as a drink or be concentrated into a syrup by boiling off the water[4, 61, 82, 159]. The syrup is used as a sweetener on many foods. The yield is only half that of A. saccharum[2]. It is said to be sweeter and whiter than A. saccharum[183]. The sap can be harvested in the late winter, the flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[177, 213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. Good crops are produced nearly every year in the wild[229]. The seed is about 12mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161, 177, 257]. The related Oregon Maple (Acer macrophyllum) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species. Carbon farming - Staple Crop: sugar.

tcanta Companion Dye Fodder Preservative Rust Shelterbelt WoodThe leaves are packed around apples, root crops etc to help preserve them[18, 20]. A fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. The branches are rather brittle, however, and can break off even in minor storms[226]. The stems are used in making baskets[257]. The boiled inner bark yields a brown dye[106]. Mixed with lead sulphate this produces a blue/black dye which can also be used as an ink[106]. A black dye is obtained from the twigs and bark[257]. The bark can be boiled, along with hemlock (Tsuga spp) and swamp oak bark (Quercus bicolor) to make a wash to remove rust from iron and steel, and to prevent further rusting[257]. Wood - rather brittle, close-grained, hard, strong, easily worked but not durable. It weighs 32lb per cubic metre. It has many uses such as veneer, cooperage, furniture, flooring and pulp[11, 46, 82, 227, 235]. Carbon Farming - Industrial Crop: biomass. Agroforestry Services: crop shade. Fodder: bank. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Astringent Dysentery Ophthalmic Skin VDAAn infusion of the bark is used in the treatment of coughs, cramps and dysentery[257]. The infusion is also applied externally to old, stubborn running sores[257]. A compound infusion is used in the treatment of 'female complaints'[257]. The inner bark is boiled and used with water as a wash for sore eyes[257]. An infusion is used internally in the treatment of diarrhoea[257]. An infusion of the root bark has been used in the treatment of gonorrhoea[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Oklahoma, Kansas and Nebraska. ksacta Banks of

invers, usually in sandy soils[24, 82]. Trees are occasionally found in deep often submerged swamps[82].

propta Seed - best sown as soon as it is ripe in the spring in a cold frame. It usually germinates immediately and by the end of summer has formed a small tree with several pairs of leaves[82]. Stored seed quickly loses its viability. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Agroforestry Services: Crop shade Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Staple Crop: SugarLandscape Uses:Erosion control, Firewood, Aggressive surface roots possible, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil[1, 11] but does well in much wetter soils than most member of the genus. Succeeds in most soils including chalk[98]. Another report says that this species is liable to become chlorotic as a result of iron deficiency when it is grown on alkaline soils. Grows well in heavy clay soils. Prefers a moderately sunny position[11, 200]. Tolerates atmospheric pollution[200]. Fairly wind-tolerant[200]. The wood is brittle and branches are liable to break off the tree in high winds[11, 200]. Trees can tolerate short periods of flooding, but are very susceptible to fire[229]. A very ornamental[1] and fast growing tree[11, 98], but it is short-lived[227], seldom surviving longer than 125 - 140 years[229]. The tree has invasive roots and these often interfere with sewer pipes and drainage tiles around houses[226]. The silver maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. Special Features:Attracts birds, North American native, Naturalizing. Carbon farming - Cultivation: experimental. Management: standard, coppice. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

### 3.2.15 *Quercus rubra*

Red Oak, Northern red oak

3 tlin 7 cyuc 3 kcaak 3 tcan 2 dwat 25 m hkc  
hmimhtut cyutli kyuctcup hwicli jltunykifrip hpa7tli flatpriklwis hpa7tmwatali hjonli

drutta *Quercus rubra* is a deciduous Tree growing to 25 m (82ft) by 18 m (59ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaкта Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[161, 177, 257]. A staple food for several native North American Indian tribes[257]. Up to 3cm long[200]. It can be

dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[183]. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

taanta Dye Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Tannin is obtained from the bark[82, 171]. A reddish-brown dye can be obtained from the bark[257]. Wood - coarse-grained, hard, strong, heavy, not durable[46, 82, 171, 226]. It weighs 41lb per cubic foot[235]. An important lumber source in America, it is highly valued for flooring, furniture, veneer, construction etc[46, 82, 171, 226].

dwatta Antidiarrhoeal Antiseptic Antiviral Astringent Cancer Dysentery Emetic Febrifuge Salve TonicThe bark and inner bark is antiseptic, astringent, emetic, febrifuge and tonic[257]. It is used in the treatment of diarrhoea, chronic dysentery, indigestion, asthma, severe coughs, hoarseness, intermittent fevers, bleeding etc[222, 257]. Externally, it is used as a wash for skin eruptions, rashes, burns etc[222, 257]. The bark can be chewed as a treatment for mouth sores[257]. The bark contains tannins, experimentally these have been shown to be antiviral, antiseptic, anticancer and also carcinogenic[222]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nraкта Eastern N. America - Nova Scotia to Georgia, west to Oklahoma and Minnesota. ksacta Dry or upland woods[43]. Found in a variety of soils, it grows best in those that are deep and fine textured, and the largest trees are found in protected ravines or on sheltered slopes[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers a hotter summer than is usually experienced in Britain[200], but trees still grow well in Britain[11, 200]. A fairly fast-growing tree[188], it is cultivated for its timber in C. Europe. Trees normally require 20 - 25 years to reach flowering size, and may take another 20 years before heavy crops of seed are produced[229]. Seed production is cyclic, heavy crops being produced every 2 - 5 years in the wild[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Trees are able to regenerate from root suckers if the top is killed by a forest fire[226]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

### 3.2.16 *Betula lenta*

Cherry Birch, Sweet birch, Black Birch, Cherry Birch  
3 tlin 7 cyuc 3 kcaak 4 tcan 3 dwat 24 m hkc

hruktu cyutli tcup hwicli hrasjlutnykfrif hpa7tli fruslat-prikkwis hpa7tmwatli hjonli

drutta Betula lenta is a deciduous Tree growing to 24 m (78ft 9in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The essential oil obtained from the bark contains 97 - 99% methyl salicylate. This is very toxic when taken orally, and it can also be absorbed through the skin, resulting in human fatalities. As little as 4, 700 mg can be fatal in children[269]. The aromatic and aliphatic hydrocarbons in birch tar are irritating to the skin. Do not use in patients with oedema or with poor kidney or heart functions [301]

ckakta Edible Parts: Inner bark SapEdible Uses: Condiment SweetenerTealInner bark - cooked or dried and ground into a powder[4, 62, 102]. Sweet and spicy[177]. The dried inner bark can be used as a thickener in soups etc or can be added to flour when making bread etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap - raw or cooked[2, 46, 102]. A sweet flavour[61, 177]. It is harvested in early spring, before the leaves unfurl, by tapping the trunk. The flow is best on sunny days following a heavy frost. A delicious drink, it can also be concentrated into a syrup or sugar[183]. The sap can be fermented to make birch beer or vinegar[183]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scum'm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. The dried leaves and bark from the larger roots are a delightful tea substitute[177, 183]. A wholesome, agreeable tea is made from the essential oil contained in the inner bark and twigs[21, 55, 62]. This essential oil is also used as a winter-green flavouring in foods[183].

tcanta Essential Fuel Tannin WoodAn essential oil is obtained from the bark and twigs, it is distilled in quantity and is an item of commerce[235]. It can be used medicinally, as a food flavouring, as an ingredient in cosmetic shampoos and also to make a wholesome tea[11, 21, 46, 171, 269]. The oil, when decolorized, is similar to 'Oil of Wintergreen' (obtained from Gaultheria procumbens) and is considered to be of superior quality[245]. The tree is coppiced every 5 years and all parts are distilled for the oil[245]. The tree grows up to 3 metres tall in this 5 year period[245]. The greatest yield of oil is obtained if the tree is harvested in the summer[245]. The oil distilled from the wood is insect repellent[269]. The bark contains up to 16% tannin[223]. The thin outer bark is waterproof and has been used as the outer cladding on dwellings, canoes etc[257]. It has also been used to make baskets, dishes, buckets etc[257]. Wood - very strong, close grained, hard, heavy. The wood is richly marked[4], it weighs 40lb per cubic foot and is exploited commercially for making floors, furniture, tools etc[11, 46, 61, 82, 171, 229]. It makes an excellent fuel[11, 46, 61, 229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic Anthelmintic Antiinflammatory Antiseborrheic Astringent Diaphoretic Diuretic Dysentery Rubefacient Stimulant UrinaryThe bark is anthelmintic, astringent, diaphoretic, diuretic and stimulant[4, 21]. A tea made from the bark is used in the treatment of fevers, stomach aches and lung ailments[222, 257], it is said to be an excellent tonic in cases of dysentery and to be useful in the treatment of gravel and female obstructions[4]. An essential oil distilled from the bark is anti-inflammatory, analgesic and rubefacient[222]. It is used in the treatment of rheumatism, bladder infections, neuralgia etc[222]. The oil, called 'oil of wintergreen', used to be produced commercially, but it is now manufactured synthetically[222]. A tea made from the twigs

is used in the treatment of fevers[222]. The leaves can be chewed or used in an infusion in the treatment of dysentery[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Eastern N. America - Quebec to Georgia, west to Alberta and Ohio. ksacta Rich woodlands, preferring north-facing slopes and moist soils[43, 62]. It is also found on rocky soils[229].

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

nwatta Landscape Uses:Specimen, Woodland garden. An easily grown plant, it succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Cherry birch is said to tolerate an annual precipitation of ca 60 to 150cm, an average annual temperature range of 5 to 12°C, and a pH of 4.5 to 7.5[269]. Hybridizes freely with other members of this genus[50]. The bruised foliage has a strong smell of wintergreen[200]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees can be coppiced on a cycle of 5 years or more[245]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

### 3.2.17 Acer negundo

Box Elder

3 tlin 8 cyuc 3 ckac 3 tcant 1 dwat 21 m hkucl hmimhtut cyutli tcup hwicli hrasjlutnykfrif hpa7tli flatprikkwis hpa7tmwatli nyanhjen hjonli

drutta Acer negundo is a deciduous Tree growing to 21 m (69ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to May, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ckakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains a reasonable quantity of sugar and can be used as a refreshing drink or be concentrated into a syrup[11, 46, 61, 82, 159]. The syrup is used



a sweetener on many foods. The sugar content is inferior to *A. saccharum* according to one report[149] whilst another says that it is highly valued as a producer of sweet sap[183]. The sugar from the sap of this tree is said to be whiter than that from other maples[183]. To obtain the sap, bore a hole on the sunny side of the trunk into the sapwood about 1 metre above the ground at anytime from about January 1st until the leaves appear[85]. The flow is best on a warm day after a frost[213]. The best sap production comes from cold-winter areas with continental climates. Inner bark - raw or cooked. It can be dried, ground into a powder and then used as a thickener in soups etc or be added to cereal flours when making bread, cakes etc[257]. The inner bark can also be boiled until the sugar crystallizes out of it[257]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seed is up to 12mm long and is produced in small clusters[82].

**caanta Musical Preservative Shelterbelt Wood**The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fairly wind-tolerant tree, it can be used in mixed plantings as a part of shelterbelt plantings[200]. Wood - soft, weak, light, close grained. It weighs 27lb per cubic foot[235]. Of little commercial value, it is used for boxes, cheap furniture, pulp, fuel etc[46, 61, 82, 149, 229]. Large trunk burls or knots have been used to make drums[257].

**dwatta Emetica** Tea made from the inner bark is used as an emetic[222, 257].

**nrakta N. America - Nova Scotia to Florida, west to California and Manitoba.** ksacta Found in a variety of soil types, growing best in lowland sites along rivers, streams, ponds or seasonally flooded flats[229].

**propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring.** Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. The cuttings of this species usually root easily. Budding onto *A. negundo* in early summer usually works well. The bud should develop a small shoot in the summer otherwise it is unlikely to survive the winter.

**nwatta** Of easy cultivation, succeeding in most soils[202] but preferring a rich moist well-drained soil and a sunny position[11]. Grows well in heavy clay soils and in sandy soils[188]. Plants often become chlorotic on very alkaline soils[202]. Plants are hardy to about -18°C[202]. A fast growing but short-lived tree in the wild, living for 75 - 100 years[149, 229]. It is fairly wind-tolerant[200], but the branches have a tendency to break in strong winds[226]. This species is cultivated commercially in Illinois for its sap[183]. Another report says that this is one of the least productive species for sugar[226]. A very ornamental plant[1], there are several named varieties[200]. This tree is a bad companion plant that is said to inhibit the growth of neighbouring plants[18, 20]. This species is notably resistant to honey fungus[88, 200]. Very tolerant of pruning, it can regenerate from old wood if it is cut back hard[202]. Dioecious. Male and female plants must be grown if seed is required.

### 3.2.18 *Quercus alba*

White Oak, Hybrid oak

3 tlin 9 cyuc 3 kcaak 4 tcan 2 dwat 20 m hkuc

hmmihtut cyutli kyuctup hwicli jltunyikfrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

**dwatta** *Quercus alba* is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a slow rate. See above for USDA har-

diness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

**kaakta Edible Parts: Seed**Edible Uses: CoffeeSeed - raw or cooked[226]. Somewhat sweet[229]. The seed is about 1 - 3cm long[200] and ripens in its first year[235]. It contains about 6% protein and 65% carbohydrates[213]. It is low in tannin and needs little if any leaching. It is said that those seeds with red or pink blotches on the shell are the sweetest[183]. Any bitter tannins can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The seed can be roasted and then eaten, its taste is something like a cross between sunflower seeds and popcorn[183]. The roasted seed is a coffee substitute that is free from caffeine[226].

**caanta Fuel Repellent Tannin Wood**Agroforestry Uses: White oak is potentially valuable for use in reforestation projects, and appears to have potential for use on other types of disturbed sites. It has been planted on strip-mined lands in Ohio, Indiana, and Illinois, and has exhibited good growth and survival on cast overburden and graded topsoil overlying mine spoils. It is well adapted to loamy and clayey spoils with a pH of 5.5 to 8.0[1050 ] Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20 , K ]. The bark is a rich source of tannin[171 , 226 ]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4 ]. A brown dye is obtained from the bark or from the galls, it does not require a mordant[226 ]. Yellow, chrome and gold can also be obtained if mordants are used[226 ]. The wood is strong, very heavy, hard, tough, strong, close grained, durable[46 , 82 , 171 , 213 , 227 ]. It weighs about 46lb per cubic foot[227 ].When properly dried treated, the wood glues well, machines very well and accepts a variety of finishes One of the most important timbers in N. America, it is used for cabinet making, furniture, panelling, flooring, construction, mine props, agricultural tools etc[46 , 82 , 171 , 213 , 1050 ]. It is highly valued for making the staves of barrels for storing wine and liquor[274 , 338 ]. The wood is a good fuel giving off a lot of heat[46, 1050 ]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

**dwatta Antiseptic Astringent Dysentery Tonic**White oak was often used medicinally by several native North American Indian tribes, who valued it especially for its antiseptic and astringent properties and used it in the treatment of many complaints[257]. It is little, if at all, used in modern herbalism. The inner bark contains 6 - 11% tannin, it has powerful antiseptic and astringent properties and is also expectorant and tonic[61, 102, 213, 257]. The bark is boiled and the liquid drunk in the treatment of bleeding piles and diarrhoea, intermittent fevers, coughs and colds, consumption, asthma, lost voice etc[213, 257]. The bark has been chewed as a treatment for mouth sores[257]. Externally, it is used as a wash for skin eruptions, burns, rashes, bruises, ulcers etc and as a vaginal douche[222, 257]. It has also been used as a wash for muscular pains[257]. The bark is best collected in the spring[213]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine to Florida, west to Texas and Minnesota. ksacta Dry woods[43], gravelly ridges, sandy plains, rich uplands and moist bottoms[82]. The best specimens are found in deep rich well-drained loamy soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. The white oak prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage over the winter[200]. There are, however, a number of trees 20 metres tall in Britain, mainly in the south-east of the country[11]. Sometimes cultivated for its edible seed, there are some named varieties[183]. Trees take about 30 years before they start to bear good crops of seed, they then have heavy crops about every 3 years with light crops in the other years[227]. They continue to yield commercial crops for about 120 years[227]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young, though they may require protection for the first winter or two[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

### 3.2.19 *Betula nigra*

River Birch, Black Birch, Red Birch, Water Birch, River Birch 3 tlin 9 cyuc 3 kcaok 0 tcan 2 dwat 20 m hkuc hmhimtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Betula nigra* is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in March, and the seeds ripen in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: SapEdible Uses: SweetenerSap - raw or cooked[2]. A sweet flavour[177]. Harvested in early spring, before the leaves unfurl. The trunk is tapped by drilling a hole about 6mm wide and about 4cm deep. The sap flows best on warm sunny days following a hard frost.

It makes a refreshing drink[55, 95] and can also be concentrated into a syrup or sugar[183]. The sap can be fermented to make birch beer or vinegar[183]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up. . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum." [269].

tcanta Besom Soil stabilization WoodYoung branches are used to make besoms, whisks etc[6]. This species has an extensive root system and is sometimes planted for erosion control along the banks of streams[227]. Wood - light, strong, close grained and hard, but it contains many knots because of the numerous branches along the trunk. It weighs 36lb per cubic foot. Of little use commercially, though it is sometimes used for furniture, turnery etc[46, 61, 82, 227, 229].

dwatta Antiseborrheic Diuretic Dysentery Salve Stomachic UrinaryA salve was made by boiling the buds until they were thick and pasty, sulphur was added and this was then applied externally to skin sores and ringworm[213]. The leaves have been chewed, or used as an infusion, in the treatment of dysentery[257]. An infusion of the bark has been used to treat stomach problems, 'milky' urine and difficult urination with discharge[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Eastern N. America - New Hampshire to Florida. ksacta Banks of streams, by swamps etc, in deep rich soil that is often inundated for weeks at a time[43].

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

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Woodland garden. Succeeds in a well-drained loamy soil in a sheltered position[11, 43, 200]. Grows well in heavy clay soils. Likes its roots within reach of water[11]. Dislikes wet soils according to another report[200]. Shade tolerant[200]. Hybridizes freely with other members of this genus[50]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms.

### 3.2.20 *Abies balsamea*

Balsam Fir

3 tlin 6 cyuc 3 kcaok 0 tcan 5 dwat 15 m hkuc pcmhimitut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Abies balsamea* is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade

woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant is not wind tolerant.

pcista The oleoresin (Canada balsam) is reported to produce dermatitis when applied as perfume[222, 269]. The foliage has also induced contact dermatitis[269].

kcakta Edible Parts: Inner barkEdible Uses: Condiment Gum Tealinner bark - cooked. It is usually dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 177]. Fir bark is a delight to chew in winter or early spring, slightly mucilaginous and sweetish, better raw than cooked[269]. Another report says that it is an emergency food and is only used when all else fails[183]. An aromatic resinous pitch is found in blisters in the bark[64]. When eaten raw it is delicious and chewy[101, 183]. Another report says that the balsam or pitch, in extreme emergency, forms a highly concentrated, though disagreeable, food[269]. An oleoresin from the pitch is used as a flavouring in sweets, baked goods, ice cream and drinks[183]. Tips of young shoots are used as a tea substitute[177, 183].

tcanta Adhesive Fibre Gum Kindling Microscope Repellent Resin Stuffing Waterproofing WoodThe balsamic resin 'Balm of Gilead'[11, 46] or 'Canada Balsam' according to other reports[64, 226, 238] is obtained during July and August from blisters in the bark or by cutting pockets in the wood[222]. Another report says that it is a turpentine[171]. The term Canada Balsam is a misnomer because balsams are supposed to contain benzoic and cinnamic acids, both absent from the Canada oleoresin[269]. Turpentine is also a misnomer, implying that the oleoresin is entirely steam volatile. Actually it contains 70 - 80% resin, only 16 - 20% volatile oil[269]. Canada Balsam yields 15 - 25% volatile oil, the resin being used for caulking and incense[269]. It is used medicinally and in dentistry, also in the manufacture of glues, candles and as a cement for microscopes and slides - it has a high refractive index resembling that of glass[11, 46, 64, 82, 222, 226, 238]. The pitch has also been used as a waterproofing material for the seams of canoes[257]. The average yield is about 8 - 10 oz per tree[171]. The resin is also a fixative in soaps and perfumery[171, 238]. "Turpentine" is usually collected during July-August by breaking the turpentine blisters into small metal cans with sharp-pointed lids. Trees are then allowed to recuperate for 1 - 2 years before being harvested again[269]. The leaves and young branches are used as a stuffing material for pillows etc - they impart a pleasant scent[46, 61, 257] and also repel moths[169]. The leaves contain an average of 0.65% essential oil, though it can go up to 1.4% or even higher[269]. One analysis of the essential oils reports 14.6% bornyl acetate, 36.1% b-pinene, 11.1% 3-carene, 11.1% limonene, 6.8% camphene, and 8.4% a-pinene[269]. To harvest the oil, it would appear that the branches should be snipped off younger trees in early spring[269]. Fifteen year old trees yield 70% more leaf oil than 110-year-old trees; oil yields are highest in January - March and September, they are lowest from April to August[269]. A thread can be made from the roots[257]. Wood - light, soft, coarse grained, not strong, not very durable. Weighs 24lb per cubic foot[235]. Used mainly for pulp, it is not used much for lumber except in the manufacture of crates etc[46, 82, 226, 229]. The wood is commercially valuable for timber even though it is relatively soft, weak, and perishable[269]. Balsam fir is used in the US for timber and plywood, and is the mainstay of the pulp wood industry in the Northeast. The wood, which is rich in pitch, burns well and can be used as a kindling[257]

dwatta Analgesic Antiscorbutic Antiseptic Diuretic Poulitice Stimulant Tonic VDThe resin obtained from the balsam fir (see 'Uses notes' below) has been used throughout the world and is a very effective antiseptic and healing agent. It is used as a healing and analgesic protective covering for burns, bruises, wounds and sores[213, 222, 226]. It is also used to treat sore nipples[213] and is said to be one of the best curatives for a sore throat[245]. The buds, resin, and/or sap are used in folk remedies for treating cancers, corns, and warts[269]. The resin is also antiscorbutic, diaphoretic, diuretic, stimulant and tonic[4, 171, 222]. It is used internally in propriety mixtures to treat coughs and diarrhoea, though taken in excess it is purgative[238]. A warm liquid of the gummy sap was drunk as a treatment for gonorrhoea[212]. A tea made from the leaves is antiscorbutic[4, 171]. It is used in the treatment of coughs, colds and fevers[222]. The leaves and young shoots are best harvested in the spring and dried

for later use[238]. This plant was widely used medicinally by various North American Indian tribes[257]. The resin was used as an antiseptic healing agent applied externally to wounds, sores, bites etc., it was used as an inhalant to treat headaches and was also taken internally to treat colds, sore throats and various other complaints[257].

nrakta North-eastern N. America - Newfoundland to Virginia, west to Alberta, Michigan and Ohio. ksacta Low swampy grounds where it is often the major component of forests[82]. Also found on well-drained hillsides[82].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. Stored seeds should be moist stratified 14 - 28 days at 1 - 5°C, though fresh seed may be sown in autumn without stratification, with target seedling densities in the nursery ca 450 - 500/m<sup>2</sup>, often mulched with sawdust. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Of slow initial growth, the stock is usually outplanted as 2- to 3-year-old seedlings or 3- to 4-year-old transplants Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80]. Trees often self-layer in the wild[226], so this might be a means of increasing named varieties in cultivation[K].

nwatta Landscape Uses:Christmas tree, Screen, Specimen. Prefers a good moist but not water-logged soil[1]. Grows well in heavy clay soils. Very shade tolerant, especially when young[81, 126], but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about 5[200], though the cultivar 'Hudsonia' is more tolerant of alkaline conditions[238]. Prefers growing on a north-facing slope[200]. A shallow-rooted plant, making it vulnerable to high winds[229]. Balsam fir is estimated to tolerate an annual precipitation of 60 to 150cm, an annual temperature range of 5 to 12°C, and a pH of 4.5 to 7.5[269]. The balsam fir is a fast-growing tree in its native environment[229], but it is fairly short-lived and slow growing in Britain, becoming ungainly after about 20 years[11, 64, 81]. It grows best in the Perthshire valleys of Scotland[11, 185]. New growth takes place from late May to the end of July[185]. Trees are very cold hardy but are often excited into premature growth in mild winters and this new growth is susceptible to damage by late frosts[11]. Female strobili may be wholly or partially aborted up to 6 to 8 weeks after bud burst by late spring frosts[269]. Pollen dispersal can be reduced by adverse weather[269]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Trees have a thin bark and are therefore susceptible to forest fires[229]. This species is closely related to A. fraseri[11]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cones break up on the tree and if seed is required it should be harvested before the cones break up in early autumn[80]. Whilst the typical species is too large for most gardens, there are some named slow-growing dwarf forms that can be grown[238]. Whilst these will not provide the resin, their leaves can be used medicinally[K]. The leaves are strongly aromatic of balsam when crushed[185]. The tree is sometimes grown and used as a 'Christmas tree'[226].

Special Features: North American native, There are no flowers or blooms.

### 3.2.21 *Quercus x bebbiana*

3 tlin 7 cyuc 3 kcak 0 tcant 2 dwat 15 m huc hmimhtut cyutli hgatkyuctcup hwicli jltunykfrip hpa7tli flat-prikwisi hpa7tmwatli hjonli

*drutta Quercus x bebbiana* is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Seed**Edible Uses:** CoffeeSeed - raw or cooked[183]. The large seeds are sweet and can be eaten out of hand[183]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

**tcanta Repellent Tannin Wood**A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, heavy, strong, tough, very durable, close grained.

**dwatta Astringent Dysentery**Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

**nrakta** A hybrid of garden origin. **ksacta** Not known in the wild.

**propta Seed** - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly. This species is a hybrid and may not breed true from seed[K].

**nwatta** Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Succeeds in a hot dry position. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A vigorous, fast-growing hybrid species, some forms are capable of reaching 1.5 metres tall in 2 years[183]. Established plants are drought resistant[229] and tolerant of atmospheric pollution[226]. This species is occasionally cultivated for its edible seed, there are some named varieties[183]. It is a hybrid of garden origin, *Q. alba* x *Q. macrocarpa*[183]. Both of its parents prefer warmer summers than are usually experienced in Britain, often growing poorly in this country and failing to properly ripen their wood, resulting in frost damage overwinter[11, 200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

### 3.2.22 *Betula alleghaniensis*

Yellow Birch, Swamp Birch

3 tin 7 cyuc 3 kcak 4 tcant 2 dwat 12 m hkuc  
hmmihtut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatti hjonli

*drutta Betula alleghaniensis* is a deciduous Tree growing to 12 m (39ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both

sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**kcakta Edible Parts:** Inner bark **SapEdible Uses:** Condiment Sweetener **Tealner** bark - cooked or dried and ground into a powder and used with cereals in making bread[62]. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap - raw or cooked. A sweet flavour[62, 102, 161, 177]. The sap is harvested in early spring, before the leaves unfurl, by tapping the trunk. It flows abundantly, but the sugar content is much lower than maple sap[226]. A pleasant drink, it can also be concentrated into a syrup or fermented into a beer[183, 226]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stir'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum." [269]. A tea is made from the twigs and leaves[62, 177]. The dried leaves are used according to another report[183]. An excellent flavour[226]. The twigs and leaves have the flavour of wintergreen and can be used as condiments[183].

**tcanta Containers Fuel Waterproofing Wood**The bark is waterproof and has been used by native peoples as the outer skin of canoes, as roofing material on dwellings and to make containers such as buckets, baskets and dishes[257]. Wood - close-grained, very strong, hard, heavy. The wood is too dense to float[226]. An important source of hardwood lumber, it is used for furniture, boxes, tubs of wheels, floors etc[46, 61, 82, 171, 229]. It is also often used as a fuel[46, 61]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

**dwatta Antiseborrheic Cathartic Emetic**Yellow birch is little used medicinally, though a decoction of the bark has been used by the native North American Indians as a blood purifier, acting to cleanse the body by its emetic and cathartic properties[257]. The bark is a source of 'Oil of Wintergreen'[226]. This does have medicinal properties, though it is mainly used as a flavouring in medicines[226].

**nrakta North-eastern N. America - Newfoundland to Virginia and Tennessee.** **ksacta** Usually found in moist well-drained soils in rich woodlands on lower slopes, it is also found in cool marshlands in the south of its range[62, 229].

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

**nwatta Landscape Uses:**Specimen, Woodland garden. Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. A slow-growing tree, it is relatively long-lived for a birch, with specimens 200 years old recorded[229]. Plants often grow taller than the 12 metres mentioned above[229]. The trees are highly susceptible to forest fires, even when wet the bark is highly inflammable[226]. The bruised foliage has a strong smell of wintergreen[200]. Hybridizes freely with other members of this genus[50]. Trees are notably susceptible to honey fungus[200]. **Special Features:** Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant

Heat Zones show when plants show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

### 3.2.23 *Malus tschonoskii*

Pillar apple, Crabapple

3 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 12 m hkuc  
hmmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus tschonoskii* is a deciduous Tree growing to 12 m (39ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177]. A gritty texture[1]. A reasonable size, about 2 - 3cm in diameter[200], but the fruit is not freely produced[11, 200]. A tree at Kew is fruiting well, producing fruits about 30mm in diameter and these fruits can hang on the tree all winter[K]. Even when harvested in February the fruits were quite firm, slightly juicy with a strong acid flavour rather like a lemon[K].

nrakta E. Asia - Japan. ksakta Woods in C. Japan[58, 109].

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

nwatta Landscape Uses: Border, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This tree is well suited to planting in public-access areas[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

### 3.2.24 *Malus prunifolia* rinki

Chinese Apple

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc  
hmmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus prunifolia* rinki is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[2, 105]. Bitter[200]. Not at all bitter, it makes quite pleasant eating[11]. Used fresh or in preserves etc[22, 46]. The fruit is about 3cm in diameter[200]. Young leaves - cooked[105, 177].

nrakta E. Asia - northern China. ksakta Not known in a truly wild state.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Cultivated for its edible fruit in China, there are many named varieties[11, 22]. This species is a famous fruit tree in N and NE China[266]. Many cultivars have been bred during its long cultivation, the fruit of which differ in shape, color, size, and ripening period[266]. It is also used in apple breeding programmes for its frost resistance[74]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.25 *Viburnum opulus*

Guelder Rose, Cramp Bark, European cranberrybush, American cranberrybush, Crampbark, European Highb

3 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 5 m hkuc  
hmmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flat-  
prikwlwisslip hpa7tmwatli fyfixre7t hjonli

drutta *Viburnum opulus* is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow

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

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

**kcakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 5, 46]. The fruit is up to 8.5mm in diameter but with a large seed[200]. A sour taste, it is best cooked. The crushed fruit has an unpleasant smell[4]. Used as a cranberry substitute in making, jellies, preserves etc[183]. Some caution is advised, see notes on toxicity at top of the page.

**tcanta** Dye Hedge Hedge Ink WoodA red dye is obtained from the fruit[13]. An ink can be made from the dried berries[4]. Plants can be grown as a tall hedge[29], they are rather bare in winter though[K]. The wood can be used to make skewers[4].

**dwatta** Antispasmodic Astringent Birthing aid Homeopathy SedativeGuelder rose is a powerful antispasmodic and is much used in the treatment of asthma, cramps and other conditions such as colic or painful menstruation[254]. It is also used as a sedative remedy for nervous conditions[254]. The bark is antispasmodic, astringent and sedative[4, 9, 46, 165, 213]. The bark contains 'scopoletin', a coumarin that has a sedative effect on the uterus[238]. A tea is used internally to relieve all types of spasms, including menstrual cramps, spasms after childbirth and threatened miscarriage[9, 222, 238]. It is also used in the treatment of nervous complaints and debility[4, 46, 165, 213]. The bark is harvested in the autumn before the leaves change colour, or in the spring before the leaf buds open. It is dried for later use[238]. The leaves and fruits are antiscorbutic, emetic and laxative[4, 222]. A homeopathic remedy is made from the fresh bark[9]. It is used in the treatment of menstrual pain and spasms after childbirth[9].

**nrakta** Europe, including Britain, from Scandinavia south and east to Spain, north and west Asia. ksacta Hedges, scrub and woodland, usually on damp soils[3, 13, 17].

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

**nwatta** Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[11]. It prefers a deep rich moist loamy soil in a sunny position[11]. Succeeds in semi-shade but does not grow or fruit so well in such a position[186]. Grows well in heavy clay soils and on chalk[184]. Does not do well on very acid soils. Best if given shade from the early morning sun in spring[200]. A very ornamental plant[1], it is hardy to about -30°C[184] and is often grown in the flower garden. There are many named varieties[184]. Guelder rose regenerates quickly if it is cut to the ground, it can also produce suckers and will often form thickets[186]. The plant is an alternative host for the broad bean aphid[11]. Special Features: Not North American native, Naturalizing, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The

root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

### 3.2.26 *Malus pumila paradisiaca*

Paradise Apple

3 tlin 7 cyuc 3 kcak 2 tcan 0 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjutnykifrip hpa7tli flatprik-  
wis hpa7tmwatl xre7t hjonli

**drutta** *Malus pumila paradisiaca* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

**kcakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 50]. The fruit can be up to 6cm in diameter[200].

**tcanta** RootstockCommonly used as a dwarfing rootstock for the cultivated apple, there are several named varieties[200]

**nrakta** Europe. ksacta Not known in the wild[50].

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

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Commonly cultivated as a rootstock for the cultivated apple, there are several named varieties[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.27 *Malus pumila nervosa*

Crab Apple

3 tlin 7 cyuc 3 kcak 2 tcan 0 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjutnykifrip hpa7tli flatprik-  
wis hpa7tmwatl xre7t hjonli

**drutta** *Malus pumila nervosa* is a deciduous Tree growing to 5 m (16ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**pcista** All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should

only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

**kaakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked. The fruit can be up to 6cm in diameter[200]. Very astringent and quite harsh[K].

**tcanta Rootstock** Can be used as a dwarfing rootstock for the cultivated apples.

**nrakta Britain?** ksacta Not known in the wild.

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

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Plants have been seen at Kew Gardens bearing huge crops of fruit[K]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.28 *Berberis georgii*

**Barberry**

3 tlin 7 cyuc 3 kcaak 1 tcan 2 dwat 3 m hkuc  
hmimhtut cyuti kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

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

**kaakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked[K]. A very acid lemon-like flavour, it is nice in small quantities raw. When cooked it can be used in pies, preserves etc[K]. A very good size for a barberry, the fruit is up to 10mm long and 4mm wide[K]. A refreshing lemon-like drink can be made from the fruit.

**tcanta Dye** A yellow dye is obtained from the roots, bark and stem.

**dwatta** Antibacterial Cancer Dysentery *Berberine*, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (*Liquorice*) because this nullifies the effects of the *berberine*[218]. *Berberine* has also shown antitumour activity[218].

**nrakta** A hybrid of uncertain parentage. ksacta Not known in a truly wild condition.

**propta Seed** - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it

can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

**nwatta** Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Plants are hardy to about -35°C. This species is a hybrid of unknown origin, probably involving *B. vulgaris*[11]. It is an exceptionally free-fruiting form[184] and is of interest in breeding programmes[K]. This species is probably an alternate host of black-stem rust of wheat. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

### 3.2.29 *Rosa canina*

**Dog Rose**

3 tlin 7 cyuc 3 kcaak 4 tcan 3 dwat 3 m hkuc  
hmimhtut cyuti tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

**drutta** *Rosa canina* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies), Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

**pcista** There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

**kaakta Edible Parts:** Flowers Fruit Seed **Edible Uses:** Coffee Tea **Fruit** - raw or cooked[2, 4, 13]. It can be used in making delicious jams, syrups etc[7]. The syrup is used as a nutritional supplement, especially for babies[238]. The fruit can also be dried and used as a tea[9, 12, 183]. Frost softens and sweetens the flesh[12]. The fruit is up to 30mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E[102], it can be ground and mixed with flour or added to other foods as a supplement. Be sure to remove the seed hairs[102]. The dried leaves are used as a tea substitute[46, 61, 183]. A coffee substitute according to another report[7]. Petals - raw or cooked[177]. The base of the petal may be bitter so is best removed[183]. Eaten as a vegetable in China[66]. The petals are also used to make an unusual scented jam[7].

**tcanta Hedge Hedge** Plants make a dense and stock-proof hedge, especially when trimmed[186].

**dwatta** Antirheumatic Astringent Bach Cancer Carminative Diuretic Laxative Ophthalmic Tonic Vermifuge Vitamin C The petals, hips and galls are astringent, carminative, diuretic, laxative, ophthalmic and tonic[7, 9, 14, 21, 165]. The hips are taken internally in the treatment of colds, influenza, minor infectious diseases, scurvy, diarrhoea and gastritis[238]. A syrup made from the hips is used as a pleasant flavouring in medicines and is added to cough mixtures[238]. A distilled water made from the plant is slightly astringent and is used as a lotion for delicate skins[7]. The seeds have been used as a vermifuge[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Resignation' and 'Apathy'[209]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of

canceler and also as a means of halting or reversing the growth of cancers[214]. Ascorbic acid in Dog Rose shells (vitamin C, 0.2 to 2.4%).

nrakta Europe, including Britain, from Norway south and east to N. Africa and southwest Asia. ksacta Hedges, scrub, woods, roadsides, banks etc[9].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11, 200]. Grows well in heavy clay soils. Prefers a circumneutral soil and a sunny position with its roots in the shade[11, 200]. When grown in deep shade it usually fails to flower and fruit[186]. Succeeds in wet soils but dislikes water-logged soils or very dry sites[186]. Tolerates maritime exposure[186]. The fruit attracts many species of birds, several gall wasps and other insects use the plant as a host[186] A very polymorphic species, it is divided into a great number of closely related species by some botanists[1, 17]. The leaves, when bruised, have a delicious fragrance[245]. The flowers are also fragrant. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.30 *Berberis vulgaris*

European Barberry, Common barberry

3 tlin 7 cyuc 3 kcaak 4 tcan 3 dwat 3 m hkuc  
hmmihmtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli  
flatprukliws hpa7tmwatli fyifxre7t hjonli

drutta *Berberis vulgaris* is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf from March to November, in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Bark in doses of 4 mg or more; stupor, nose-bleeds, vomiting, diarrhoea and kidney irritation. Contraindicated during pregnancy as abortion risk[301].

kcaakta Edible Parts: Fruit Leaves Edible Uses: Condiment Tea Fruit - raw or cooked[2, 3, 5, 7, 9, 11, 95, 183]. Rich in vitamin C[268], the fruit has a very acid flavour and is mainly used in preserves[100], though children and some adults seem to like it raw when it is fully ripe[K]. A refreshing

lemon-like drink can be made from the fruit[183]. The fruits are about 10mm long[200]. Young leaves - used as a flavouring or as an acid nibble[177, 183]. They can be used in much the same way as sorrel (*Rumex acetosa*)[9]. The dried young leaves and shoot tips make a refreshing tea[9, 183].

tcanta Beads Dye Fuel Hedge Hedge Wood Plants can be grown as a medium-size hedge in exposed positions but they cannot tolerate extreme maritime exposure[75]. They are very tolerant of trimming but can also be left untrimmed if required[K]. A good quality yellow dye is obtained from the roots, bark and stem[4, 13, 46, 100, 244]. As well as being used on cloth, it is also used to stain wood[244]. The unripe fruit is dried and used as beads[106]. Wood - soft, very hard, fine grained, yellow. Used for carving, toothpicks, mosaics etc[13, 46, 61]. It is also used as a fuel[146].

dwatta Antibacterial Antidiarrhoeal Antipruritic Antirheumatic Antiseptic Antispasmodic Appetizer Astringent Cancer Chologogue Diaphoretic Diuretic Dysentery Expectorant Hepatic Homeopath Laxative Malaria Ophthalmic Purgative Refrigerant Stomachic TB Tonic Vitamin C Barberries have long been used as a herbal remedy for the treatment of a variety of complaints. All parts of the plant can be used though the yellow root bark is the most concentrated source of active ingredients. The plant is mainly used nowadays as a tonic to the gallbladder to improve the flow of bile and ameliorate conditions such as gallbladder pain, gallstones and jaundice[254]. The bark and root bark are antiseptic, astringent, chologogue, hepatic, purgative, refrigerant, stomachic and tonic[4, 7, 9, 21, 46, 165, 222]. The bark is harvested in the summer and can be dried for storing[4]. It is especially useful in cases of jaundice, general debility and biliousness[4], but should be used with caution[165]. The flowers and the stem bark are antirheumatic[218]. The roots are astringent and antiseptic[222]. They have been pulverized in a little water and used to treat mouth ulcers[213]. A tea of the roots and stems has been used to treat stomach ulcers[213]. The root bark has also been used as a purgative and treatment for diarrhoea[213] and is diaphoretic[222]. A tincture of the root bark has been used in the treatment of rheumatism, sciatica etc[222]. The root bark is a rich source of the alkaloid berberine - about 6%[240]. Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218] and is also effective in the treatment of hypersensitive eyes, inflamed lids and conjunctivitis[244]. A tea made from the fruits is antipruritic, antiseptic, appetizer, astringent, diuretic, expectorant and laxative[7, 222]. It is also used as a febrifuge[213]. The fruit, or freshly pressed juice, is used in the treatment of liver and gall bladder problems, kidney stones, menstrual pains etc[9]. The leaves are astringent and antiscorbutic[7]. A tea made from the leaves is used in the treatment of coughs[222]. The plant (probably the inner bark) is used by homeopaths as a valuable remedy for kidney and liver insufficiency[244]. Other uses include malaria, and opium and morphine withdrawal[301].

nrakta Barberry Coast. Naturalized, or possibly native, in Britain[17]. ksacta Light deciduous woodland, hedges, roadsides, clearings etc, preferring a sunny position and a chalky soil[9, 268].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Germination averages out at about 90%[98, 113]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and



planted out in late spring[2, 200].  
nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Prefers a light rich rather dry soil according to another report[37]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200] but requires a moist soil when grown in the shade of trees[14]. Hardy to about -35°C[184]. A very ornamental plant[11], the barberry was at one time cultivated for its edible fruit, there are several named varieties[11, 200]. 'Dulcis' the fruit of which is sweet or slightly sour[200]. 'Asperma' is a seedless form that was often used in France to make a jam[182, 183]. An alternate host of 'black-stem rust' of wheat so it has been extensively grubbed up from its habitats[3, 11, 13, 74]. Hybridizes freely with other members of this genus[1], though it usually breeds fairly true to type[80]. Can be pruned back quite severely, it resprouts well from the base[200].

### 3.2.31 *Filipendula ulmaria*

Meadowsweet, Queen of the meadow, Double Lady of the Meadow, European Meadowsweet

3 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 1.2 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrip hpa7tli  
prikwlis hpa7tmwatli fyifxre7t hjonli

drutta *Filipendula ulmaria* is a PERENNIAL growing to 1.2 m (4ft) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Avoid for asthmatics. Use by children for diarrhoea not recommended or for children under 12 due to salicylate content (risk of Reye's syndrome) [301].

kcakta Edible Parts: Flowers Leaves Root Edible Uses: Condiment Tea All parts of the plant are edible. Root - cooked[2, 141]. Young leaves - cooked as a flavouring in soups[177]. Young leaves, flowers and roots are brewed into a tea[183]. The dried leaves are used as a flavouring[12, 100], especially as a sweetener in herb teas[13, 183]. The flowers are used as a flavouring in various alcoholic beverages and in stewed fruits[183]. Adding them to wine or beer is said to make a very heady brew[244]. They are also made into a syrup which can be used in cooling drinks and fruit salads[183].

tcanta Dye Essential Pot-pourri Strewing A black dye is obtained from the roots. It is brown[141]. A yellow dye is obtained from the plant tops[106]. An essential oil obtained from the flower buds is used in perfumery[46, 61]. The whole plant, but especially the leaves[245], was formerly used as a strewing herb, imparting an almond-like fragrance[4, 66]. Strongly aromatic, its delightful perfume would completely fill the room[244]. Both flowers and leaves have been used in pot-pourri, retaining their scent for several months. The scent of the dried flowers becoming more and more pleasant with age[245].

dwatta Alterative Antiinflammatory Antirheumatic Antiseptic Aromatic Astringent Diaphoretic Diuretic Dysentery Homeopathy Stomachic Tonic Meadowsweet has a very long history of herbal use, it was one of the three most sacred herbs of the Druids[238]. The leaves and flowering stems are alterative, anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, diuretic, stomachic and tonic[4, 9, 21, 165]. The plant is harvested in July when it is in flower and can be dried for later use[4]. The flower head contains salicylic acid, from which the drug aspirin can be synthesised[200, 238]. Unlike the extracted aspirin, which can cause gastric ulceration at high doses, the combination of constituents in meadowsweet act to protect the inner lining of the stomach and intestines whilst still providing the anti-inflammatory benefits of aspirin[254]. The herb is a valuable medicine in the treatment of diarrhoea, indeed it is considered almost specific in the treatment of children's diarrhoea[4]. It is also considered to be a useful stomachic, being used to treat hyperacidity, heartburn, gastritis and pep-

tic ulcers, for which it is one of the most effective plant remedies[4, 238]. It is also frequently used in the treatment of afflictions of the blood[4]. Meadowsweet is also effective against the organisms causing diphtheria, dysentery and pneumonia[238]. This remedy should not be given to people who are hypersensitive to aspirin[238]. A strong decoction of the boiled root is said to be effective, when used externally, in the treatment of sores and ulcers[244]. A homeopathic remedy is made from the fresh root[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Filipendula ulmaria* Meadowsweet for cough, bronchitis, fever and cold (see [302] for critics of commission E).

nrakta Europe, including Britain, from Iceland south and east to Spain, temperate Asia and Mongolia. ksacta Wet ground in swamps, marshes, fens, wet woods and meadows, wet rock ledges and by rivers, but not on acid peats[17].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted directly into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Massing, Rock garden, Seashore, Specimen, Woodland garden. Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils[1, 17]. Does well in marshy soils[24, 200]. Grows well in heavy clay soils. The flowers have a strong sweet smell[4], which for many people is sickly[245]. The leaves are also aromatic[187], though the scent is very different from the flowers[4]. The leaves are pleasantly aromatic[245]. A good bee plant[24, 30]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

### 3.2.32 *Asclepias incarnata*

Swamp Milkweed, Swamp Butterfly Weed, Marsh Milkweed  
3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 1.2 m hkuc  
hmimhtut cyutli kyuctcuphja7n hwicli hrasljutnyikfrip  
hpa7tli flatprikwlis hpa7tmwatli fyifxre7t hjonli

drutta *Asclepias incarnata* is a PERENNIAL growing to 1.2 m (4ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The leaves and the stems might be poisonous[20].

kcakta Edible Parts: Flowers Leaves Oil Seedpod Edible Uses: Oil Sweetener Unopened flower buds - cooked[46, 61, 161]. Tasting somewhat like peas[85]. They can also be dried and stored for later use[183]. Young shoots - cooked. An asparagus substitute[85, 106]. Tips of older shoots are cooked like spinach[85]. Young seed pods, harvested when 3 - 4 cm long - cooked. A pea-like flavour, they are very appetizing[85]. The flower clusters can be boiled down to make a sugary syrup[85].

tcanta Fibre Latex Oil Pollution Stuffing Wax A good quality fibre is obtained from the bark[46, 57, 61, 95, 112, 169]. It is used in twine, cloth etc[112]. It is easily harvested in late autumn, after the plants have died down, by simply pulling it off the dead stems[112]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[57, 171]. It is a Kapok substitute, it is used in Life Jackets or as a stuffing material[169, 171]. It is very water repel-

lent. The floss has also been used to mop up oil spills at sea. Rubber can be made from latex contained in the leaves and stems[57]. Pods contain an oil and a wax which are of potential importance[171]. The dogbane-milkweed family *Asclepias*, *Apocynum*, *Calotropis*, and *Trachomitum* spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Anthelmintic Carminative Diuretic Emetic Laxative StomachicA tea made from the roots is anthelmintic, carminative, diuretic, emetic, strongly laxative and stomachic[4, 61, 222, 257]. The tea is said to remove tapeworms from the body in one hour[257]. It has also been used in the treatment of asthma, rheumatism, syphilis, worms and as a heart tonic[4, 207, 222]. An infusion of the roots is used as a strengthening bath for children and adults[257].

nrakta N. America - Quebec to Manitoba and Wyoming, south to Texas and New Mexico. ksacta Swamps, wet thickets and shores[43].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°C[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HayLandscape Uses:Border, Foundation, Massing. Prefers a well-drained light rich or peaty soil[1, 200]. Requires a moist soil and a sunny position, doing well by water[111, 134]. Succeeds on dry soils and on all soil types[112]. Plants are hardy to at least -25°C[187]. A very ornamental plant[1], the flowers are very attractive to butterflies[169]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Fragrant flowers. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots

along their length [1-2].

### 3.2.33 *Campanula latifolia*

Large Campanula, Giant bellflower

3 tlin 7 cyuc 3 kcaak 0 tcan 1 dwat 1.5 m hkuc pcimhmim cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli prikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Campanula latifolia* is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

ksakta Edible parts: Flowers Leaves RootEdible Uses: Young shoots - raw or cooked[5, 177]. Contains up to 400mg% of vitamin C[174]. Root - raw[74]. This report is rather vague and needs further investigation. Flowers - raw or cooked. A pleasant sweetness[K].

dwatta Emetic Vitamin CThe flowers are emetic[61].

nrakta Much of Europe, including Britain, north to Norway east to Siberia and W. Asia. ksacta Woodlands, lush meadows and hedgerows, frequently on slightly acid soils[1, 5, 31, 271].

propta Seed - surface sow in spring in a cold frame. Three or four weeks pre-chilling of the seed improves the germination rate[138]. The seed usually germinates in 2 - 4 weeks at 18°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown outdoors in situ during the spring. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta A very robust plant, capable of succeeding in the wild garden and tolerating considerable neglect[271]. It succeeds in most fertile well-drained soils[233], though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Prefers a humus-rich soil in shade or partial shade[271]. Grows well in cool moist woodlands with light shade where it can spread freely[1]. Plants occasionally grow in old walls[219] and also succeed in the dry shade of trees[233]. Plants are hardy to at least -15°C[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very ornamental plant, there are some named varieties[187]. The species can be quite invasive, though most of the cultivars that have been selected for flower colour are less rampant[271].

### 3.2.34 *Symphytum officinale*

Comfrey, Common comfrey

3 tlin 10 cyuc 3 kcaak 4 tcan 5 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Symphytum officinale* is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral

acidic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**pcista** This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disinfectants, especially if only the younger leaves are used. Use topically on unbroken skin. May cause loss of appetite, abdominal pain, vomiting. Do not use with Eucalyptus. Do not combine with herbs containing pyrrolizidine alkaloids (e.g. agrimony, alpine ragwort, help, tansy ragwort) [301].

**kcakta** Edible Parts: Leaves Edible Uses: Gum Tea Young leaves - cooked or raw [2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious [183, K]. Young shoots can be used as an asparagus substitute [46]. The blanched stalks are used [183]. Older leaves can be dried and used as a tea [26]. The peeled roots are cut up and added to soups [183]. A tea is made from the dried leaves and roots [183]. The roasted roots are used with dandelion and chicory roots for making coffee [183].

**tcanta** Biomass Compost Gum The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap [26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun [100]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

**dwatta** Anodyne Antidiarrhoeal Antirheumatic Astringent Demulcent Eczema Emollient Expectorant Haemostatic Homeopathy Refrigerant Vulnery Comfrey is a commonly used herbal medicine with a long and proven history in the treatment of various complaints. The root and the leaves are used, the root being more active, and they can be taken internally or used externally as a poultice [4, 222]. Comfrey is especially useful in the external treatment of cuts, bruises, sprains, sores, eczema, varicose veins, broken bones etc, internally it is used in the treatment of a wide range of pulmonary complaints, internal bleeding etc [4, 238, K]. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process [4, 21, 26, 165, 222, 238]. This substance is now synthesized in the pharmaceutical industry and used in healing creams [238]. The root and leaves are anodyne, astringent (mild), demulcent, emollient, expectorant, haemostatic, refrigerant, vulnerary [4, 21, 26, 165, 222]. Some caution is advised, however, especially in the internal use of the herb. External applications and internally taken teas or tinctures of the leaves are considered to be completely safe, but internal applications of tablets or capsules are felt to have too many drawbacks for safe usage [238]. See also the notes above on toxicity. The leaves are harvested in early summer before the plant flowers, the roots are harvested in the autumn. Both are dried for later use [238]. A homeopathic remedy is made from the fresh root, harvested before the plant flowers [232]. This has a very limited range of application, but is of great benefit in the treatment of broken bones and eye injuries [232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Symphytum officinale* for blunt injuries (see [302] for critics of commission E).

**nrakta** Europe, including Britain, south and east from Scandinavia to Spain, Siberia and Turkey. **ksacta** Damp, often shady localities, in meadows, woods etc, especially near streams and rivers [9, 17, 244].

**propta** Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected

frost. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

**nwatta** Landscape Uses: Border, Ground cover, Specimen. Tolerates moist soils and situations but prefers a moist soil and some shade [1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material [200]. Plants can be invasive, often spreading freely by means of self-sown seed. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features: Attractive foliage, Edible, Fragrant foliage, North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

### 3.2.35 *Tragopogon pratensis*

Goat's Beard

3 tlin 7 cyuc 3 kcaok 0 tcant 2 dwat 0.6 m hkuc htut cyutit tcup hwicli hrasjlutnykfrif hpa7tli flatprikwlis hpa7tmwatli fyfixre7t hjonli

**drutta** *Tragopogon pratensis* is an ANNUAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

**kcakta** Edible Parts: Leaves Root Stem Edible Uses: Root - raw or cooked [2, 9, 12, 52, 100]. The roots have a sweet flavour due to their inulin content [7]. The young roots can be eaten raw whilst older roots are best cooked like parsnips or salsify [9]. They are often blanched before use [183]. Young leaves and shoots - raw or cooked [2, 5, 12, 52, 62, 183]. They can be added to mixed salads or used in soups etc [7, 9]. The leaves are best used as they come into growth in the spring [9]. The flowering stem, including the buds, is cooked and served like asparagus [183].

**tcanta** Cosmetic An infusion of the petals is used to clear the skin and lighten freckles [7]. A distilled water made from the plant is used in cleansing lotions for dry skins [7].

**dwatta** Astringent Depurative Diuretic Expectorant Stomachic Goat's beard is considered to be a useful remedy for the liver and gallbladder [254]. It appears to have a detoxifying effect and may stimulate the appetite and digestion. Its high inulin content makes this herb a useful food for diabetics since inulin is a nutrient made of fructose rather than glucose units and therefore does not raise blood sugar levels [254]. The root is astringent, depurative, diuretic, expectorant, nutritive and stomachic [7, 21]. A syrup made from the root gives great relief in cases of obstinate coughs and bronchitis [7]. A decoction of the root is given in the treatment of heartburn, loss of appetite and disorders of the breast or liver [240]. The root is harvested in the autumn and dried for later use [7]. The fresh juice of young plants is said to be

good dissolver of bile, relieving the stomach without side effects[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Caucasus, Siberia, Iran. ksacta Meadows, pastures, dunes, waysides and waste places[17].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200]. Goat's beard was formerly cultivated as a vegetable, though it has now fallen into disuse[2, 4]. Grows well in the summer meadow[24]. The flowers open at day-break and close before noon[4].

### 3.2.36 *Mentha x piperita officinalis*

White Peppermint

3 tlin 7 cyuc 3 kcak 3 tcan 5 dwat 0.5 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Mentha x piperita officinalis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so should not be used by pregnant women.

kcakta Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked. A mild peppermint flavour, they are used as a flavouring in salads or cooked foods[183]. An essential oil from the leaves and flowers is used as a flavouring in sweets, chewing gum, ice cream etc[183]. A herb tea is made from the fresh or dried leaves[183].

tcanta Essential Repellent Strewing An essential oil obtained from the whole plant is used in perfumery[46, 105]. It is also an ingredient of oral hygiene preparations, toilettries etc[238]. Peppermint leaves are used as an ingredient of pot-pourri[238]. They were formerly used as a strewing herb[14] The plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Dynamic accumulator.

dwatta Anodyne Antiseptic Antispasmodic Aromatherapy Carminative Chologogue Diaphoretic Refrigerant Stomachic Tonic Vasodilator White peppermint is a very important and commonly used remedy, being employed by allopathic doctors as well as herbalists[9]. It is also widely used as a domestic remedy. This cultivar is considered to be milder acting than black peppermint (*Mentha x piperita vulgaris*). A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders (especially flatulence) and various minor ailments[222, 238]. The herb is abortifacient, anodyne, antiseptic, antispasmodic, carminative, chologogue, diaphoretic, refrigerant, stomachic, tonic and vasodilator[4, 9, 21, 165, 238]. An infusion is used in the treatment of irritable bowel syndrome, digestive problems, spastic colon etc[254]. Externally a lotion is applied to the skin to relieve pain and reduce sensitivity[254]. The leaves and stems can be used fresh or dried, they are harvested for drying in August as the flowers start to open[4]. The essential oil in the leaves is antiseptic and strongly antibacterial, though it is toxic in large doses[222, 254]. When diluted it can be used as an inhalant and chest rub for respiratory infections[254]. The essential oil is used in aromatherapy. Its keyword is 'Cooling'[210].

nrakta Britain. ksacta A natural hybrid, *M. aquatica x M. spicata* found in moist soils.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and

so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oil but the plant also succeeds in partial shade. Prefers a slightly acid soil[16]. Often grown in the herb garden and also commercially for its essential oil. The whole plant has a pleasant aroma of peppermint. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Produces a better quality essential oil if the plant is grown in dry ground[115]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

### 3.2.37 *Quercus macrocarpa*

Burr Oak, Mossy Cup Oak

3 tlin 8 cyuc 3 kcak 4 tcan 2 dwat m hkuc  
hmmihtut cyutli hgatkyuctcup hwicli jlutnyikfrip hpa7tli flat-  
prikwis hpa7tmwatli hjonli

drutta *Quercus macrocarpa* is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Seed Edible Uses: Seed - cooked[101, 105, 161, 257]. Very large, the seed can be up to 5cm x 4cm[82, 200], though it is somewhat variable in size and shape[227]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. The seed of this species is considered to be one of the most palatable of all the oaks[159, 183]. Many trees have sweet seeds with little tannin and the seed can be eaten raw or cooked. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Mordant Repellent Tannin Wood Agroforestry Uses: The tree has been widely tested for use in rehabilitation of the soil. It has been successfully planted on coal spoils in the north-central and northern Great Plains, and in the Western Interior Coal Province which encompasses Missouri, Kansas, and Oklahoma. It may be either seeded or transplanted onto disturbed areas[1050]. Other Uses: The leaves of most species in this genus are more or less rich in tannins.

Ach much of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20 , K ]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4 ]. The bark has been used as a mordant for fixing dyes[257 ]. The wood is hard, heavy, strong, tough, very durable, close grained. It weighs about 46lb per cubic metre[227 ]. This species is of considerable importance as a timber tree, it is used for all types of construction, in making baskets, flooring, cabinet making, ship building, cooperagem fence posts etc[46 , 61 , 82 , 149 , 171 , 227 , 229 , 338 ]. The wood is a good fuel[82 ].

dwata Antispasmodic Astringent Dysentery TonicThe bark is astringent and tonic[61]. An infusion has been used in the treatment of diarrhoea[257]. A decoction of the root or inner bark has been used in the treatment of cramps[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Nova Scotia to Manitoba, Wyoming, Massachusetts, Georgia, Kansas and Texas. ksacta Found in a variety of habitats from dry hillsides to moist bottomlands, rich woods and fertile slopes, mainly on limestone soils[43, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Succeeds in a hot dry position. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A slow-growing tree[188]. Established plants are drought resistant[229] and tolerant of atmospheric pollution[226]. Trees have a thick, fire-resistant bark[274]. Occasionally cultivated for its edible seed, there are some named varieties[183]. Slow growing in the wild, it takes about 30 years to start producing seed, though it then continues to crop for the next 200 - 300 years with large crops being produced every 2 - 3 years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Prefers warmer summers than are usually experienced in Britain, often growing poorly in this country and failing to properly ripen its wood, resulting in frost damage overwinter[11, 200]. A tree at the Hillier Arboretum in Hampshire was growing well in September 1993. It was 9 metres tall but had a lot of mildew, there was no sign of seeds[K]. There is a dwarf form of this species:- Q. macrocarpa depressa (Nutt.)Engelm. grows about 2 metres tall with corky branches and smaller seeds than the species, usually about 1cm long[227]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly

### 3.2.38 Acer platanoides

Norway Maple, Harlequin Maple

3 tlin 7 cyuc 2 kca3 3 tcan 0 dwat 21 m hkcuc hmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprkli-wisslip hpa7tmwatli hjonli

drudda Acer platanoides is a deciduous Tree growing to 21 m (69ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[4, 105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*)[2]. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta Dye Preservative Shelterbelt WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. The trees are fairly wind tolerant and are often used in to give protection from the wind in mixed shelterbelts[200]. They are fast-growing and rapidly produce a screen[200]. A rose coloured dye is obtained from the bark[57]. Wood - hard, heavy, fine grained. Used for small domestic items[4, 13, 46, 61].

nrakta Europe, from Scandanavia to the Urals and the Mediterranean, east to W.Asia. Naturalized in Britain. ksacta Grows on all but very poor soils in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars can be budded onto rootstocks of the species. Any grafting is best carried out in September rather than February.

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Pollard, Screen. Of easy cultivation, it prefers a good moist well-drained soil but thrives in any soil[11, 17]. Grows well in heavy clay soils. Prefers a sunny position but tolerates some shade[11, 200]. One report says that plants tolerate chalky soils[200], but another says that plants can develop chlorosis as a result of iron deficiency when they are grown in alkaline soils. Trees are very tolerant of atmospheric pollution[226]. The Norway maple is a quick-growing tree that has been widely planted in Britain and is more or less naturalized. There are many named forms that have been selected for their ornamental value[11]. Norway maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. The leaves are seldom eaten or defaced by insects because the tree contains a sharp milky juice that they dislike[4]. Trees take 30 years to produce seed[98]. Special Features: Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

### 3.2.39 Betula platyphylla

White Birch, Asian white birch,  
3 tin 6 cyuc 2 kcaak 2 tcan 2 dwat 20 m hkuc  
htut cyutli kyuctcup hwicli hyishrasjltutnyikfrip hpa7tli flat-  
priklwis hpa7tmwatli hjonli

drutta *Betula platyphylla* is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kcakta Edible Parts: Inner bark SapEdible Uses: Inner bark - cooked. Rich in starch[177]. It can be dried and ground into a meal and used as a thickener in soups etc or mixed with flour for making bread, biscuits etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap. Used for making a vinegar[177].

tcanta Dynamic accumulator.

dwatta Antifungal Antinflammatory Antiseborrheic Cancer Tonic UrinaryThe bark of the sub-species *Betula platyphylla japonica* is often used medicinally in Korea. It contains several medically active constituents including triterpenoids and flavonoids and is antifungal, anti-inflammatory and tonic[279]. It is used in the treatment of conditions such as internal diseases and inflammation[279]. The root bark, and other parts of the plant, show anticancer activity[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta E. Asia - northern China, Japan, Korea, Siberia. ksacta Highlands, C. and N. Japan[58].

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

nwatta Landscape Uses:Specimen. Succeeds in a well-drained loamy soil in a sunny position[11, 200]. Tolerates most soils including poor soils and heavy clays[200]. Fairly wind tolerant[200]. A fast-growing but short-lived tree[200]. Hybridizes freely with other members of this genus[50]. This species is closely related to *B. pendula*[11]. A good plant to grow near the compost heap, aiding the fermentation process[200]. Trees are notably susceptible to honey fungus[200]. Special Features: Not North American native, inconspicuous flowers or blooms.

### 3.2.40 Thuja occidentalis

American Arbor-Vitae, Arborvitae, Eastern Arborvitae, Siberian Arborvitae, Northern White Cedar, Wh  
3 tin 7 cyuc 2 kcaak 0 tcan 3 dwat 15 m hkuc  
hmimhtut cyutli tucphja7n hwicli hrasjltutnyikfrip hpa7tli flat-  
priklwisslip hpa7tmwatli hjonli

drutta *Thuja occidentalis* is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower from April to May, and the seeds ripen from

September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista An essential oil from the leaves is poisonous if taken in large doses[7, 65]. Nausea, vomiting, flatulence, indigestion reported. Possible asthma and seizures [301]. This plant should not be used by pregnant women[165]. Use oil internally in small quantities and under medical supervision. Death and convulsions reported with improper internal use [301].

kcakta Edible Parts: StemEdible Uses: TeaPith of young shoots - cooked[105]. It can be added to soups[177]. Pleasantly sweet, the pith was used as the basis of the soup according to one report[183]. Inner bark - cooked. It is only used in times of emergency or scarcity[213]. The inner bark can be dried and ground into a powder, then used with wheat or other cereals in making bread, biscuits etc. The leafy branchlets are used as a tea substitute[159, 177, 257] but are probably best avoided by pregnant women[165]. An aromatic flavour[183]. Another report says that the foliage and bark are used, the resulting tea is a good source of vitamin C[226].

tcanta Broom Essential Fibre Incense Repellent Tannin WoodTolerant of regular trimming, though not into the old wood, it can be grown as a hedge[226]. The fresh branches are used as besoms[4]. Their aromatic smell serves to deodorize the house whilst sweeping[226]. The leaves have been kept in the clothes cupboard as a perfume, incense and insect repellent[257]. The leaves and stems have been used as an incense[257]. An essential oil is obtained from the leaves and branches, it is used in perfumery and in medicines[46, 57, 61, 226]. It is poisonous if taken internally[65]. This essential oil also has insect repellent properties[106]. The tough and stringy bark has been used to weave fibre bags[257]. The bark is a source of tannin[257]. Wood - light, soft, not strong, brittle, coarse grained, very durable, easily worked, does not warp[61, 82, 171, 226, 235]. It weighs 20lb per cubic foot[235]. Used especially where contact with water cannot be avoided, for canoes, garden buildings, shingles, posts etc[11, 61, 82, 171, 226].

dwatta Alternative Anthelmintic Antiinflammatory Antirheumatic Antiseptic Antiviral Aromatic Astringent Diaphoretic Diuretic Emmenagogue Homeopathy Rubefacient Vitamin C American arbor-vitae was much used by many native North American Indian tribes as a medicine to treat fevers, coughs, headaches, swollen hands and rheumatic problems[254, 257]. The plant has an established antiviral activity and is most commonly used in modern herbalism to treat warts and polyps, being prescribed both internally and externally for these conditions[254]. The plant can be used to induce menstruation and so should not be prescribed for pregnant women[238]. The recently dried leafy young twigs are alterative, anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, diuretic and emmenagogue[4, 7, 21, 165]. The plant is being used internally in the treatment of cancer[238], especially cancer of the uterus[254]. A tea made from the leaves is used in the treatment of bronchitis and other respiratory problems, colds, headaches and as a cough syrup[222, 254]. The plants diuretic properties make it useful in treating acute cystitis and bed-wetting in children[254]. The leaves are used in steam baths in the treatment of rheumatism, arthritis, colds etc[222]. Externally, the leaves are used as a wash for swollen feet and burns[222]. Extracts of the leaves can be painted on painful joints or muscles as a counterirritant, improving local blood supply and thus facilitating the removal of toxins, easing pain and stiffness[254]. A tincture of the leaves has been used in the treatment of warts, piles, bed sores and fungal infections[222]. The leaves and young twigs can be harvested as required and used fresh or dried[238]. 'Oil of white cedar', obtained from the leaves, is an essential oil that is antiseptic, expectorant and rubefacient[213, 222]. It is used internally to promote menstruation and relieve rheumatism[213]. This volatile oil is toxic and poisoning from overdoses has occurred[213], it should only be used under the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The oil also stimulates

the heart and causes convulsions in high doses[213]. A tea of the inner bark is used to promote menstruation[213] and in the treatment of consumption and coughs[222]. A homeopathic remedy is made from the leaves and twigs, gathered when the tree is flowering[232]. It is used in the household as a treatment against warts, but also has a range of other applications that should only be prescribed by a competent homeopath[7, 232].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Illinois and Minnesota. ksacta Swamps and cool rocky banks of streams[43], forming dense almost impenetrable forests[82, 165]. Also found on rocky soils[226]. Plants are usually found on neutral to alkaline limestone soils[226].

propta Seed - best sown when ripe in the autumn in a cold frame[113]. Stored seed germinates best if given a short cold stratification[113]. It can be sown in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If growing large quantities of plants, the seed can be sown in an outdoor seed bed in mid spring[78]. Grow the plants on for two years and then plant them out into their permanent positions in late autumn or early spring. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but it should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Landscape Uses:Firewood, Hedge, Screen, Superior hedge, Specimen. Prefers a permanently moist soil[1], it is intolerant of dry soils[11]. A useful plant for very poorly-drained soils[185, 200]. The best stands in America are on well-drained soils[11]. Grows well in heavy clay soils. Succeeds in sandy soils[188] and on chalk[200]. A very hardy tree, tolerating very cold winters with temperatures down to -46°C[200, 238]. In cold weather the leaves turn brown, becoming green again in the spring[226]. It is usually slow growing and short-lived in cultivation in Britain and rarely looks thrifty[81, 185]. However, there are some good specimens in western Britain[4, 14]. Some cultivars are more healthy, 'Lutea' is growing very well in several places and 'Spiralis' is also growing well[185]. Trees live 200 - 300 years in the wild[226]. Sometimes planted as a timber tree in C. Europe[50]. Plants cannot regenerate from old wood. Pruning is not normally necessary for this species, any pruning that is carried out should be done with care[238]. The wood and the foliage are strongly aromatic[226]. The crushed leaves have a scent of apples[185]. Special Features: Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms.

### 3.2.41 *Sorbus aucuparia*

Mountain Ash, European mountain ash  
3 tlin 6 cyuc 2 kcaak 3 tcan 2 dwat 15 m hkc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflat-  
prklwysslip hpa7tmwatl xre7t hjonli

drutta *Sorbus aucuparia* is a deciduous Tree growing to 15 m (49ft) by 7 m (23ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 2 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Large quantities of the raw fruit can cause vomiting, especially if people are not used to the fruit. Seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is

also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Leaves Oil Edible Uses: Coffee Oil Tea Fruit - raw or cooked[2, 3, 5, 7, 9]. The fruit is very acid and large quantities of the raw fruit can cause stomach upsets[10, 13]. It can be used to make delicious, if slightly acidulous, jams and preserves[7], the fruit can also be dried and used as a flour mixed with cereals[2, 66]. The fruit is about 7.5mm in diameter[200] and is produced in quite large bunches making harvest easy[K]. The leaves and flowers are used as a tea substitute[61, 183]. Young leaves are said to be a famine food but they contain a cyanogenic glycoside so you should be very hungry before even thinking of eating them[179]. A coffee substitute[183]. The report was referring to the fruit, it probably means the roasted seed.

tcanta Cosmetic Dye Oil Shelterbelt Tannin Wood An oil is obtained from the seed[13]. A cosmetic face-mask is made from the fruits and is used to combat wrinkled skin[7]. A black dye is obtained from the young branches[74]. All parts of the plant contain tannin and can be used as a black dye[4]. Trees are very wind resistant and can be used in shelterbelt plantings[11, 200]. Wood - hard, fine grained, compact and elastic. It is highly recommended by wood turners and is also used to make hoops for barrels, cogs and furniture[7, 13, 61, 74, 113].

dwatta Antirheumatic Antiscorbutic Aperient Astringent Diuretic Hypoglycaemic Laxative Vitamin C The bark is astringent, it is used in the treatment of diarrhoea and as a vaginal injection for leucorrhoea etc[4]. The fruit is antiscorbutic and astringent[4, 7]. It is normally used as a jam or an infusion to treat diarrhoea and haemorrhoids[254]. An infusion can also be used as a gargle for sore throats and as a wash to treat haemorrhoids and excessive vaginal discharge[254]. The seeds contain cyanogenic glycosides which, in reaction with water, produce the extremely toxic prussic acid[254]. In small quantities this acts as a stimulant to the respiratory system but in larger doses can cause respiratory failure and death[K]. It is therefore best to remove the seeds when using the fruit medicinally or as a food[254]. Both the flowers and the fruit are aperient, mildly diuretic, laxative and emmenagogue[9, 13, 21]. An infusion is used in the treatment of painful menstruation, constipation and kidney disorders[9].

nrakta Europe, including Britain, south and east from Iceland to Spain, Macedonia and the Caucasus. ksacta Woods, scrub and mountain rocks, mainly on lighter soil, rare or absent on clays or soft limestones. It is found at higher elevations than any other native tree[17].

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

nwatta Landscape Uses:Specimen. Succeeds in most reasonably good soils in an open sunny position[11]. Grows well in heavy clay soils. Tolerates some shade[186], though it fruits better in a sunny position[K]. Prefers a cool moist position and a lighter neutral to slightly acid soil[11, 13, 200]. Dislikes shallow soils or drought[11, 200]. Succeeds on chalk or acid peats[98, 186]. A very wind firm tree tolerating very exposed and maritime positions[186, 200]. Tolerates atmospheric pollution[200]. Some named varieties have been developed for their improved fruits which are larger and sweeter than the type[183]. Plants, and especially young seedlings, are quite fast growing[186]. The fruit is very attractive to birds. 28 species of insects are associated with this tree[186]. Responds well to coppicing[186]. Plants are susceptible to fireblight[188]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage.

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

### 3.2.42 *Betula populifolia*

Grey Birch  
3 tlin 6 cyuc 2 kcaak 3 tcan 1 dwat 12 m hkuc  
htut cyutli kyuctcup hwicli hyishrasjltunyikfrip hpa7tli flat-prikkwis hpa7tmwatli hjonli

drutta *Betula populifolia* is a deciduous Tree growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant is not wind tolerant.

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

kcaakta Edible Parts: Inner bark SapEdible Uses: Inner bark - cooked or dried and ground into a meal. The meal can be used as a thickener in soups etc, or be added to flour when making bread, biscuits etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[177, K]. Sap - sweet. Harvested in early spring, before the leaves unfurl, by tapping the trunk. The flow is best on warm days that follow frosty nights. The sap is drunk as a sweet beverage or it can be fermented to make birch beer or vinegar[177, 183]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up. . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum." [269].

tcanta Charcoal Pioneer WoodA pioneer species, readily invading old fields, burnt-over or cleared land and providing suitable conditions for other woodland trees to become established[226]. It is an excellent crop for very poor soils, where it grows rapidly and affords protection to the seedlings of more valuable and slower-growing trees[82]. Since this species is short-lived and not very shade tolerant, it is eventually out-competed by these other trees[226]. Wood - close-grained, soft, light, weak, not durable[61, 82, 229, 235]. It weighs 36lb per cubic foot[235]. Unimportant commercially, the wood is used locally for making clothes pegs, spools, pulp, charcoal and quite commonly as a fuel[61, 82, 229].

dwatta Antiseborrheic Astringent Urinary The bark is astringent. a decoction has been used to treat bleeding piles[257]. Scrapings of the inner bark have been used to treat swellings in infected cuts[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Eastern N. America - Quebec to Virginia and west to Indiana ksacta Found on the margins of swamps and ponds, it also commonly grows in dry sandy or gravelly barren soils, growing well in poor almost sterile soils[82, 229].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134].

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

nwatta Landscape Uses:Firewood, Specimen. Succeeds in a well-drained loamy soil in a sunny position[11, 200]. Tolerates most soils doing well on poor ones[1] and on heavy clays. A fast growing tree, though it rarely lives longer than 50 years[200, 229]. It is a pioneer species of abandoned fields, burnt-over lands, cleared woodlands etc[200, 229]. A fairly wind-tolerant plant[200], but it is shallow-rooted and older trees are often uprooted by winds and heavy snow in the wild[229]. Hybridizes freely with other members of this genus[50], especially with *B. papyrifera*[43]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: North American native, Naturalizing, Inconspicuous flowers or blooms.

### 3.2.43 *Malus x robusta*

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 12 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltunyikfrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Malus x robusta* is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is rather variable in size and is usually about 1 - 3cm in diameter[200]. A firm and juicy flesh with rather an acid flavour, we found it pleasant in small quantities when fully ripe[K].

tcanta RootstockUsed as a vigorous winter-hardy rootstock for the cultivated apple, *M. sylvestris domestica*, it is somewhat resistant to fireblight but susceptible to crown rot[183].

nrakta A hybrid of garden origin, *M. baccata* x *M. prunifolia*. ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy



soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. There are some named varieties, selected for their ornamental value[183]. 'Fairy' and 'Joan' both have larger fruits than the type, up to 4cm in diameter[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.44 Malus yunnanensis

Crabapple

3 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 10 m hkuc  
hmmihmtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta Malus yunnanensis is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A gritty texture[1]. The fruit is harsh and acid[11], though it improves somewhat when it has been frosted[K]. Quite small, it is 10 - 15mm in diameter[200].

tcanta RootstockThe plant is very adaptable to poor environmental conditions and can be used as stock for grafting apple trees in W China[266].

nrakta E. Asia - China. ksacta Mixed forests on slopes or by streams in valleys at elevations of 1600 - 3800 metres in Guizhou, Hubei, Sichuan and Yunnan Provinces[266].

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

nwatta Landscape Uses:Border, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

### 3.2.45 Acer tataricum

Tatarian Maple

3 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 9 m hkuc  
hmmihmtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli hjonli

drutta Acer tataricum is a deciduous Tree growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Sap SeedEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[74]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Seed - cooked[105, 177]. The wings are removed and the seeds are then boiled[2].

tcanta Companion PreservativeThe leaves are packed around apples, rootstocks etc to help preserve them[18, 20].

nrakta S.E. Europe, W. Asia. ksacta Found in deciduous oak scrub, rocky slopes and river valleys at altitudes between 500 - 1700 metres in Turkey[93].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Container, Pollard, Standard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil on the acid side and a sunny position[11, 182]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Trees usually fruit abundantly in Britain[11]. A bad companion plant, inhibiting the growth of nearby plants[18, 20]. Special Features:Not North American native, Fragrant flowers, Inconspicuous flowers or blooms.

### 3.2.46 Acer glabrum

Rock Maple, Rocky Mountain maple, Douglas maple, Greene's maple, New Mexico maple, Torrey maple  
3 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 9 m hkuc  
hmmihmtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli nyanhjen hjonli

drutta Acer glabrum is a deciduous Tree growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Inner bark Leaves SeedEdible Uses: CondimentEdible young shoots - cooked. They are used like asparagus[85]. The seedlings, gathered in early spring, are eaten fresh or can be dried for later use[213]. The

crushed leaves have been used as a spice[257]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seeds are about 6mm long[82]. Inner bark[85]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. An emergency food, it is usually only used when all else fails[85].

**tcanta** Containers Fibre Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fibre obtained from the inner bark is used for making mats, rope etc[99, 257]. The bark has been used to make spoons, paint containers etc[257]. Wood - tough, hard, heavy, close grained, pliable[82, 99]. It weighs 37lb per cubic foot[235]. The wood can also be used as friction sticks[99]. The green wood can be moulded.[99] The wood is too small for commercial exploitation, though it makes a good fuel[99, 229]. It was often used by native North American Indian tribes for making small items such as snowshoes, drum hoops, bows and pegs[257].

**dwatta** Antiemetic Birthing aid Cathartic GalactogogueA decoction of the wood and bark is said to cure nausea[213]. Another report says that this is specifically the nausea caused by smelling a corpse[257]. An infusion of the bark has been used as a cathartic[257]. A decoction of the branches, together with the branches of *Amelanchier* sp., was used to heal a woman's insides after childbirth and also to promote lactation[257].

**nrakta** Western N. America - Alaska to California, west to New Mexico. ksacta Edges of mountain streams, on rocks and in coniferous woods, 1500 - 2000 metres[82, 184].

**propta** Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. The seed has a hard coat and can be slow to germinate, often taking 2 years. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. It is very difficult to find suitable wood for cuttings.

**nwatta** Landscape Uses:Erosion control, Massing. Of easy cultivation, it succeeds in any soil, preferring a good moist well-drained soil[11]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Hardy to about -25°C[184]. This species grows well at Kew, a specimen was 12 metres tall in 1967[11]. The tree is almost fastigiate[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Trees are usually dioecious. Male and female trees must be grown if seed is required[226]. Special Features:North American native, Inconspicuous flowers or blooms.

### 3.2.47 *Malus angustifolia*

Southern Crab, Southern crab apple  
3 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 7 m hkuc  
hmimhtu cyutli tcup hwicli hrasjutnykifrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

**drutta** *Malus angustifolia* is a deciduous Tree growing to 7 m (23ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid,

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

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

**kaakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[61, 105]. A fragrant aroma, but the fruit is harsh and acid[11]. The hard sour fruits are often used for making preserves, cider, jellies etc[46, 82, 183]. The fruit is about 25mm in diameter and is slightly pear-shaped[200].

**tcanta** WoodWood - hard, heavy, close grained[46, 61, 82, 229]. It weighs 43lb per cubic foot[235]. Of no commercial value, but it is used locally for making levers, tool handles and other small objects[46, 61, 82, 229].

**nrakta** Eastern N. America - Maryland to Florida, west to Texas and Louisiana. ksacta Woods and thickets, especially along river banks[229].

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

**nwatta** Landscape Uses:Border, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The flowers have a perfume of violets[245]. A short-lived tree in the wild[229]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms.

### 3.2.48 *Malus x astracanica*

3 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 5 m hkuc  
hmimhtu cyutli tcup hwicli hrasjutnykifrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

**drutta** *Malus x astracanica* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

**kaakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105].

nrakta A garden hybrid, M. prunifolia x M. pumila[177].  
ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This hybrid species is possibly a primitive form of the cultivated apple[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.49 *Cotoneaster racemiflorus*

Black-Wood, Cotoneaster

3 tlin 7 cyuc 2 kcaak 2 tcan 1 dwat 2.4 m hkuc  
hmimhtut cyutli kyucutcp hwicli hysrasjlutnyikfrip hpa7tli  
flatprikwlisslip hpa7tmwatli xre7t hjonli

drutta *Cotoneaster racemiflorus* is a deciduous Shrub growing to 2.4 m (7ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: MannaEdible Uses: Yields a manna-like substance called shir-khist, it is rich in sugars[46, 61, 183]. It contains about 13% sacchrose, 37.5% dextrose[105, 183]. No details of which part of the plant yields the manna, it is most likely to be the stem.

tcanta Basketry Dye WoodA rose-tan dye is obtained from the fruit[168]. The wood is used in basket making.

dwatta Aperient Expectorant StomachicThe plant is aperient, expectorant and stomachic[240].

nrakta N. Africa to W. and C. Asia. ksacta Shrubby thickets on stony slopes[74]. To elevations of 2400 metres in Kashmir[145].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Cuttings of mature wood of the current year's growth, preferably with a heel, November in a frame.

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -25°C[200]. Hybridizes freely with other members of this

genus[200]. There are several sub-species[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 3.2.50 *Filipendula kamschatica*

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc  
hmimhtut cyutli tucphja7n hwicli hrasjlutnyikfrip hpa7tli  
prikllwis hpa7tmwatli fyfixre7t hjonli

drutta *Filipendula kamschatica* is a PERENNIAL growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots [74]. Leaves - cooked[74]. Root - raw or cooked[74].

nrakta E. Asia - Japan, Siberia. ksacta High grass meadows[74] along streams in the mountains[187].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[188, 200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semi-shade[1, 200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. Plants are hardy to about -25°C[187], when growing in shallow water they even survive if the water is frozen[245]. A good bee plant, the flowers also attract flies. The flowers have a powerful, sweet scent when inhaled from a distance, though there are fishy undertones when inhaled near to[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 3.2.51 *Heliopsis helianthoides*

False sunflower, Oxeye sunflower

3 tlin 9 cyuc 2 kcaak 2 tcan 0 dwat 1.5 m hkuc  
hmimhtut cyutli hgatkyuctcp hwicli hrasjlutnyikfrip hpa7tli  
flatprikllwis hpa7tmwatli hjonli

drutta *Heliopsis helianthoides* is a PERENNIAL growing to 1.5 m (5ft) by 1.2 m (4ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects, Birds. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FlowersEdible Uses: The flowers have a mild taste and can be used as a garnish or in a salad [318-1].

tcanta Soil stabilizationPossibly used for erosion control due to the fibrous deep roots. Insectory: The nectar and pollen of the flowers attract their fair share of insects, including long-tongued bees, Halictine bees, bee flies, butterflies, *Chauliognathus pennsylvanicus* (Goldenrod Soldier Beetle), and other insects. Among the long-tongued bees, is

the oligolege Holcospites heliopsis (False Sunflower Bee). The caterpillars of *Papaipoma rigida* (Rigid Sunflower Borer Moth) sometimes bore through the stems[318-1]. Attracts birds and painted lady butterflies. Plant communities- Thickets Selected cultivars are shorter and attractive in a more formal garden. Smooth oxeye is considered one of the best hardy plants for a wildflower garden border [318-1].

dwatta Febrifuge MalariaOx-eye has been used in medicinal drinks, for treatment of lung troubles. The leaves have been used in a strong tea to reduce fevers and loosen phlegm. Stems have been used to treat malaria [318-1].

nrakta Native to eastern and central North America from Saskatchewan east to Newfoundland and south as far as Texas, New Mexico, and Georgia. ksacta Open woods, woodland borders and clearings, thickets, grassy meadows, savannas, limestone glades, tallgrass prairies, blackland prairies, stream banks and disturbed roadsides or railroad rights of way.

propta Seed. Cuttings, Division. *Heliopsis helianthoides* establishes readily from seed when planted in the winter/fall or early in spring (March to April). Germination generally starts four weeks after sowing if soil temperatures remain in the 60 - 70 degree Fahrenheit range. Seeds ripen approximately one month after flowering, however as with many Asters, plants are self sterile. It may be necessary to crack open a few seeds to make sure they are viable. Cuttings and Divisions: Five to seven node cuttings taken from the top 12 inches of growth in late spring root easily. Cuttings are sometimes reluctant to overwinter. Divide plants in the fall for best results [318-1].

nwatta An upright clumping perennial wildflower with sunflower-like heads. It performs well in dry (xeric) locations, in poor to average soils, and in full sun to partial shade. Flowering can be extended by removing spent flowers. Staking may be necessary in shady locations[318-1]. USDA Hardiness Zones: 3 - 9. Soil pH: 6.0 - 8.0. Growth Rate: Moderate. Life Span: Short-Lived Perennial. Stand Persistence: Long. Form: Upright. Texture: Coarse. Sun: Full Sun, Partial Shade. Soil Type: Loamy, Silty, Clay. Soil Moisture: Moderate, Dry. Minimum Root Depth: 12 inches. Root Type: Tap, Stolon. Fungal Types: Endomycorrhizal. Seasonal Interest: Summer. Fruit Type: Achene. Flower Color: Yellow. Drought: Tolerant. Flood: Moderate. Salt: Moderate. Soil Compaction: Moderate. Mowing: Tolerant. Fire Damage: Tolerant. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Animal Damage: Deer, Gophers, Mice, Rabbits. Growing Season: Warm. Bloom Time: Early Summer - Late Summer. Fruit Time: Summer - Fall [318-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Several cultivars are available with flowers of varying colors and shades. These include 'Summer Sun', 'Golden Plume', and 'Prairie Sunset'. The following cultivars of *H. helianthoides* var. *scabra* ("rough") have gained the Royal Horticultural Society's Award of Garden Merit: 'Benzingold', 'Light of London', 'Spitzentänzerin', 'Waterperry Gold'.

### 3.2.52 *Solidago odora*

Sweet Goldenrod, Anise-scented goldenrod, Chapman's goldenrod

3 tlin 7 cyuc 2 kcak 2 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnykfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Solidago odora* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. kckaTa Edible Parts: Leaves SeedEdible Uses: Condiment TeaLeaves - cooked[177]. Seed[177]. No more details are given but the seed is very small and fiddly to har-

vest[K]. An aromatic, anise-flavoured tea is made from the dried leaves and dried fully expanded flowers[21, 55, 95, 183]. The blossoms are used as a flavouring[102].

tcanta Dye EssentialAn anise-scented essential oil is obtained from the plant[61]. It is used medicinally[207] and in perfumery - especially for scenting soaps[245]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Aperient Astringent Carminative Diaphoretic Diuretic Dysentery Febrifuge Stimulant Tonic UrinaryAn infusion of the dried powdered herb is antiseptic[168]. The leaves make a very pleasant-tasting tea that is mildly astringent, carminative, diaphoretic, diuretic, febrifuge and stimulant[21, 95, 207, 222, 257]. It is useful in the treatment of coughs and colds, dysentery and ulceration of the intestines[4, 257]. The essential oil has been used as a diuretic for infants, as a local application for headaches and for the treatment of flatulence and vomiting[4]. The flowers are aperient, astringent and tonic[4]. An infusion is beneficial in the treatment of gravel, urinary obstruction and simple dropsy[4]. The root can be chewed as a treatment for sore mouths[257].

nrakta Eastern N. America - New Hampshire to Florida, west to Texas and Oklahoma. ksacta Dry sterile soil or thin woodlands[43]. Woods and roadsides in Texas[274].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Tolerant of very poor sandy soils[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The bruised leaves have a smell like a mixture of saffras and aniseed[245]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

### 3.2.53 *Lythrum salicaria*

Purple Loosestrife

3 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnykfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Lythrum salicaria* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kckaTa Edible Parts: Leaves RootEdible Uses: ColouringLeaves - cooked[13, 46, 61, 105]. Rich in calcium[179]. Root - cooked[13]. An edible dye is obtained from the flowers[13].

tcanta Cosmetic Dye Preservative Tannin TeethA decoction of the plant is impregnated into wood, rope etc to prevent it rotting in water[74]. The leaves contain about 12% tannin, the stems 10.5%, the flowers 13.7% and the roots 8.5%[218]. It is probably these tannins that preserve the wood etc[218]. The powdered plant is used cosmetically in face-packs to counteract reddened skin[7].

dwatta Antibiotic Antidiarrhoeal Astringent Dysentery Eczema Hypoglycaemic Styptic VulneraryPurple loosestrife

an astringent herb that is mainly employed as a treatment for diarrhoea and dysentery. It can be safely taken by people of all ages and has been used to help arrest diarrhoea in breast-feeding babies[254]. It can also be used to treat heavy periods and inter-menstrual bleeding[254]. Modern research has shown the whole plant to be antibiotic and to be particularly effective against the micro-organism that causes typhus[254]. The flowering plant is antibiotic, highly astringent, hypoglycaemic, styptic and vulnerary[4, 7, 9, 21, 152, 218, 238]. It is valued as an intestinal disinfectant, especially in cases of enteritis[7], an infusion is used internally in the treatment of diarrhoea, internal bleeding, excessive menstruation etc[9, 222, 238]. The flowering plant is harvested in the summer and can be used fresh or dried[9]. Externally, the plant is used as a cleansing and healing wash for wounds, sores, impetigo, eczema, excess vaginal discharge, vaginal itching etc[7, 222, 238, 254]. The powdered plant is used as a haemostatic in cases of severe nosebleeds[7]. The stems are regarded as gum stimulators and are given to children to chew in order to strengthen weak or bleeding gums[7].

nrakta Europe, including Britain, south to N. Africa east to western and northern Asia. N. America.. ksacta Reed swamps at the margins of lakes and slow-flowing rivers, fens and marshes, avoiding acid soils[17].

propta Seed - sow in the autumn or the spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it could be worthwhile trying a sowing in situ in the autumn or the spring. Division in March or October[188]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in the spring[238]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Container, Massing, Rock garden, Seashore, Specimen. Succeeds in ordinary garden soil, especially if it is damp[1]. Prefers a neutral to alkaline soil[238]. Grows well in heavy clay soils. Grows well in marshy soils[24] and succeeds in shallow water at the edges of ponds[56]. Succeeds in full sun or partial shade[188]. A very hardy plant, tolerating temperatures down to at least -25°C[187]. This species can be very invasive and has been declared a noxious weed in some countries. Since being introduced in N. America it has invaded native marshlands, forming large areas of dense stands and crowding out many native species[274]. A very ornamental plant[1]. A good bee and butterfly plant[24]. Plants usually self-sow when well sited[200]. Special Features:Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 3.2.54 *Rheum rhaponticum*

Rhubarb, Garden rhubarb  
 3 tlin 7 cyuc 2 kcaok 0 tcan 3 dwat 1.2 m hkuc  
 hmimhtut cyutli tcup hwicli jltunykfril hpa7tli flatprikwlis  
 hpa7tmwatli xre7t hjonli

drutta *Rheum rhaponticum* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain high concentrations of oxalic acid[34, 76]. Oxalic acid can lock up certain minerals (especially calcium) in the body, leading to nutritional deficiency. Cooking the plant will reduce the concentration of oxalic acid. Another report says that the leaves have the same concentration of oxalic acid in the stems as they do in the leaves and it is not the oxalic acid that makes them poisonous. It

says that any toxic properties of the leaves is more likely to be due to the presence of glycosides[142]. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

ksakta Edible Parts: Flowers StemEdible Uses: Leaf stem - raw or cooked[1, 2, 103]. An acid flavour, they are used as a fruit substitute in tarts etc[2]. The young flower pouch, harvested before the flowers open, is said to form a dish of great delicacy[2].

tcanta Plants can be grown for ground cover when spaced about 1.8 metres apart each way[208].

dwatta Astringent Purgative StomachicRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is *R. palmatum*. Though the chemistry varies slightly, this species is used interchangeably[238]. Another report says that this species contains only small quantities of the medicinally active compounds and so it is only used as a mild laxative[244]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 37, 57, 61, 171, 238]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta Europe to E. Asia - Siberia. ksacta Wet mountain rocks in Europe[50].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Shade tolerant[15], but plants prefer a sunny position[37]. Grows well in heavy clay soils. Hardy to at least -20°C[200]. This species is probably a parent of the cultivated rhubarb, *R. x cultorum*[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

### 3.2.55 *Rosa virginiana*

Virginia Rose  
 3 tlin 7 cyuc 2 kcaok 0 tcan 1 dwat 1.5 m hkuc  
 hmimhtut cyutli kyuctup hwicli hrasjltunykfril hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Rosa virginiana* is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit - raw or cooked[177]. The fruit is up to 15mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The buds are eaten by native Indians in N. America[161, 177, 183]. No further details are given, does this refer to the leaf or flower buds? The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Hedge Hedge Soil stabilization Can be grown as a hedge, succeeding in windy positions[1, 11]. The suckering form of this species can be used to fix sand dunes[11]. It also makes a good ground cover[245].

dwatta Anthelmintic Cancer Haemostatic Ophthalmic A decoction of the roots has been used as a bath and to treat worms in children[257]. An infusion of the roots has been drunk and used as a wash in treating bleeding cuts on the feet[257]. An infusion of the roots has been used as a wash to treat sore eyes[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Eastern N. America - Newfoundland to Ontario, south to Louisiana. A garden escape in Britain[17]. ksacta Damp to dry thickets, clearings, swamps and shores[43].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils, preferring one on the dryish side[11]. Grows well in heavy clay soils. Prefers a circum-neutral soil and a sunny position[200]. Dislikes water-logged soils. Does well in a windy position[11]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. The flowers are fragrant[245]. The form in cultivation in Britain is very invasive, forming thickets with its suckers, whilst the wild form does not produce suckers[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.56 *Malus x adstringens*

3 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta *Malus x adstringens* is a deciduous Tree. See above for USDA hardiness. It is hardy to UK zone 3 and

is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. A rather acid flavour. The fruit is about 4 - 5cm in diameter[200].

nrakta A hybrid species of garden origin, *M. baccata* x *M. pumila*. ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. A very ornamental plant, there are a great many named varieties[200]. 'Robin', 'Hopa' and 'Tradescant' have all been mentioned for their edible fruit[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 3.2.57 *Acer mono*

Maple

3 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta *Acer mono* is a deciduous Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Sap Edible Uses: The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Leaves - cooked. A famine food, they are only used when all else fails[179].

tcanta Fuel Preservative Wood The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - hard, close grained[46]. Used as a fuel[46].

dwatta *Astringent Irritant* The leaves are an irritant[240]. The bark is astringent[240].

nrakta E. Asia - China, Japan, Korea, Mongolia and eastern Russia ksacta Mountains all over Japan[58]. Hillsides, mountain valleys and forests from sea level to 1800 metres in China[266].

propta Seed of this species is rarely available. If obtained, it is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting onto the roots of *A. platanoides* is usually successful, but the graft should be made as low as possible to reduce the incident of suckers from the rootstock.

nwatta Landscape Uses:Specimen. Of easy cultivation, it prefers a good moist well-drained soil[11] and a position that is at least moderately sunny[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A polymorphic species[58], it is closely related to *A. truncatum*[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:Not North American native, Inconspicuous flowers or blooms.

### 3.2.58 *Solidago canadensis scabra*

Canadian Goldenrod

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 1.8 m hkuc  
hmihtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Solidago canadensis scabra* is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaYoung leaves and flowering stems - cooked[172]. Seed[22, 46, 61, 105, 161, 183]. It can be used as a thickener in soups[172]. The seed is very small and fiddly to harvest or utilize[K]. A tea can be made from the flowers and/or the leaves[172, 183].

tcanta Dye LatexA source of latex, contained in the leaves. A potentially good source of rubber[61]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Haemostatic Salve Skin StypticThe whole plant is antiseptic, haemostatic, salve and styptic[168, 172, 257]. An infusion of the dried powdered herb can be used as an antiseptic[168]. A poultice of the flowers has been used in the treatment of ulcers and burns[257]. A poultice of the moistened, crushed root has been used in the treatment of boils[257].

nrakta Eastern N. America - Maine to Ontario, Nebraska, Georgia and Texas. ksacta Dry to damp thickets, roadsides and clearings[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent posi-

tions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. Hybridizes freely with *S. canadensis*[43]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

### 3.2.59 *Anchusa azurea*

Anchusa, Italian bugloss

3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc  
htut cyutli hgattcup hwicli hrasj|lutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Anchusa azurea* is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw. An excellent and decorative addition to the salad bowl, or used as a garnish[183]. The tender young leaves and young flowering shoots can be cooked and eaten as a vegetable[7].

tcanta DyeA red dye is obtained from the root[7]. This was at one time used as a basis for some cosmetics[7].

dwatta Antitussive Depurative Diaphoretic Diuretic PoulticeThe whole plant is antitussive, depurative, diaphoretic and diuretic[7]. It is harvested when in flower and dried for later use. The dried and powdered herb is used as a poultice to treat inflammations[7]. Use internally with caution, the plant contains the alkaloid cynoglossine which can have a paralyzing effect[7].

nrakta Europe - Caucasus. An occasional garden escape in Britain[17]. ksacta Sides of arable fields, waste places, roadsides and steppes on stony hills[45, 187].

propta Seed - sow spring in pots of sandy soil[200]. An overnight drop in temperature helps germination[133]. The seed usually germinates in 1 - 4 weeks at 21°C[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in early spring[200]. Root cuttings in autumn or early winter. Late winter is best[200].

nwatta Succeeds in most soils, preferring a sunny position[1, 111]. Prefers a fertile well-drained soil[111]. Tolerates heavy clay[200]. Requires a deep well-drained soil[187]. Established plants tolerate drought[187]. Plants are hardy to about -15°C[187]. The flowers are a good source of food for bees[1]. Many named forms have been selected for their ornamental value[187]. The plants tend to be short-lived perennials but they can be propagated by means of root cuttings[187].

### 3.2.60 *Bergenia crassifolia*

Siberian Tea

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc  
pcimhmimhtut cyutli hgattcup hwicli hrasj|lutnyikfrip hpa7tli  
flatprik|wis hpa7tmwatli xre7t hjonli

drutta *Bergenia crassifolia* is an evergreen Perennial growing to 0.3 m (1ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year; in flower from March to April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

ksakta Edible Parts: Teas Edible Uses: TeaThe leaves are used as a tea substitute[2, 61, 105, 177, 183].

tcanta TanninA useful ground cover plant[188], though rather slow to spread[197]. It forms a clump[208]. Tannin is obtained from the bark[61]. The roots contain 15 - 22% tannin, exceptionally 26%[223]. The leaves and stems contain 17 - 25% tannin[223].

nrakta E. Asia - N.W. China to Siberia. ksakta On shady north-facing rocks, stony slopes, rock streams and old moraines in the forest and alpine zones[74].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1 - 6 months at 15°C[134]. Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering[188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[134, 200] but prefers a deep fertile soil that does not dry out fully[134]. Established plants are drought tolerant according to another report[190]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Requires a position sheltered from cold drying winds and from the early morning sun. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. A very ornamental plant, it is hardy to about -20°C[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants seem to be immune to the predations of rabbits[233]. The different species of this genus will hybridise freely when grown near each other[233].

### 3.2.61 *Glechoma hederacea*

Ground Ivy, Field Balm, Gill Over The Ground, Runaway Robin

3 tlin 10 cyuc 2 kcak 3 tcan 3 dwat 0.2 m hkuc  
hmimhtut cyutli tcup hwicli jltunyikfrip hpa7tli flatprikliw  
hpa7tmwatli xre7t hjonli

drutta *Glechoma hederacea* is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. It is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A report in the medicinal uses says the plant should be used with caution, no reason is given. Another report says that the plant might be toxic to horses[222]. Avoid if pregnant as abortifacient. Contraindicated in epilepsy. Avoid if kidney disease [301].

ksakta Edible Parts: Leaves Edible Uses: Condiment Tea Young leaves - raw or cooked[9]. The leaves have a bitter flavour[5], they can be mixed into salads to add a slight aromatic tang[7]. They can also be cooked like spinach, added to soups etc or used as a flavouring[2, 183]. Available very early in the year. A herb tea is made from the fresh or dried leaves[2, 177, 183]. It is often used mixed with verbena leaves[7]. The herb has been added to beer in much the same way as hops in order to clear it and also to improve its flavour and keeping qualities[4, 183]. This species was the most common flavouring in beer prior to the use of hops from the 16th century onwards[238].

tcanta MiscellanyA good ground cover plant for shady places. It is rather vigorous though and can swamp smaller plants[197].

dwatta Anodyne Antidiarrhoeal Antiphlogistic Antirheumatic Appetizer Astringent Digestive Diuretic Febrifuge Miscellany Pectoral Stimulant Tonic Vermifuge-Ground ivy is a safe and effective herb that is used to treat

many problems involving the mucous membranes of the ear, nose, throat and digestive system[254]. A well-tolerated treatment it can be given to children to clear lingering catarrh and to treat chronic conditions such as glue ear and sinusitis[254]. Throat and chest problems, especially those due to excess catarrh, also benefit from this remedy[254]. The leaves and flowering stems are anodyne, antiphlogistic, appetizer, astringent, digestive, diuretic, febrifuge, pectoral, gently stimulant, tonic and vermifuge[4, 9, 21, 100, 147, 165, 178]. They are best harvested in May whilst still fresh[4], and are dried for later use[238]. The leaves are used in the treatment of hypersensitivity in children and are useful in the treatment of kidney diseases and indigestion[4, 9, 21, 100, 147, 165, 178]. Applied externally, the expressed juice speeds the healing of bruises and black eyes[4]. Use with caution[21].

nrakta Most of Europe, including Britain, northern and western Asia to Japan. ksakta Damp waste ground, hedgerows and woodland margins[7].

propta Seed - we have no information for this species but suggest sowing the seed in situ as soon as it is ripe, or in the spring. Division in spring or autumn[188]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses: Container, Ground cover. Prefers a heavy soil and dappled shade[17, 31]. Prefers a moist well-drained soil, succeeding in sun or shade[188]. A very invasive plant, spreading freely at the roots[1, 31, 238]. A good bee plant[108]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Naturalizing, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 3.2.62 *Polypodium vulgare*

Polypody, Adders Fern, Golden Maidenhair Fern, Wall Fern, Common Polypod Fern

3 tlin 6 cyuc 2 kcak 3 tcan 3 dwat 0.3 m hkuc  
pcimhmim cyutli kyuctcup hwicli hyishrasjltunyikfrip hpa7tli  
flatprikliw hpa7tmwatli hjonli

drutta *Polypodium vulgare* is an evergreen Fern growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

ksakta Edible Parts: Root Edible Uses: Root. Very sweet, it contains sugars, tannin and oils[13]. It is used as a liquorice adulterant[7]. The root has a unique, rather unpleasant odour and a sweet (cloying) flavour at first though it quickly becomes nauseating[222]. The root contains 15.5% saccharose and 4.2% glucose[218].

tcanta Insecticide Potash Plants can be grown as a ground cover in a shady position[188, 200]. They form a spreading carpet and are best spaced about 30cm apart each way[208]. The ash of burnt leaves is rich in carbonate of potash[4].

dwatta Alterative Anthelmintic Cholagogue Demulcent Diuretic Expectorant Pectoral Purgative Tonic Polypody stimulates bile secretion and is a gentle laxative. In European herbal medicine it is traditionally used as a treatment for hepatitis and jaundice and as a remedy for indigestion and loss of appetite[254]. It should not be used externally since



it can cause skin rashes[254]. The root is alternative, anthelmintic, cholagogue, demulcent, diuretic, expectorant, pectoral, purgative, tonic[4, 238, 240]. It can be used either fresh or dried and is best harvested in October or November, though it can be collected until February[4]. The leaves can also be used but are less active[4]. A tea made from the roots is used in the treatment of pleurisy, hives, sore throats and stomach aches and as a mild laxative for children[222]. It was also considered of value for lung ailments and liver diseases[222]. The poulticed root is applied to inflammations[222]. A tea or syrup of the whole plant is anthelmintic[222].

nrakta All of Europe, the Mediterranean, temperate Asia and eastern N. America. ksacta Rocks, walls and trees, as well as on the ground, in a variety of habitats[187] but especially in humid shady conditions[31].

propta Spores - best sown as soon as they are ripe, though they can also be sown in the spring. Sow them on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division. This is best done in the spring but it succeeds at most times of the year[1].

nwatta Landscape Uses:Border, Container, Erosion control, Foundation, Ground cover, Massing, Rock garden, Woodland garden. Easily grown in most light soils[187]. Prefers a soil of leaf mould and a cool but not too moist clay[1]. Prefers a cool damp shady position[1]. Thrives in dry shade[28, 188]. Established plants are drought tolerant[208]. They grow well on drystone walls[200]. Plants often grow as epiphytes[28, 31]. Members of this genus are rarely if ever troubled by browsing deer[233]. A rather variable plant, it is considered to be an aggregate species of several very similar species[187]. Only the roots should be planted, the rhizome being fixed to the surface of the soil[1, 187]. Special Features: Attractive foliage, Not North American native, There are no flowers or blooms. Polypodium virginianum (Polypodium vulgare subsp. virginianum (L.) Hultén is a synonym of Polypodium virginianum L.) commonly known as rock cap fern, or common polypody tolerates hardiness zones down to 3. It prefers acidic soil. It is a small evergreen species of fern native to the Eastern United States and Canada. It generally grows on rocks and occasionally on tree roots in nature. A small rhizomatous fern with narrow leaves 8-40 centimetres (3.1-15.7 in) long and 3-6 centimetres (1.2-2.4 in) wide. Polypodium virginianum typically grows on boulders, cliffs, and rocky slopes and does not need well-developed soil. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 3.2.63 *Filipendula vulgaris*

Dropwort, Meadowsweet

3 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc  
htut cyutli kyuctcup hwicli hrasjlutnyikfripr hpa7tli priklwisslip hpa7tmwatli fyifxre7t hjonli

drutta *Filipendula vulgaris* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attract-

ing wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves Root Edible Uses: Young leaves - raw or cooked[61, 177, 200]. They can be added to salads and soups[183]. Root - raw or cooked[61, 115, 177, 200]. Rather bitter[5]. Astringent[100]. Best if roasted[141]. A famine food, it is only used in times of scarcity[183].

tcanta Plants can be used as a ground cover when planted about 45cm apart each way[208]. The cultivar 'Florence Pleno' with sweetly scented double flowers has been recommended[208].

dwatta Anthelmintic Antispasmodic Epilepsy Lithontripic The root is anthelmintic and lithontripic. It is used in the treatment of epilepsy, kidney and bladder stones, genital discharges and intestinal worms[61].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, Siberia and the Caucasus. ksacta Dry pastures on limestone or chalky soils[4].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Massing, Rock garden. Prefers a well-drained moisture retentive soil[200]. Dislikes shade[17]. Tolerates dry soils[200]. Grows well on calcareous soils[17]. The flowers are sweetly scented and are very attractive to bees[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers.

### 3.2.64 *Hosta ventricosa*

Blue plantain lily, Hosta

3 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatprikliwss hpa7tmwatli fyifxre7t hjonli

drutta *Hosta ventricosa* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Stem Edible Uses: Young leaves and leaf stems - cooked. The white part of the stem is boiled[46, 61, 177].

tcanta A good ground cover plant[104], succeeding in dense shade but rather slow to spread[197]. Plants should be spaced about 60cm apart each way[208].

dwatta Odontalgic Odontalgic[74]. The root is used.

nrakta E. Asia - China. ksacta Rocky or stony river banks near ponds and lakes[74]. Forests, grassy slopes and hillsides at elevations of 500 - 2400 metres[266].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and

not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

**nwatta Landscape Uses:**Border, Container, Foundation, Ground cover, Seashore, Specimen. Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A vigorous plant, forming medium to large clumps[200]. Hybridizes freely with other members of this genus[200]. Since this species produces its seed apomictically, it should breed true[200] (unless there is also cross pollination of course). Cultivated for its root (used medicinally) in China[74]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A number of named forms have been selected for their ornamental value[187]. **Special Features:**Attractive foliage, Naturalizing, Suitable for cut flowers.

### 3.2.65 *Lamium galeobdolon*

**Yellow Archangel**

3 tlin 9 cyuc 2 kcaak 3 tcan 1 dwat 0.3 m hkuc  
pcimhmimhtut cyutli hgattcup hwicli hrasjlutnykfrif hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

**drutta** *Lamium galeobdolon* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

**kcakta Edible Parts:** Flowers **Leaves****Edible Uses:** Young leaves and shoots - cooked[183]. Young flowering tips - cooked.

**tcanta** A good ground cover plant, spreading rapidly by means of its rooting stems and succeeding even in dense shade. It is very vigorous, however, and can smother small plants[31, 197, 200]. It does very well in woodlands[K].

**dwatta** Antispasmodic Astringent Diuretic Expectorant Styptic VasoconstrictorThe herb is antispasmodic, astringent, diuretic, expectorant, styptic and vasoconstrictor[4].

**nrakta** Europe, including Britain, from Sweden south and east to Spain and Iran. **ksacta** Woods and shady hedgerows[5, 31], usually on heavier soils. Sometimes becoming locally dominant, especially after coppicing[17].

**propta** Seed - usually self sows freely and should not require human intervention. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ as soon as it is ripe. Division in spring. Succeeds at almost any time in the growing season. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta Landscape Uses:**Ground cover, Massing, Woodland garden. A very easily grown plant, it tolerates most soils and conditions[200]. It grows well in heavy clay soils[17], though it prefers a light calcareous soil[1]. Dislikes dry soils[31]. This species succeeds even in dense shade, growing well under trees[31, 200]. Once established, it can also succeed in drought conditions under the shade of trees, providing there is plenty of humus in the soil[190]. There are

at least four sub-species, *L. galeobdolon montanum* is the form generally found wild in Britain and it is a triploid. *L. galeobdolon luteum* and *L. galeobdolon flavidum* are both diploids[187]. *L. galeobdolon argentatum* is the more rampant form, its clone 'Variegatum' is a commonly used ground cover plant for shady places[187]. Plants seem to be immune to the predations of rabbits[233]. A very invasive plant, sending out long prostrate shoots that root at intervals along the stems[31, 200]. **Special Features:** Attractive foliage, Naturalizing. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 3.2.66 *Primula elatior*

**Oxlip**

3 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 0.3 m hkuc  
pcimhmim cyutli tcup hwicli jlutnykfrif hpa7tli flatprikliwis hpa7tmwatli fyfxfre7t hjonli

**drutta** *Primula elatior* is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

**kcakta Edible Parts:** Leaves**Edible Uses:** Young leaves - raw or cooked in soups etc[13]. They have a mild flavour and are available in late winter[K].

**dwatta** Diuretic Expectorant MiscellanyThe root is diuretic and expectorant[9, 13]. It is used in the treatment of coughs, flu and other febrile conditions, insomnia and migraine[9, 13]. The root can be harvested in the spring or autumn and is dried for later use[9].

**nrakta** Europe, including Britain, from Sweden to the Alps and S. Russia. **ksacta** Woods and meadows on chalky boulder clay[17, 50].

**propta** Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. Prick out the seedlings into individual pots when large enough to handle and plant out in the summer. Division in autumn. This is best done every other year[200].

**nwatta** Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200], though it succeeds in heavier shade[187]. Grows well in heavy clay soils and in chalky soils[187]. A very ornamental plant[1], there are a number of subspecies[187]. The subspecies *P. elatior meyeri* is a parent of the *P. x pruhonicensis* group of ornamental hybrids[187]. This species hybridizes readily with *P. vulgaris*[17].

### 3.2.67 *Mentha x piperita citrata*

**Eau De Cologne Mint, Eau de Cologne Mint, Peppermint**

3 tlin 9 cyuc 2 kcaak 3 tcan 2 dwat 0.3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrif hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

**drutta** *Mentha x piperita citrata* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**pcista** Although no specific mention has been seen for this sub-species, it should be noted that, in large quantities, the closely allied *M. x piperita vulgaris* can cause abortions,

especially when used in the form of the extracted essential oil, so it should not be used by pregnant women.

**kcakta Edible Parts:** Leaves **Edible Uses:** Condiment **Tea/Leaves** - raw or cooked. Used as a flavouring in salads or cooked foods[5]. A very pungent flavour, the leaves of the true eau-de-cologne mint are too aromatic for most tastes, though the cultivar 'Basil' has an excellent flavour and makes a very good substitute for basil in pesto[K]. A herb tea is made from the fresh or dried leaves[21, 183].

**tcanta Essential Repellent Strewing/Landscape Uses:** Container, Ground cover, Woodland garden. An essential oil obtained from the whole plant is a source of lavender oil which is used in perfumery[46, 105, 238]. It is also used in oral hygiene preparations, toiletries etc[238]. Formerly used as a strewing herb[14], the plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. **Dynamic accumulator.**

**dwatta Anodyne Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Refrigerant Stomachic Tonic Vasodilator/Eau de Cologne mint,** like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The leaves and flowering plant are anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic, vasodilator[4, 9, 21, 165]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The medicinal uses of this herb are more akin to lavender (*Lavandula* spp) than the mints. It is used to treat infertility, rapid heartbeat, nervous exhaustion etc[238]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

**nrakta Britain.** **ksacta** A natural hybrid, *M. aquatica* x *M. spicata* found in moist soils on the sides of ditches, roadsides etc in S. England[5, 17].

**propta Seed** - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

**nwatta** A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Prefers a slightly acid soil[16]. Plants are very tolerant of neglect, succeeding in long grass[K]. Hybridizes freely with other members of this genus. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. The mint will need to be grown in containers to prevent it spreading too aggressively into the other plants. The whole plant has a strong minty aroma with a hint of ginger[245]. The plant produces a better quality essential oil if the plant is grown in dry ground[115]. Members of this genus are rarely if ever troubled by browsing deer[233]. **Special Features:** Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant,

root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 3.2.68 *Populus angustifolia*

Narrowleaf Cottonwood

3 tin 7 cyuc 1 kcak 2 tcan 2 dwat 30 m hkuc  
htut cyutli tcup hwicli hrasjlutnykfrif hpa7tli flatprikwlis  
hpa7tmwatli nyanhjen hjonli

**drutta** *Populus angustifolia* is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

**kcakta Edible Parts:** Inner bark **Edible Uses:** Gum Sweetener **Inner bark**[105, 161, 177] There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A 'honeydew', produced on the undersides of leaves by aphids, was collected by various native North American Indian tribes and used as a sweetener[227]. The buds have been used as a chewing gum[257].

**tcanta Basketry Gum Rooting hormone Soil stabilization** WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The young shoots are used in making baskets[227, 257]. The highly developed root system helps to reduce erosion when trees are planted on banks and slopes[226]. Wood - weak, soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11, 227]. It weighs 24lb per cubic foot[235]. The tree's scarcity and small size make it commercially unimportant, though it is sometimes used locally for fence posts and fuel[227, 229].

**dwatta Analgesic Antiinflammatory Antiscorbutic Febrifuge Odontalgic** A tea made from the inner bark is used in the treatment of scurvy[161]. The bark contains salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 226, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. The woolly fruit is moistened and applied to the gums in order to treat infections[226]. A tea made from the fruits is used in the treatment of toothache[226].

**nrakta Western N. America** - Alberta to Mexico. **ksacta** Streambanks in dry mountains, foothills and dry plains[60].

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

**nwatta** An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. Dislikes shade, it is intolerant of root or branch competition[200]. A fast-growing but short-lived species in the wild[229]. The young leaves and expanding buds emit a pleasant distinctive fragrance in the spring[226]. **Poplars**

have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

### 3.2.69 Populus nigra

Black Poplar, Lombardy poplar

3 tlin 9 cyuc 1 kcak 4 tcan 3 dwat 30 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfriphpa7tli flatpriklwis  
hpa7tmwatli nyanhjen hjonli

drutta Populus nigra is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in April, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Inner bark Edible Uses: Inner bark - dried, ground then added to flour and used for making bread etc[2]. A famine food, used when all else fails[177].

tcanta Cork Fodder Rooting hormone Shelterbelt Wood An extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fast growing tree, it is often used to provide a quick screen or wind-break[200]. The cultivar 'Italica' is commonly used for this purpose though it is not a very suitable choice because it has fragile branches and is prone to basal rots which can cause sudden collapse[200]. The cultivar 'Plantierensis' is much more suitable[200]. A resin obtained from the buds is made into a salve and used in home remedies[46]. The bark is used as a cork substitute for floats etc[115]. Wood - very soft, very light, rather woolly in texture, without smell or taste, of low flammability, not durable, easy to work, very resistant to abrasion. Used for lower quality purposes[11, 46, 61, 115, 227].

dwatta Alternative Anodyne Antiinflammatory Astringent Diaphoretic Diuretic Expectorant Febrifuge Salve Stimulant Tonic Urinary Vulnerary The leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[4, 213]. They also contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213]. The buds are antiscorbutic, antiseptic, balsamic, diaphoretic, diuretic, expectorant, febrifuge, salve, stimulant, tonic and vulnerary[4, 9, 21, 165, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections, stomach and kidney disorders[4, 238]. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. The stem bark is anodyne, anti-inflammatory, antiseptic, astringent, diuretic and tonic[14, 46, 61, 178, 218]. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[14, 46, 61, 178, 213, 238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238].

nrakta Central and southern Europe, including Britain, Mediterranean, temperate Asia to the Himalayas. ksacta Moist ground in woods and by streams[9, 17].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of

viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78]. This species rarely produces suckers[238].

nwatta Agroforestry Services: Living Fodder  
trelis Agroforestry Services: Windbreak Fodder  
Bank Historic Crop Industrial Crop: Biomass Management  
Coppice Management: Standard Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercrop A very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It is fairly wind tolerant, though it does not do well in exposed upland sites, or in maritime exposure[11, K]. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing tree, reaching maturity in about 100 years and declining thereafter[186]. There are several named varieties that have been selected mainly for their ornamental value[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. Very tolerant of hard pruning, the trees have often been pollarded in the past[186]. Plants seldom produce suckers[186]. An important food plant for the caterpillars of several species of butterfly[30]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Inconspicuous flowers or blooms.

### 3.2.70 Populus alba

White Poplar

3 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 20 m hkuc  
htut cyutli kyuctcup hwicli hrasjlutnyikfriphpa7tli flatpriklwis  
hpa7tmwatli nyanhjen hjonli

drutta Populus alba is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark Leaves Edible Uses: Leaves - rich in Vitamin C[179]. Inner bark - dried, ground into a powder and added to flour for making bread[2, 105]. A famine food, it is only used when all else fails[177].

tcanta Dye Rooting hormone Shelterbelt Wood An extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. A yellow dye is obtained from the bark[100]. Wood - rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion, very light, soft, elastic. It is used for less good quality purposes such as making matches, packing materials etc[11, 13, 46, 61, 100, 115].

dwatta Alternative Anodyne Antiinflammatory Antiseptic Astringent Diuretic Febrifuge Tonic Urinary Vitamin C The

stem bark is anodyne, anti-inflammation, antiseptic, astrigent, diuretic and tonic[14, 46, 61, 178, 218]. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[14, 46, 61, 178, 213, 238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238]. The leaves are used in the treatment of caries of teeth and bones[218]. The twigs are depurative[218].

nrakta C. Europe to Asia. Frequently planted in Britain but not naturalized[17]. ksacta Woods and watersides[100].

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

nwatta Landscape Uses:Erosion control, Aggressive surface roots possible, Specimen. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. This species thrives on drier soils than other members of the genus[188]. It does not do well in exposed upland sites[11] but it is tolerant of maritime exposure, though it can be wind pruned in such a situation[11, 200]. Dislikes shade, it is intolerant of root or branch competition[200]. Tolerates both hot and cool summers[200]. A very ornamental tree, it is fast-growing but fairly short-lived[1, 11, 227]. There are several named varieties[188]. An important food plant for the caterpillars of many species of butterflies[30]. The leaf buds are resinous and exude an aromatic perfume in the spring[245]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Invasive, Inconspicuous flowers or blooms.

### 3.2.71 *Carpinus caroliniana*

American Hornbeam, Blue Beech, Ironwood, American Hornbeam

3 tlin 9 cyuc 1 kcaok 0 tcan 1 dwat 12 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

drutta *Carpinus caroliniana* is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a slow rate. See above for USDA hardness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

tcanta Wood Wood - heavy, close grained, very hard, strong, but not very durable in the soil. It weighs 45lb per

cubic foot. Too small to be exploited commercially, this high quality wood is often used locally for flooring, cogs, tool handles, golf clubs etc[46, 61, 82, 171, 226, 227, 229, 235]. It is especially suitable for making levers[171] and is also a good fuel[61].

dwatta Astringent American hornbeam was employed medicinally by some native North American Indian tribes, though it is not used in modern herbalism[257]. The inner bark is astringent[257]. An infusion has been used in the treatment of diarrhoea and difficult urination with discharge[257].

nrakta Eastern N. America - Nova Scotia to Ontario, south to Florida and Texas. ksacta Usually found as an understory tree in rich woods and the borders of streams and swamps in deep rich moist soils[43, 82, 229].

propta Seed - best sown in an outdoors seedbed as soon as it is ripe[78]. Germination is usually good, though it may take 18 months[80]. If collected whilst still 'green' (after the seed is ripe but before it has dried fully on the plant) and sown immediately it should germinate in the following spring[80]. Grow the plants on for two years in the seedbed and then plant them out into their permanent positions in the winter. The average seed viability is around 65%[98]. Pre-treat stored seed with 4 weeks warm and 12 weeks cold stratification and sow in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall before planting them into their permanent positions.

nwatta Landscape Uses:Espalier, Pest tolerant, Hedge, Standard, Superior hedge, Specimen, Street tree, Woodland garden. Thrives in any good loam, including chalk, it does not demand much light[1, 11]. Prefers a deep open loam[1]. Grows well in heavy clay soils. A slow-growing and short-lived tree in the wild[229], it is slower growing than *C. betulinus* in cultivation[11]. Seed production is cyclic, a year of heavy yields being followed by 2 - 4 years of low yields[229]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

### 3.2.72 *Acer ginnala*

Amur Maple

3 tlin 8 cyuc 1 kcaok 3 tcan 0 dwat 10 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Acer ginnala* is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 8. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: Tea The young leaves are used as a tea substitute[177, 183].

tcanta Dye Preservative Tannin The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Black, blue and brown dyes are obtained from the dried leaves[151]. The leaves contain the dyestuff quercetin[223]. They also contain about 30% tannin[223].

nrakta E. Asia - China, Japan, Manchuria. ksacta Found in many habitats in Korea, especially along streamsides and swampy places[151]. Forests at elevations of 100 - 800 metres in China[266].

propta Seed of garden origin rarely comes true to type. The seed is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base.

Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Fairly easy from cuttings.

nrwatta Of easy cultivation, it prefers a good moist well-drained soil on the acid side[11, 182]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A very ornamental tree[1], there are some named varieties[11]. The form 'Bailey Compact' is a compact form originating in N. America. Very closely related to and possibly only a ssp. of *A. tataricum*[11]. The dried leaves are exported to China in large quantities for their use as a dye[151]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20].

### 3.2.73 *Acer truncatum*

Shantung Maple, Purpleblow Maple  
3 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat 8 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltutnyikfrrip hpa7tli flatprik-  
wis hpa7tmwatli hjonli

drutta *Acer truncatum* is a deciduous Tree growing to 8 m (26ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Seed Edible Uses: Seed - roasted[105, 177]. Rather small and fiddly to utilize[K].

tcanta Companion Preservative The leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - N. China, Korea, Manchuria. ksakta Deciduous oak forests at elevations of 400 - 1000 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. The seed of this species has hypogeal germination, that is the true seed leaves remain below the soil and the first leaves to appear above soil level are true leaves. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nrwatta Landscape Uses: Container, Standard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] and a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Plants produce prodigious root growth but little top growth in first year from seed[133]. This species is closely related to *A. mono*[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features: Not North American native, Inconspicuous flowers or blooms.

### 3.2.74 *Syringa vulgaris*

Lilac, Common lilac  
3 tlin 7 cyuc 1 kcaok 0 tcan 1 dwat 6 m hkuc  
htut cyutli tcup hwicli hrasjltutnyikfrrip hpa7tli prikhwisslip  
hpa7tmwatli xre7t hjonli

drutta *Syringa vulgaris* is a deciduous Shrub growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: Flowers Edible Uses: Flowers - raw or folded into batter and fried to make fritters[183].

tcanta Dye Essential Hedge Hedge Rootstock An essential oil is obtained from the flowers. Used in perfumery[171]. A green dye is obtained from the flowers[168]. Green and brown dyes can be obtained from the leaves[168]. A yellow-orange dye is obtained from the twigs[168]. Plants can be grown as an informal hedge[200]. The plant is often used as a rootstock for the various ornamental cultivars of lilac. Its main disadvantage is that it can sucker very freely[200].

dwatta Antiperiodic Febrifuge Mouthwash Tonic Vermifuge The leaves and the fruit are antiperiodic, febrifuge, tonic and vermifuge[4]. The bark or leaves have been chewed by children as a treatment for sore mouth[257].

nrakta E. Europe. Occasionally naturalized in Britain[17]. ksakta Scrub on rocky hill slopes in Europe[50]. Found in hedges, thickets and shrubberies in Britain[17].

propta Seed - sow March in a north facing cold frame. Pre-treating the seed with 4 weeks warm then 3 weeks cold stratification improves germination. It is probable that sowing the seed as soon as it is ripe in a cold frame would be a more reliable method[K]. Prick the seedlings out into individual pots once they are large enough to handle. Plant them out in the summer if sufficient growth has been made, otherwise grow them on in a cold frame for their first winter and plant out in late spring of the following year. Cuttings of young shoots, 7cm with a heel, June in a frame[200]. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame[200]. Layering in spring before new growth begins. Takes 12 months[78]. Division of suckers in late winter. They can be planted straight out into their permanent positions.

nrwatta Landscape Uses: Border, Standard, Seashore, Specimen. Succeeds in most soils, including chalk, but dislikes acid soils[11]. Prefers a deep stiff well-drained loam in a warm sunny position[11, 200]. A very ornamental plant[1], it does tend to sucker quite freely though[200]. There are many named varieties, developed for their ornamental value[182]. The flowers attract butterflies and moths[30]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy.

### 3.2.75 *Symphoricarpos albus laevigatus*

Snowberry  
3 tlin 7 cyuc 1 kcaok 0 tcan 2 dwat 3 m hkuc  
pcimhmimhtut cyutli kyntcup hwicli hyshrasjltutnyikfrrip  
hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Symphoricarpos albus laevigatus* is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pista The fruit contains saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins but it would take extremely large doses of many kilos of fruit from this plant in order to produce toxic symptoms[65]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 161]. An insipid flavour, it is best if cooked[177]. The fruit is rather boring[K]. The fruit is about 15mm in diameter[200]. See the notes at top of page regarding possible toxicity.

tcanta Broom Cosmetic Disinfectant Hair Hedge Hedge Soap Soil stabilizationPlants have extensive root systems and are used to stabilize soils on banks and slopes[200]. The branches can be tied together and used as a broom[99, 257]. The berries contain saponins and have been used as a hair wash[257]. A mild decoction of the wood has been used as a cleansing wash for babies[257]. The crushed berries have been rubbed into the armpits as an antiperspirant[257]. Very tolerant of trimming, it can be grown as a medium to tall hedge[29]. Its main drawback as a hedge is its propensity to sucker[K].

dwatta Disinfectant Diuretic Febrifuge Laxative Ophthalmic Poultice Salve Skin Stomachic TB VD WartsSnowberry was commonly employed medicinally by several native North American Indian tribes who valued it especially for the saponins it contains. These saponins can be toxic, but when applied externally they have a gentle cleansing and healing effect upon the skin, killing body parasites and helping in the healing of wounds. The native Americans used it to treat a variety of complaints but especially as an external wash on the skin[257]. The plant is little, if at all, used in modern herbalism. Any internal use of this plant should be carried out with care, and preferably under the supervision of a qualified practitioner. See the notes above on toxicity. The whole plant is disinfectant, diuretic, febrifuge and laxative[257]. An infusion of the stems has been drunk to treat stomach problems and menstrual disorders[213]. A decoction of the leaves has been used in the treatment of colds[257]. A poultice of the chewed leaves has been applied, or an infusion of the leaves has been used as a wash, in the treatment of external injuries[257]. A weak solution of the stems and leaves has been used as a wash for children whilst a stronger solution is applied to sores[213]. The fruit has been eaten, or used as an infusion, in the treatment of diarrhoea[257]. An infusion of the fruit has been used as an eye wash for sore eyes[257]. The berries have been rubbed on the skin as a treatment for burns, rashes, itches and sores[257]. The berries have also been rubbed on warts in order to get rid of them - this treatment needs to be carried out at least three times a day for a period of a few weeks[257]. A poultice of the crushed leaves, fruit and bark has been used in the treatment of burns, sores, cuts, chapped and injured skin[257]. An infusion of the roots has been used in the treatment of fevers (including childhood fevers), stomach aches and colds[257]. A decoction of the root bark has been used in the treatment of venereal disease and to restore the flow of urine[257]. An infusion of the root has been used as an eyewash for sore eyes[257]. An infusion of the whole plant has been drunk and also applied externally in the treatment of skin rashes[257]. A decoction of the roots and stems has been used in the treatment of the inability to urinate, venereal disease, tuberculosis and the fevers associated with teething sickness[257].

nrakta Western N. America. Naturalized in Britain[17]. ksacta Banks and flats in canyons and near streams below 1200 metres in California[71].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months warm then 5 months cold stratification[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood, 15 - 25cm long preferably with a heel, in a sheltered bed outdoors in winter. High percentage[78, 200]. Division of

suckers in winter. They can be planted straight Tu into their permanent positions.

nwnatta Tolerates most soils and conditions, including poor soils and amongst the roots and under the drip of trees[11, 200]. Grows well in heavy clay soils. Prefers a well-drained soil[200]. Does well in sun or shade[1]. Tolerates urban pollution and maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -40°C[200]. A very ornamental but invasive plant, spreading by means of suckers[1, 11]. Its flowers are much visited by bees and the fruit is very attractive to wild life[1, 94]. There are some named varieties, developed for their ornamental value[11]. 'Constance Spry' bears a copious crop of large round berries. Plants in this genus are notably resistant to honey fungus[200].

### 3.2.76 *Lysimachia clethroides*

Gooseneck Loosestrife, Gooseneck yellow loosestrife, Japanese Loosestrife, Shepherd's Crook

3 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrsajlutnyikfrip hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Lysimachia clethroides* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: CondimentLeaves and young shoots - cooked and used as a vegetable[183]. A famine food, they are only used when all else fails[179]. They can also be used as a condiment[46, 61, 183]. Fruits and flowers are said to be edible[177, 183] but no further details are given. The fruit is very small[200].

nrakta E. Asia - China, Japan. Naturalized in Holland. ksacta Sunny grassy hills and at low altitudes in mountains all over Japan[58, 187]. Damp woodland margins, wet ravines and grassy mountain slopes at elevations of 300 - 2100 metres in China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwnatta Landscape Uses:Border, Container, Ground cover, Massing, Specimen, Woodland garden. An easily grown plant, succeeding in a moist loamy soil[1]. Grows well in heavy clay soils. Succeeds in sun or semi-shade[188]. Hardy to about -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Succeeds in a woodland or semi-wild garden, it often spreads wildly[200]. Special Features:Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers.

### 3.2.77 *Symphoricarpos occidentalis*

Wolfberry, Western snowberry

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc pcmhmmhtut cyutli kyuctcup hwicli hyishrsajlutnyikfrip hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Symphoricarpos occidentalis* is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista No report of toxicity has been seen for this species but the fruit of many if not all members of this genus contains saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also destroyed by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins but it would take extremely large doses of many kilos of fruit from this plant in order to produce toxic symptoms[65]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[161]. Insidip. They are best if cooked. A famine food, they are only used when all else fails[177, 257]. The fruit is about 8mm in diameter[200]. See the notes at top of page regarding possible toxicity.

tcanta Broom Hedge Hedge Soil stabilization Plants have extensive root systems and are used to stabilize soils on banks and slopes[200]. The branches can be made into brooms[257]. Very tolerant of trimming, it can be grown as a medium to tall hedge[200].

dwatta Birthing aid Ophthalmic An infusion of the leaves has been used as a wash for weak and inflamed eyes[257]. An infusion of the root has been used to cleanse the afterbirth and aid in convalescence[257].

nrakta Western N. America - Illinois, Michigan and Minnesota to British Columbia, Kansas and Colorado. ksacta Bluffs, dry prairies and plains[43], mainly in the Rockies[11].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months warm then 5 months cold stratification[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, 15 - 25cm long preferably with a heel, in a sheltered bed outdoors in winter. High percentage[78, 200]. Division of suckers in winter. They can be planted out direct into their permanent positions.

nwatta Tolerates most soils and conditions, including poor soils and amongst the roots and under the drip of trees[11, 200]. Grows well in heavy clay soils. Prefers a well-drained soil[200]. Does well in sun or shade[1]. Tolerates urban pollution and maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -40°C[200]. Plants in this genus are notably resistant to honey fungus[200].

### 3.2.78 *Aconitum lycoctonum vulparia*

Wolffbane

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltutnykfrrip hpa7tli flatprik-  
wislissip hpa7tmwatli xre7t hjonli

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

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 13, 65].

kcakta Some reports suggest the root is edible if cooked[2, 105], but these should be treated with extreme caution due to the highly toxic nature of the plant[K].

dwatta Analgesic Anodyne Diaphoretic Diuretic Irritant Sedative The root is analgesic, anodyne, diaphoretic, diuretic, irritant, sedative[4, 7, 9, 165]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta Europe to Asia ksacta Woods and bushy places in damp shady places.

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. An aggregate species which is divided by some botanists into many species.

### 3.2.79 *Aconitum napellus*

Aconite, Venus' chariot, Wolfsbane Garden, Monk's Hood Garden

3 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltutnykfrrip hpa7tli frusflat-  
prikwislissip hpa7tmwatli xre7t hjonli

drutta *Aconitum napellus* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from February to October, in flower from July to August, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic, acting especially on the nerve centres. At first it stimulates the central and peripheral nervous system and then paralyzes it. Other symptoms of poisoning include a burning sensation on the tongue, vomiting, stomach pain and diarrhoea. Simple skin contact with the plant has caused numbness in some people[4, 7, 9, 10, 14, 19, 65, 76, 244]. The root contains 90% more poison than the leaves[232].

kcakta Some reports suggest the root is edible if cooked[2, 177], but these should be treated with extreme caution due to the highly toxic nature of the plant[K].

dwatta Analgesic Anodyne Antirheumatic Diaphoretic Diuretic Febrifuge Homeopathy Irritant Sedative Aconite has been used since ancient times, especially as an antidote to poisoning[244]. Since the entire plant is itself very toxic, however, any use should be under the guidance of a skilled practitioner[4]. All parts of the plant are used medicinally. The root is the most important and this is harvested as soon as the plant dies down in the autumn and is dried before use[4]. The other parts of the plant are less important and are used fresh, being harvested when the plant is coming into flower[4]. The root is analgesic, anodyne, antirheumatic, diaphoretic, diuretic, irritant and sedative[4, 7, 9, 165, 200]. Due to its poisonous nature, it is not normally used internally though it has been used in the treatment of fevers[200]. Externally, it is applied to unbroken skin in the treatment of rheumatism, painful bruises, neuralgia etc[200, 254]. All parts of the plant, except the root, are harvested when the plant is in flower and used to make a homeopathic medicine[232]. This is analgesic and sedative and is used especially in the treatment of fevers, inflammation, bronchitis, neuralgia etc[9, 232].

nrakta Most of Europe, including Britain, east to N. W. Asia and the Himalayas. ksacta Damp shady places and moist rich meadows in southern Wales and south-western England[7, 13, 31, 165, 176]. It is usually found in calcareous soils[9].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant



them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Landscape Uses:Border, Container, Massing, Woodland garden. Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Plants only thrive in a sunny position if the soil remains moist throughout the growing season[238]. Prefers a calcareous soil. Tolerates a pH in the range 4.5 to 7.5. Plants take 2 - 3 years to flower when grown from seed[244]. Grows well in open woodlands[1, 4]. The flowers are very attractive to bees[244]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. Although the plant is a perennial, individual roots only live for one year and die after flowering. Each root produces a number of 'daughter' roots before it dies and these can be used for propagating the plant[4]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. An aggregate species which is divided by some botanists into many species[17, 76]. Special Features:Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers.

### 3.2.80 *Berberis koreana*

Korean Barberry, Barberry

3 tlin 7 cyuc 1 kcaok 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli kyuctucp hwicli hyishrasjlutnykfrip hpa7tli flatprik  
lwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis koreana* is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked. The fruits are about 5mm long[200]. Young leaves - cooked[177].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumor activity[218].

nrakta E. Asia - Korea. ksacta Hedgerows, ledges and montibus[11, 67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Landscape Uses:Erosion control, Pest tolerant, Hedge, Massing, Screen, Superior hedge, Woodland garden. Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A very hardy plant, tolerating temperatures down to about -30°C[200]. Plants can be pruned back quite severely, they resprout well from the base[200]. Very stoloniferous, plants produce

suckers freely[67, 200]. A very ornamental plant[67], it is closely related to *B. vulgaris*[1]. Hybridizes freely with other members of this genus[1]. The flowers are produced late in spring, thereby escaping spring frosts[67]. Special Features: Not North American native, Inconspicuous flowers or blooms.

### 3.2.81 *Aconitum lycoctonum*

Wolfsbane

3 tlin 7 cyuc 1 kcaok 0 tcan 1 dwat 1 m hkuc  
hmimhtut cyutli tucp hwicli hrasjlutnykfrip hpa7tli flatprik  
lwis hpa7tmwatli hjonli

drutta *Aconitum lycoctonum* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

kcakta There is a report that this root has been boiled and used for food in Lapland[2]. However, this is a very poisonous plant and such a use is very inadvisable[K].

dwatta Alterative Anaesthetic Antiarthritic Antitussive. Deobstruent Diaphoretic Diuretic Sedative StimulantThe root is alterative, anaesthetic, antiarthritic, antitussive, deobstruent, diaphoretic, diuretic, sedative and stimulant[178]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta Europe to W. Asia. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. If the flower stems are removed after flowering the plant will normally flower again later in the season[200]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. A polymorphic species[1]. The nomenclature is very confused for this species, *A. lycoctonum*. L. is treated as *A. septentrionale* by many botanists whilst *A. lycoctonum*. Auct. is *A. vulparia*[50].

### 3.2.82 *Solidago graminifolia*

Flat-Topped Goldenrod

3 tlin 7 cyuc 1 kcaok 0 tcan 1 dwat 1.5 m hkuc  
hmimhtut cyutli tucp hwicli hrasjlutnykfrip hpa7tli flatprik  
lwis hpa7tmwatli xre7t hjonli

drutta *Solidago graminifolia* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe fresh or dried leaves are a tea substitute[183].

tcanta Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Febrifuge Pectoral Antiseptic. An infusion of the dried powdered herb can be used[168]. A decoction of the root has been used in the treatment of chest pains and lung problems[257]. An infusion of the blossoms has been used in the treatment of some types of fevers[257]. nrakta N. America - British Columbia to Alberta, south to Florida and New Mexico. ksacta Damp to dryish shores, thickets and meadows[204].

propta Seed - sow spring in a cold frame. Only just over the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. This plant has become a weed in its natural range and can be invasive under cultivation[200]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

### 3.2.83 Ranunculus repens

Creeping Buttercup, Prairie Double-flowered Buttercup, Water Buttercup, Creeping Buttercup  
3 tlin 8 cyuc 1 kcaok 0 tcan 1 dwat 0.3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ranunculus repens is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. It is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[19], the toxins being destroyed by heat or by drying[65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: Leaves Root Edible Uses: Leaves - cooked and used as a pot-herb[2, 105]. A famine food, used when all else fails, and I would rather give it a miss even then[K]! See the notes above on toxicity. Root - must be dried beforehand and thoroughly cooked[118]. Personally, I would rather give this one a miss[K], see the notes above on toxicity.

dwatta Analgesic Rubefacient The entire plant is analgesic and rubefacient[257]. A poultice of the chewed leaves has been used in the treatment of sores, muscular aches and rheumatic pains[257]. Some caution is advised in the use of this plant, see the notes above on toxicity.

nrakta Europe, including Britain, from Norway south and east to Spain, through Asia to China and Japan. ksacta Wet meadows, pastures, woods, dune slacks etc[19]. A common and rampant weed, avoiding acid soils[19].

propta Seed - sow spring in a cold frame. A very common weed, it doesn't really need any help from us. Division in spring. Very easy, though probably totally unnecessary, larger divisions can be planted out direct into their permanent positions.

nwatta Landscape Uses: Ground cover, Woodland garden. Prefers a moist loamy soil on the heavy side. A rampantly spreading weed of grassland, few gardeners would want to introduce it to their land[K]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Wetlands plant, Extended bloom season in Zones 9A and above. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

### 3.2.84 Athyrium niponicum

Painted Fern, Japanese Silver Painted Fern  
3 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat 0.3 m hkuc  
pcimhmim cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli frusflatprikliwis hpa7tmwatli hjonli

drutta Athyrium niponicum is a FERN growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves Edible Uses: Very young fronds (croziers) - boiled[177]. Some caution is advised. See the notes above on toxicity.

nrakta E. Asia - China, Japan, Korea. ksacta Shaded places in lowland all over Japan[58].

propta Spores - surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses: Alpine garden, Border, Container, Massing, Rock garden, Woodland garden. An easily grown plant, it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. Succeeds in a semi-shaded bog-garden or in damp woodland, also in garden borders in full or part shade[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage.

### 3.2.85 Monarda menthifolia

Mint-Leaved Bergamot, Mintleaf bergamot  
3 tlin 7 cyuc 1 kcaok 0 tcan 2 dwat m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda menthifolia is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Edible Uses: Tea Leaves - used as an aromatic tea[212]. The leaves are a very common and popular potherb with the Hopi Indians - they are gathered and dried in bundles for winter use[216].

dwatta Anaesthetic Antiseptic Diaphoretic The leaves and flowering stems are anaesthetic, antiseptic and diaphoretic[238]. An infusion is used in the treatment of fevers and sore throats[257]. The pulverized plant has been rubbed on the head to bring relief from a headache[257]. An infusion of the plant is used as a wash on wounds[257]. The plant is a source of the medicinal essential oil 'thymol', which is antiseptic[212].

nrakta N. America - Manitoba to Alberta, south to Arizona and Texas. ksacta Medium-dry to moist soils in valleys,

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nrwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Requires a moist soil and a sunny position[200]. A good bee plant[200]. Subject to mildew in dry summers[200]. The Hopi Indians occasionally cultivate this plant as a pot herb[216].

### 3.2.86 *Athyrium filix*

Lady Fern, Common ladyfern, Subarctic ladyfern, Asplenium ladyfern, Southern Lady Fern, Tatting Fer  
3 tlin 8 cyuc 1 kcak 2 tcan 2 dwat 0.6 m hkuc  
pcimhmit cyuti tcup hwicli hrsajlutnyikfrip hpa7tli frusflat-prikwlis hpa7tmwatli hjonli

drutta *Athyrium filix-femina* is a deciduous Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The fresh shoots contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. Although we have found no reports for this species, a number of ferns also contain carcinogens so some caution is advisable[200].

kcakta Edible Parts: Leaves Root Edible Uses: Young shoots, harvested before they have fully unfolded, can be eaten cooked[256]. They must not be eaten raw - see the notes above on toxicity[172]. Used in spring, they are a bitter emergency food[172]. Rhizome - peeled and slow-baked[118, 257]. Reports that the roots of this plant were eaten by native North American Indians are likely to be mistaken, it was probably *Dryopteris expansa* that was used[256].

tcanta A good ground cover plant[200], forming a slowly spreading clump[208]. The cultivar 'Minor' has a denser habit and spreads more freely, making a better cover[208].

dwatta Anthelmintic Diuretic Poulitice Women's complaints A tea of the boiled stems has been used to relieve labour pains[213, 222, 257]. The young unfurled fronds have been eaten to treat internal ailments such as cancer of the womb[257]. The roots are anthelmintic and diuretic[4, 222]. A tea of the boiled roots has been used to treat general body pains[213, 257], to stop breast pains caused by childbirth and to induce milk flow in caked breasts[222, 257]. The dried powdered root has been applied externally to heal sores[222, 257]. A liquid extract of the root is an effective anthelmintic, though it is less powerful than the male fern, *Dryopteris filix-mas*[4].

nrakta Throughout the N. Temperate zone, including Britain, to the mountains of India, tropical S. America. ksacta Moist sheltered woods, hedgebanks and ravines[4], usually on acidic soils but also found in drier and more open habitats[187].

propta Spores - surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle

and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nrwatta Landscape Uses: Border, Container, Foundation, Ground cover, Massing, Woodland garden. An easily grown plant[4], it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. A very ornamental [1] and polymorphic species, there are many named varieties selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Naturalizing, Wetlands plant. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 3.2.87 *Betula ermanii*

Gold Birch  
3 tlin 7 cyuc 0 kcak 3 tcan 1 dwat 25 m hkuc  
hmimhtut cyuti tcup hwicli hyishrsajlutnyikfrip hpa7tli flat-prikwlis hpa7tmwatli hjonli

drutta *Betula ermanii* is a deciduous Tree growing to 25 m (82ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Pioneer The tree colonizes poor soils and cleared woodlands in the wild[11]. This makes it suitable for use as a pioneer species for re-establishing woodlands. It is a quite short-lived species, but grows fairly quickly and creates suitable conditions for more permanent trees to become established. Because its seedlings do not grow well in shady conditions, the birch is eventually out-competed by the other woodland trees.

dwatta Antiseborrheic Vulnerary Vulnerary. The bark is used to bandage wounds[61].

nrakta N.E. Asia - China, Japan. ksacta Mountains all over Japan[58].

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

nwatta Succeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. A very polymorphic species[58], it hybridizes freely with other members of this genus[50]. The young growth in spring is subject to damage by late frosts[1]. A colonizer of poor soils and cleared woodlands, it tolerates very poor soils[11]. Trees are notably susceptible to honey fungus[200].

### 3.2.88 *Cornus alternifolia*

Green Osier, Alternatleaf dogwood, Alternate Leaf Dogwood, Golden Shadoks Pagoda Dogwood, Green Osier

3 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 6 m hkuc  
htut cyutli kyucupc hwcil hrasjlutnykfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Cornus alternifolia* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dye WoodA light to dark-brown dye is obtained from the roots with the addition of vinegar[226]. Wood - heavy, hard, close grained. It is too small to be of commercial value, but is used locally for turnery[82, 229].

dwatta Anthelmintic Antiaphonic Astringent Diaphoretic Febrifuge Ophthalmic Poultice Stimulant VDGreen osier was employed medicinally by a number of native North American Indian tribes who valued it particularly for its astringent bark which was used both internally and externally to treat diarrhoea, skin problems etc[257]. It is little used in modern herbalism. The dried bark is used as an astringent, diaphoretic and stimulant[213, 257]. The inner bark was boiled and the solution used as an enema[213] and this solution was also used as a tea to reduce fevers, treat influenza, diarrhoea, headaches, voice loss etc[213, 257]. It was used as a wash for the eyes[257]. A compound infusion of the bark and roots has been used to treat childhood diseases such as measles and worms[257]. It has also been used as a wash on areas of the body affected by venereal disease[257]. A poultice of the powdered bark has been used to treat swellings, blisters etc[257].

nrakta Eastern N. America - Newfoundland to Florida, west to Manitoba and Arkansas. ksacta Dry woods and rocky slopes[43]. Rich woodlands and forest margins in moist well-drained soils[82].

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

nwatta Landscape Uses:Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils and in dry soils. Succeeds in full sun or light shade[188]. Plants are hardy to about -25°C[184]. A fast-growing but short-lived species in the wild[229], it is closely related to *C. controversa*[200]. This species is unusual in having alternate leaves whilst almost all other members of this genus have opposite leaves[182]. Plants have a thin bark and this makes them susceptible to forest fires[229]. There is at least one named form selected for its ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: At-

tracts birds, North American native, Attractive flowers or blooms.

### 3.2.89 *Filipendula rubra*

Queen Of The Prairie, Meadowsweet

3 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 2.5 m hkuc  
hmimhtut cyutli tcuphja7n hwcil hrasjlutnykfrip hpa7tli  
prikwis hpa7tmwatli fyfxfre7t hjonli

drutta *Filipendula rubra* is a PERENNIAL growing to 2.5 m (8ft) by 1.3 m (4ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Analgesic Antiinflammatory Astringent Cardiac DysenteryThe root is rich in tannin, it is used as an astringent in the treatment of diarrhoea, dysentery, bleeding etc[222]. It has also been used in the treatment of various heart complaints[257]. The plant probably contains salicylic acid, the chemical forerunner of aspirin[222]. This is anti-inflammatory and analgesic[222].

nrakta Eastern N. America - Pennsylvania to Georgia, west to Michigan and Iowa. ksacta Moist meadows and bogs[222].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Specimen. Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils[1, 17]. Does well in marshy soils[24, 200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Although the plants are perfectly hardy in Britain, they appreciate the winter protection of bracken or some similar mulch when grown in areas of prolonged frosts[200]. Plants spread fairly freely and form large clumps[233]. There is at least one named variety, selected for its ornamental value[200]. The flowers are very attractive to bees[24, 30]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, North American native, Suitable for cut flowers.

### 3.2.90 *Aconitum carmichaelii*

Japanese Aconite, Carmichael's monkshood

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwcil hrasjlutnykfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Aconitum carmichaelii* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcisat The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 238].

dwatta Anaesthetic Analgesic Antiinflammatory Antirheumatic Cardiotonic VasodilatorA widely used herbal remedy in China, where it is cultivated for its root[218]. This is harvested in the autumn as the plant dies down and is then dried before being used. The root is anaesthetic, analgesic,

anti-inflammatory, antirheumatic, cardiotoxic, stimulant and vasodilator[176, 218, 238]. It is used in the treatment of shock and collapse, chronic diseases with symptoms of cold, gastralgia and rheumatic arthralgia, oedema and diarrhoea due to hypofunction of the spleen and kidney[176]. A tincture of the root is used externally in the treatment of rheumatism, arthralgia, sprains, contusions etc[283]. Use with great caution, the plant contains the toxic alkaloid aconitine and is very poisonous - should not be used internally[218] unless under the direction of a qualified practitioner[238, 283]. Overdoses lead to numbness of the tongue, lips and extremities, nausea, vomiting, irritability and coma[176].

nrakta E. Asia - C. and W. China to N. America. ksacta Forest margins, scrub, grassy slopes and mountains at elevations of 100 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Plants will only thrive in a sunny position if the soil remains moist throughout the growing season[238]. Prefers a calcareous soil. This species is not included in the Flora of North America[270] and so it should be considered doubtful that its range includes this region. A very ornamental plant[233], there are some named forms[238]. It grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. fischeri* and considered to be part of that species by some botanists[1].

### 3.2.91 *Chelone glabra*

Balmomy, White turtlehead

3 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 1 m hkuc  
hmimhtut cyutli tcuphja 7n hwicli hrasjlutnyikfrip hpa 7tli flat-  
prikklwis hpa 7tmwatli xre 7t hjonli

drutta *Chelone glabra* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Antibilious Aperient Appetizer Cathartic Cholagogue Detergent Tonic Vermifuge Balmomy is a very bitter herb with a tea-like flavour that acts mainly as a tonic for the liver and digestive system[238]. It has long been held in esteem in N. American folk medicine, though it has never been investigated scientifically[268]. The herb also has antidepressant and laxative effects[238]. A decoction of the whole herb is antibilious, aperient, appetizer, cathartic, cholagogue, detergent, tonic, vermifuge[4, 21, 46, 61, 165, 207, 222]. It is used internally in the treatment of consumption, debility, diseases of the liver, gallbladder problems, gallstones etc[4, 254]. It is also used to relieve nausea and vomiting, intestinal colic and to expel worms[254]. Its tonic effect upon the digestive system has made it of benefit in the treatment of anorexia nervosa[268]. Externally, it is applied as a soothing ointment to piles, inflamed tumours, irritable ulcers, inflamed breasts etc[4, 268]. The plant is harvested when in flower and is dried for later use[238].

nrakta Eastern N. America - Newfoundland to Ontario and Minnesota, south to Georgia and Missouri. ksacta Margins of swamps, wet woods and rivers[4, 43].

propta Seed - sow spring in a cold frame and keep moist. The seed germinates in 2 - 6 weeks at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. Plant them out into their permanent positions in the spring or early summer.

Division in autumn[1]. Cuttings of soft tips in summer in a sandy soil in a frame[200].

nwatta Easily grown in any ordinary soil, but it grows best in a light loam[1]. Tolerates heavy clays and light shade[1, 200]. Prefers growing in light shade[238]. Survives but does not thrive in dry conditions[200]. Prefers growing in a bog garden or in a soil that is unlikely to dry out[200]. Plants are very cold-hardy, tolerating temperatures down to about -20°C[187]. A polymorphic species, there are several named forms[43]. The plant spreads freely at the roots and so is best grown in a large pot[4].

### 3.2.92 *Solidago rigida*

Stiff Goldenrod, Flat Topped Goldenrod, Stiff Goldenrod  
3 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1.2 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa 7tli flatprik-  
klwis hpa 7tmwatli xre 7t hjonli

drutta *Solidago rigida* is a PERENNIAL growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Dye LatexA good quality rubber can be made from a latex that is obtained from the leaves[46, 61]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Astringent Cathartic Diuretic Stings Stypitic The leaves and blossoms are antiseptic, astringent and stypitic[4, 168]. A valuable remedy in the treatment of all kinds of haemorrhages[4]. The flowers have been ground into a lotion and used to treat bee stings[213, 257]. An oil obtained from the plant (is this an essential oil?) is diuretic[4]. The root is cathartic and diuretic[257]. A decoction of the root has been used as an enema[257]. An infusion has been used to restore the flow of urine[257].

nrakta Eastern N. America - Ontario to Saskatchewan, south to Massachusetts, Georgia, Texas and Colorado. ksacta Dry or gravelly open woods, thickets and prairies[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

### 3.2.93 *Lobelia cardinalis*

Cardinal Flower

3 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 1 m hkuc  
hmimhtut cyutli tcuphja 7nhs6s hwicli hrasjlutnyikfrip  
hpa 7tli flatprikklwis hpa 7tmwatli xre 7t hjonli

drutta *Lobelia cardinalis* is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade

(woodland) or no shade. It prefers moist or wet soil and can grow in water.

**pcista** The plant is potentially toxic, but the degree of toxicity is unknown[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274]. A sample of the plant has been known to cause skin irritation[274].

**dwatta** Analgesic Anthelmintic Antispasmodic Emetic Epilepsy Expectorant Febrifuge Homeopathy Nervine StomachicEmetic, expectorant and nerve[4, 61]. The root is analgesic, anthelmintic, antispasmodic and stomachic[4, 61, 257]. A tea made from the roots has been used in the treatment of epilepsy, syphilis, typhoid, stomach aches, cramps, worms etc[222, 257]. A poultice of the roots has been applied to sores that are hard to heal[257]. The leaves are analgesic and febrifuge[257]. A tea made from the leaves is used in the treatment of croup, nosebleeds, colds, fevers, headaches etc[222]. A poultice of the leaves has been applied to the head to relieve the pain of headaches[257]. This species is considered to have similar medicinal activity to *L. inflata*, but in a milder form[222]. It was seldom if ever used[222]. The plant is used to make a homeopathic remedy[4]. The report does not say which part of the plant is used, nor what it treats.

**nrakta** N. America - New Brunswick to Quebec, south to Florida and Texas. **ksacta** Damp shores, meadows and swamps[43].

**propta** Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

**nwatta** Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Requires a deep rich soil and plenty of moisture[1, 200]. Grows well in heavy clay soils. Succeeds in standing water though is not then so long lived[200]. Succeeds in full sun or light shade[200]. Requires protection from the wind[200]. Dormant plants are hardy to at least -25°C[187], though they can be excited into premature growth in mild winter areas and are then more susceptible to frost damage[200]. A very ornamental plant[1]. Hybridizes freely with other members of this genus. Special Features:Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

### 3.2.94 *Helleborus niger*

Black Hellebore

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc  
hmim cyutlp tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw  
hpa7tmwatli xre7t hjonli

**drutta** *Helleborus niger* is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from January to February, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy

(clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

**pcista** All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76]. The fresh root can be a violent irritant to sensitive skin[244].

**tcanta** Miscellany ParasiticideUsed as a parasiticide against body lice, fleas etc[76]. This use is somewhat dangerous, see the notes above on toxicity. The powdered root has been used as a snuff[245]. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

**dwatta** Anthelmintic Antiemetic Cardiac Cathartic Diuretic Emetic Emmenagogue Homeopathy Irritant Miscellany Narcotic Parasiticide PurgativeBlack hellebore is a very poisonous plant that is toxic when taken in all but the smallest doses. As such it should not be taken except under professional supervision. The plant contains cardiac glycosides which have a similar action to the foxglove (*Digitalis* spp) and it has been used as a heart stimulant for the elderly, though this treatment is no longer recommended[254]. The root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagogue, irritant, violently narcotic and a drastic purgative[4, 9, 21, 46, 240]. It is harvested in the autumn and dried for later use[4]. It has been used in the treatment of dropsy, amenorrhoea, nervous disorders and hysteria, but it is very poisonous and great care must be taken over the dosage[4]. The root is also applied externally as a local irritant[4], but even this should be done with care, see notes above on toxicity. A homeopathic remedy is made from the roots[9]. It is used in the treatment of headaches, psychic disorders, enteritis and spasms[9].

**nrakta** S.E. and C. Europe. **ksacta** Woods and thickets, mainly in mountains, on calcareous soils[50, 187]. Sometimes also found in grassland[187].

**propta** Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as possible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. Division after flowering or in autumn. Take care since the plant resents disturbance[111, 200].

**nwatta** Cultivation of this plant is not always easy, it prefers a rich limy soil in partial shade[187]. Succeeds in any good garden soil[1], growing and flowering best in a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 111, 244]. Succeeds when grown in the shade of a north-facing wall[233]. Does not object to lime[1]. Grows well in heavy clay soils[200]. Dislikes drought. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. Plants can flower in three years from seed[4]. A very ornamental plant, there are many named varieties[187]. Plants resent root disturbance and are slow to re-establish when divided[244]. They are best left undisturbed for 6 - 7 years before being divided[244]. Seedling plants should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 3.2.95 *Alchemilla mollis*

Lady's-mantle

3 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat m hkuc  
pcimhmimhtut cyutlp tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw  
hpa7tmwatli fyif hjonli

**drutta** *Alchemilla mollis* is a deciduous Perennial growing to 0.6 m (2ft) by 0.8 m (2ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

**tcanta** A good ground cover plant. Grow as ground cover in shade or or beneath open shrubs and trees. Will self-seed

to gravel or cracks between paving. Great at the front of borders, as edging for paths or massed as a ground cover. A clump-forming perennial forming dense, leafy mounds of light green leaves.

**nrakta** Native to southern Europe and grown throughout the world as an ornamental. **ksacta** Moist meadows, open woods, pastures and also on rock ledges in mountainous areas

**propta** Seed - sow spring in a cold frame. The seed usually germinates in 3 - 4 weeks at 16c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on a cold frame for their first winter, planting out in late spring or early summer. Division in spring or autumn. The divisions can be planted out direct into their permanent positions, though we find it best to pot them up and keep them in a sheltered position until they are growing away well.

**nwatta** An low growing herbaceous perennial plant making an excellent ground cover that grows in a clumping manner. Moist but well-drained soil in sun to partial shade. Sun exposure: Full sun, dappled shade, partial shade. Shade type: Damp. Hardiness: Hardy. Soil type: Well drained, blight, sandy, clay, heavy, moist. Soil pH: 5.5 to 7.5. Hardiness Zones: 3 to 8. The plant tolerates close to full shade. The Royal Horticultural Society has given it its prestigious Award of Garden Merit (AGM). Dies down completely in winter.

### 3.2.96 *Symphytum orientale*

White comfrey

3 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.8 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

**drutta** *Symphytum orientale* is a deciduous Perennial growing to 0.8 m (2ft 6in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

**pcista** This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used. Use topically on unbroken skin. May cause loss of appetite, abdominal pain, vomiting. Do not use with Eucalyptus. Do not combine with herbs containing pyrrolizidine alkaloids (e.g. agrimony, alpine ragwort, help, tansy ragwort) [301].

**tcanta** The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses: Border, Ground cover, Specimen. One of the more attractive comfrees. A good bee plant.

**nrakta** Native to: Lebanon-Syria, Turkey, Turkey-in-Europe, Ukraine. Introduced into: Slovakia, Czech Republic, France, Great Britain, Italy. **ksacta** Hedgerows and copses, on lane sides, by roads and railways, on waste ground. It is often naturalised, and sometimes regenerates from seed.

**propta** Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse

for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

**nwatta** A clump-forming, hairy, herbaceous to semi-evergreen perennial. Bell-shaped, white flowers in early summer. Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Not as invasive as other *Symphytum* species. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2]. This plant is the ornamental variety and so often mistaken for Common Comfrey it has the same distinct leaf continuation down the stem but is softer and more esthetically pleasing than Common Comfrey (*Symphytum officinal*).

### 3.2.97 *Primula auricula*

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc  
hmim cyutli tcup hwicli hrasjltutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

**drutta** *Primula auricula* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

**tcanta** When growing in the right conditions this species and its cultivars make a good ground cover[208]. They are best spaced about 30cm apart each way[208].

**dwatta** Antitussive The leaves are used as a remedy for coughs[4]. Used in the treatment of headaches[61].

**nrakta** Europe - Alps and Carpathian mountains. **ksacta** Rock crevices or wet alpine grassland[50].

**propta** Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in early spring in a cold frame. Germination is inhibited by temperatures above 20°C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn.

**nwatta** Prefers a freely-draining moderately fertile humus-rich sandy loam[200]. Prefers an alkaline soil[188]. Grows well in heavy clay soils[208]. Dislikes dry soils[200]. Requires some shelter from the summer sun[1, 200]. Grows well in the shade of a north wall but does not like growing under trees[208]. A very ornamental and polymorphic species[1]. The flowers are sweetly honey-scented[245].

## 3.2.98 Symphytum grandiflorum

Ground Cover Comfrey, Comfrey

3 tlin 9 cyuc 0 kcaak 4 tcan 0 dwat 0.4 m hkuc  
pcimhmim cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprik-  
lwis hpa7tmwatli xre7t hjonli

drutta *Symphytum grandiflorum* is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for *S. officinale*. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

tcanta A very good ground cover plant[188, 208]. It spreads rapidly to form a good carpet, rooting as it spreads, and should be spaced about 60cm apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses:Border, Container, Ground cover, Specimen, Woodland Forest Garden. Shelter for insects, nectary, Green mulch. Notable Products: Sheep and chicken food.

nrakta Europe - the Caucasus. Naturalized in Britain. ksacta Not infrequently naturalized in hedges and woods in S. England and the Midlands[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Grows well under trees[208]. There are some named varieties, selected for their ornamental value[200]. Plants can be invasive, often spreading freely by means of self-sown seed[200]. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features:Attractive foliage, Fragrant foliage, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 3.2.99 Carex sylvatica

Wood sedge

3 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 0.6 m hkuc  
hmimhtut cyutli tucphja7n hwicli jlutnyikfrp hpa7tli flat-  
prikrlwis hpa7tmwatli hjonli

drutta *Carex sylvatica* is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind, Insects. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta InsulationA good evergreen ground cover supplying winter interest. Can be used on slope or Banks. Good in containers. Can make a good edging plant. Deer resistant and shade tolerant. Recommended as a groundcover under trees and shrubs. Wildlife Habitat - provides cover for small wildlife. Fiber. *C. sylvatica* was used as wadding in order to retain heat by Laplanders (English Botany. Sowerby and Smith, 1802). Ornamental [318-1].

nrakta Europe, Asia, and far east to Iran.Introduced to North America, and New Zealand. ksacta Deciduous woodlands on heavy soils; Sometimes found in unwooded areas.

propta Propagate by plant division in spring or seeding in the fall.

nwatta *C. sylvatica* is a clump-forming, log-lived, evergreen to semi-evergreen perennial 0.15m to 0.6m (6 inches - 24 inches) high and a spread of 0.15m to 0.6m (6 inches - 24 inches). It has a moderate Growth Rate. It prefers sun to partial shade and loamy to clay soil. Soil moisture is wet, to moderate and soil pH: 5.8 - 7.0. it is drought intolerant. There are a few distinct subspecies. It can be evergreen or deciduous. Non-mycorrhizal. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length.

## 4 4 tlin

### 4.1 bwon

#### 4.1.1 Vicia faba major

Broad Bean, Fava Bean

tfo2n 4 tlin 10 cyuc 4 kcaak 3 tcan 1 dwat m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrp hpa7tli flat-  
prikrlwis hpa7tmwatli fyfjxre7t hjonli

drutta *Vicia faba major* is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Although often used as an edible seed, there are reports that eating the seed of this plant can cause the disease 'Favism' in susceptible people[7, 76]. Inhaling the pollen can also cause the disease[7, 218]. Favism, which is a severe haemolytic anaemia due to an inherited enzymatic deficiency[218], only occurs in cases of excessive consumption of the raw seed (no more details are given[K]) and when the person is genetically inclined towards the disease[7, 213]. About 1% of Caucasians and 15% of Negroids are susceptible to the disease[218].

kcakta Edible Parts: Leaves SeedEdible Uses: Immature seed - raw or cooked. Broad bean seeds are very nutritious and are frequently used as items of food. The seeds can be eaten raw when they are small and tender, as they grow older they can be cooked as a vegetable[2, 7, 16, 132, 183]. They



Use a very pleasant floury taste[K ]. There are some potential problems to the use of these seeds if they are consumed in large quantities[7 ] - see the notes above on toxicity. Mature seeds can be eaten cooked as a vegetable or added to soups etc[2 , 7 , 16 , 183 ]. They are best soaked for 12 - 24 hours prior to cooking in order to soften them and reduce the cooking time[K ]. They will also become more nutritious this way[K ]. The flavour is mild and pleasant with a floury texture[K ]. They can also be dried and ground into a flour for use in making bread etc with cereal flours[183 ]. The seed can also be fermented to make tempeh[183 ]. Made into a paste, they can be used as a sandwich filling[299 ]. The seed can be sprouted before being cooked[183 ]. Popped seeds can be salted and eaten as a snack or roasted like peanuts[183 ]. Young pods - cooked and eaten as a vegetable[183 ]. They quickly become fibrous as they grow larger[183 ], and also develop a hairy coating inside the pods that can become unpleasant as the pods get larger[K ]. Young leaves - cooked. They are very nutritious and can be used like spinach[105 , 183 ].

tcanta Fibre Soap makingAgroforestry Uses: The stems and leaves are sometimes used as a green manure[299 ]. Broad beans grow well with carrots, cauliflowers, beet, cucumber, cabbages, leeks, celeriac, corn and potatoes, but is inhibited by onions, garlic and shallots[18 , 20 ]. Other Uses: A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap. The dried stems can be burnt as a fuel[299 ].

dwatta DiureticThe seedpods are diuretic and lithon-  
triptic[7].

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in succession from late winter until early summer. Germination should take place in about 7 - 10 days. The earlier sowings should be of suitably hardy varieties such as the 'Longpods' whilst later sowings can be of the tastier varieties such as the 'Windsors'. By making fresh sowings every 3 weeks you will have a continuous supply of fresh young seeds from early summer until early autumn. If you want to grow the beans to maturity then the seed needs to be sown by the middle of spring. You may need to protect the seed from the ravages of mice. Another sowing can be made in middle to late autumn. This has to be timed according to the area where the plants are being grown. The idea is that the plants will make some growth in the autumn and be perhaps 15 - 20cm tall by the time the colder part of winter sets in. As long as the winter is not too severe, the plants should stand well and will grow away rapidly in the spring to produce an earlier crop. The plants will also be less likely to be attacked by blackfly. Make sure you choose a suitably hardy variety for this sowing.

nwatta Broad beans originated in warm temperate areas and can be cultivated from the cold temperate zone to the subtropics, and also at higher elevations from 1,300 - 3,800 metres in the tropics. It may flower well in the lowland tropics, but usually does not produce pods[299

]. The ideal temperature range in the growing season is between 18 - 27°C, at higher temperatures the flowers are often aborted[200

]. The plant requires an annual rainfall of 700 - 1,000mm, of which more than 60% should occur during the growing period[299

]. Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1

, 200

]. Grows well in heavy clay soils. Dislikes dry conditions according to some reports[87

, 200

], whilst another says that it is drought tolerant once established[132

]. Prefers a pH in the range 5.5 to 7[200

]. There are two main forms of this species - small seeded forms that are more commonly grown for feeding livestock and as a green manure, and larger seeded forms that are usually grown for human food. Of the larger seeded forms there are two main types:- 'Longpod' beans are the more hardy and can be sown in the autumn in cool temperate areas. 'Windsor' beans, which are considered to be finer flavoured, are less tolerant of the cold and so are best sown in spring[132

]. Autumn sown varieties are more susceptible to 'chocolate spot' fungus, this problem can be more alleviated by the addition of potash to the soil[87

]. Black fly can be a major problem. Autumn sown crops are less likely to be affected. Pinching out the soft tips of the plants, one they are tall enough and are beginning to flower, can reduce the problem since the blackfly always start on the soft shoots and then spread to the older stems. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200

]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

## 4.1.2 Desmanthus illinoensis

Prairie Mimosa, Illinois bundleflower  
tfo2n 4 tlin 8 cyuc 4 kcaak 1 tcan 1 dwat 1.3 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis  
hpa7tmwatli xre7t hjonli

trutta Desmanthus illinoensis is a PERENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaakta Edible Parts: SeedEdible Uses: Seed - cooked. Rich in protein but without much flavour[183]. The seedpods are about 25mm long and contain 3 - 5 small seeds[235]. They are freely borne in the plants native environment, but will have to be very freely produced in this country if it is to be a worthwhile crop[K].

tcanta Root bark of *D. illinoensis* has been found to contain N,N-DMT, NMT, N-hydroxy-N-methyltryptamine, 2-hydroxy-N-methyltryptamine, and gramine (toxic). The root bark is mixed with a native source of beta-Carbolines to produce a hallucinogenic drink called prairiehuasca, which is an analog of the shamanic brew ayahuasca.

dwatta Antipruritic OphthalmicA leaf tea has been used in the treatment of itchy skin[222, 257]. Five seeds have been placed in the eye at night and washed out in the morning to treat trachoma[257].

nrakta N. America - Ohio to N. Dakota, New Mexico to Mississippi. ksacta Prairies, river banks and fields[222, 235]. Ditches, stream bottoms, fields, roadsides and low areas, often on clay soils[274].

propta Seed - pre-soak for 12 hours in warm water and then sow in a cold frame in the spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer. If you have sufficient seed then it is probably worthwhile sowing some in situ in mid to late spring.

nwatta Agroforestry Services: Nitrogen Management: Standard Staple Crop: Protein Under DevelopmentRequires a moist but well-drained soil in full sun[200]. Plants are often found growing in clay soils in the wild[274]. Suitable for the wild garden or other naturalistic plantings[200]. In favourable situations this plant can self-sow to the point of nuisance[200]. This plant is being evaluated by the Land Institute of Salina, Kansas, as an edible legume for growing with perennial grains in a non-tillage permaculture system[183]. It is certainly worthy of more attention in this country, though the small seed size mitigates against its use[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 4.1.3 Vicia faba equina

Horsebean  
tfo2n 4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 1 m hkuc

ymikrip cyutli tcup hwicli hrasglutnyikfrif hpa7tli flatprikli-wiss hpa7tmwatli fyfxfre7t hjonli

drutta *Vicia faba equina* is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although often used as an edible seed, there is a report that eating the seed of this plant can cause the disease 'Favism' in susceptible people[76]. Favism only occurs in cases of excessive consumption of the seed (no more details are given[K]) and when the person is genetically inclined towards the disease[213].

kcakta Edible Parts: Leaves Seed Edible Uses: Seed - raw or cooked[27, 61]. It can be eaten before it is fully ripe in the same way as broad beans, the fully ripe seed requires overnight soaking to soften it before it is cooked. Leaves - cooked[105]. Used like spinach.

tcanta Fibre Green manure Soap making A good green manure crop, sown in autumn or spring. Relatively fast growing, producing a good bulk and fixing nitrogen[87]. The upright growth is not a very good weed suppresser though. A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap.

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1]. Grows well in heavy clay soils. Dislikes dry conditions[57]. Sometimes cultivated for its edible seed, more commonly as a green manure crop[87]. There are 2 main types, 'daffa' beans are the more hardy and can be sown in the autumn, whilst 'tic' beans are best sown in spring. The autumn sown varieties are more susceptible to 'chocolate spot' fungus (which can be remedied by the addition of potash to the soil) but are more likely to escape damage from aphids[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

#### 4.1.4 *Trifolium repens*

White Clover, Dutch Clover, Purple Dutch Clover, Shamrock, White Clover

tfo2n 4 tlin 8 cyuc 3 keak 4 tcan 2 dwat 0.1 m hkuc  
thtut cyutli tcup hwicli hyishrasglutnyikfrif hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Trifolium repens* is an evergreen Perennial growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant has been known to cause problems for grazing animals, though this has never happened in Britain[76]. The problem may be associated with the climate in which the plant is growing[76]. The species is polymorphic for cyanogenic glycosides[218]. The leaves and flowers of certain cyanogenic phenotypes contain a glycoside which releases cyanide on contact with the enzyme linamarase[218].

kcakta Edible Parts: Flowers Leaves Root Edible Uses: Condiment Tea Leaves - raw or cooked as a potherb[13, 94, 183]. The young leaves are harvested before the plant comes into flower and are used in salads, soups etc[9]. They can also be used as a vegetable, cooked like spinach[9]. The leaves are best cooked[172]. Flowers and seed pods are dried, ground into powder and used as a flour or sprinkled on cooked foods such as boiled rice[183]. Very wholesome and nutritious[115]. The young flowers can also be used in salads[144, 172, 183]. Root - cooked[172, 177]. The dried leaves impart a vanilla flavour to cakes etc[172]. Dried flowering heads are a tea substitute.

tcanta Fodder Green manure The plant makes a good green manure, it is useful for over-wintering, especially in a mixture with *Lolium perenne*[87]. Produces a good bulk. It is a host to 'clover rot' however, so should not be used too frequently[87]. It can be undersown with cereals or with tomatoes in a greenhouse (sow the seed before planting the tomatoes)[87]. Fairly deep rooting but not very fast growing[87]. A good fast ground-cover plant for a sunny position[87]. Nectary. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antirheumatic Antiscrophalatic Depurative Detergent Ophthalmic Tonic The plant is antirheumatic, antiscrophalatic, depurative, detergent and tonic[218]. An infusion has been used in the treatment of coughs, colds, fevers and leucorrhoea[257]. A tincture of the leaves is applied as an ointment to gout[218]. An infusion of the flowers has been used as an eyewash[257].

nrakta Europe, including Britain, from Norwath south and east to N. Africa, north and western Asia. ksacta Grassland and lawns, preferring a calcareous clay soil[9, 17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring[238].

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Understorey legume Fodder: Pasture Global Crop Management: Fodder Management: Hay Staple Crop: Protein Landscape Uses: Ground cover. Succeeds in a moist, well-drained circum-neutral soil in full sun, preferring a sweet calcareous clay soil. Succeeds in poor soils. A very important food plant for the caterpillars of many butterfly and moth species[30] it is also a good bee plant[54]. A good companion plant in the lawn, tolerating trampling[18, 54], but it dislikes growing with henbane or members of the buttercup family[18]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Polymorphic, there are many subspecies and varieties. Some varieties have also been selected for use in lawn mixes[183]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. Special Features: Not North American native, Invasive. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 4.1.5 *Vicia faba minuta*

Tick Bean

tfo2n 4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat m hkuc  
hmmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli fyifxre7t hjonli

drutta *Vicia faba minuta* is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although often used as an edible seed, there is a report that eating the seed of this plant can cause the disease 'Favism' in susceptible people[76]. Favism only occurs in cases of excessive consumption of the seed (no more details are given[K]) and when the person is genetically inclined towards the disease[213].

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[27, 61]. It can be eaten before it is fully ripe in the same way as broad beans, the fully ripe seed requires overnight soaking to soften it before it is cooked. Leaves - cooked[105]. Used like spinach.

tcanta Fibre Green manure Soap makingA good green manure crop, it is best sown in the spring. Relatively fast growing, producing a good bulk and fixing nitrogen[87]. The upright growth is not a very good weed suppresser though. A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap.

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1]. Grows well in heavy clay soils. Dislikes dry conditions[57]. Sometimes cultivated for its edible seed, though more commonly as a green manure crop[87]. Tick beans are not as winter-hardy as other forms of this species and so are best sown in the spring. The autumn sown varieties are more susceptible to 'chocolate spot' fungus (which can be remedied by the addition of potash to the soil) but are more likely to escape damage from aphids[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

## 4.1.6 *Alnus viridis crispa*

American Green Alder

tfo2n 4 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 3 m hkuc  
hmmimhtut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprklwis hpa7tmwatli hjonli

drutta *Alnus viridis crispa* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

tcanta Dye TeethAn orange-red to brown dye can be obtained from the bark[257]. Nitrogen fixer.

dwatta Abortifacient Appetizer Astringent Emetic Emmenagogue Haemostatic Poulitce Skin Stomachic Tonic-The bark is astringent, emetic, haemostatic, stomachic and

tonic[172]. The bark was burnt as an inhalant in the treatment of rheumatism[257]. The ashes were also used as a tooth cleaner[257]. A decoction of the inner bark has been used as a carminative to reduce gas in the stomach and as a febrifuge[257]. A decoction of the plant has been used in a steam treatment to bring about menstruation - it has been used as an abortifacient[257]. A poultice of the leaves has been used to treat infected wounds or sores[257]. The poultice was left in place over the wound until the leaves stuck to it and was then pulled off, removing the 'poison' with it[257]. An infusion of the plant tops was given to children with poor appetites[257].

nrakta Eastern N. America - Labrador to Alaska and Newfoundland and southwards. ksacta Rocky shores, slopes and mountains[43]. Singly or in thickets along streams, lakeshores, coasts, and bog or muskeg margins, or on sandy or gravelly slopes or flats, from sea level to 2000 metres[270].

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

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

## 4.1.7 *Alnus japonica*

Japanese Alder

tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 22 m hkuc  
hmmimhtut cyutli kyuctcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprklwis hpa7tmwatli hjonli

drutta *Alnus japonica* is a deciduous Tree growing to 22 m (72ft 2in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 4. It is in flower from February to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

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

dwatta CancerVarious species of alder, including this species, seem to contain antitumour compounds[218].

nrakta E. Asia - China, Japan. ksacta Wet lowlands all over Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in

the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

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

#### 4.1.8 Laburnum anagyroides

Laburnum, Golden chain tree

tfo2n 4 tlin 8 cyuc 0 kcaak 4 tcan 1 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikrlwis hpa7tmwatli xre7t hjonli

drutta Laburnum anagyroides is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, and especially the seed, are poisonous[1, 61].

tcanta Insecticide Rootstock WoodThis plant is often used as a rootstock for other members of the pea and bean family[11]. The seeds contain the poisonous alkaloid 'cystisine'. This has insecticidal properties similar to nicotine (Nicotiana spp.) but cannot be recommended for use since it needs to be used in such a concentration that it can then be absorbed over a wide area of the body with possibly fatal results[4]. Wood - coarse grained, durable, dark coloured and very hard, it can be used as an ebony substitute[4, 11, 46]. It is much in demand among turners, and is used in making instruments and furniture especially where strength and smoothness are important[4, 11, 46, 61].

dwatta PectoralThe seed contains the poisonous alkaloid 'cystisine'. This has been used in the treatment of whooping cough and asthma[4].

nrakta C. and S. Europe. ksacta Woods and scrub on limestone[50, 200].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame[200]. Germination is usually very quick and good[78]. Prick out indoor-sown seedlings into individual pots when they are large enough to handle and plant them out in the summer. Another option is to pre-soak the stored seed for 12 hours in warm water and sow in an outdoor seed bed in early spring. These plants can be allowed to grow on in the seedbed for two years before planting them out in the winter. Cuttings of mature wood in late winter planted in the open ground[200].

nwatta A very tolerant and easily grown plant, it succeeds in almost any soil or situation[1] so long as it is not water-logged[11]. It grows well in heavy clay soils. Succeeds in cold exposed situations and tolerates industrial pollution[200]. Plants can be successfully transplanted even when quite large[200]. The flowers are delicately scented[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This species is notably susceptible to

honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 4.1.9 Alnus maximowiczii

tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tucpja7n hwicli hyisjlutnyikfrip hpa7tli flatprikrlwis hpa7tmwatli hjonli

drutta Alnus maximowiczii is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

nrakta E. Asia - Japan. ksacta High mountains, often to the alpine zone. C. and N. Japan[58].

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

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

#### 4.1.10 Laburnum alpinum

Scotch Laburnum, Alpine Bea Tree, Alpine Golden Chain Tree

tfo2n 4 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikrlwis hpa7tmwatli xre7t hjonli

drutta Laburnum alpinum is a deciduous Tree growing to 5 m (16ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, and especially the seed, are poisonous[1, 61].

ta Miscellany WoodWood - hard. It is highly esteemed by turners[7] and is used for making musical instruments[245].

dwatta Cholagogue Miscellany PurgativeThe leaves are cholagogue and purgative[7]. The leaves have a similar effect to tobacco and have thus been used in treating nicotineism[7]. The plant is very poisonous and should not be used internally without expert supervision[7].

nrakta C. and S. Europe. Naturalized in Northern Britain. ksacta Stony hillsides[200] of mountain woodlands[7].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame[200]. Germination is usually very quick and good[78]. Prick out indoor-sown seedlings into individual pots when they are large enough to handle and plant them out in the summer. Another option is to pre-soak the stored seed for 12 hours in warm water and sow in an outdoor seed bed in early spring. These plants can be allowed to grow on in the seedbed for two years before planting them out in the winter. Cuttings of mature wood in late winter planted in the open ground[200].

nwatta Landscape Uses:Espalier, Specimen. A very tolerant and easily grown plant, it succeeds in almost any soil or situation[1] so long as it is not water-logged[11]. It grows well in heavy clay soils and in poor shallow limestone soils[245]. Succeeds in cold exposed situations and tolerates industrial pollution[200]. This species is closely related to *L. anagyroides*[11]. There are some named varieties, selected for their ornamental value[11]. The flowers have a delicious vanilla scent[245]. Plants can be successfully transplanted even when quite large[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Blooms are very showy.

## 4.2 mran

### 4.2.1 Prunus domestica

Plum, European plum

4 tlin 9 cyuc 5 kcak 3 tcan 2 dwat 12 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw  
hpa7tmwattli fyifxre7t hjonli

dwatta Prunus domestica is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from July to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Flowers Fruit Oil SeedEdible Uses: Gum Oil Oil TeaFruit - raw or cooked[1, 2, 7, 46]. The fruit varies considerably from cultivar to cultivar, but it is generally somewhat mealy, soft and juicy with a delicious flavour ranging from very sweet to acid[K]. The more acid fruits are usually only used for cooking purposes[K]. The fruit varies widely in size according to cultivar but can be 8cm long and contains a single large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained from points of damage

on the trunk[64]. The seed contains about 20% of an edible semi-drying oil[4, 57]. It has an agreeable almond smell and flavour[4]. The flowers are eaten. They are used as a garnish for salads and ice cream or brewed into a tea[183].

tcanta Adhesive Dye Gum Oil Oil WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A yellow dye is obtained from the bark[115]. A gum obtained from points of damage along the stem can be used as an adhesive[64]. The ground up seeds are used cosmetically in the production of face-masks for dry skin[7]. A semi-drying oil is obtained from the seed[64]. No details of its uses. Wood - hard, compact. Used for musical instruments[115].

dwatta Febrifuge Laxative StomachicThe dried fruit, known as prunes, is a safe and effective laxative and is also stomachic[4, 7, 21, 238]. The bark is sometimes used as a febrifuge[7]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Europe to W. Asia. Naturalized in Britain. A hybrid *P. spinosa* x *P. cerasifera* *divaricata*. ksacta Found in hedges in Britain[17].

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

nwatta Requires a well-drained moisture retentive soil[1, 11] and a sheltered position[200]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH between 6 and 6.5[200]. The plum is widely cultivated for its edible fruit in temperate zones, there are many named varieties able to supply fresh fruits from late July to November or December[183]. Many cultivars are fully self-fertile, though some are partially self-sterile and others require cross-pollination[200]. Where space is at a premium, or at the limits of their climatic range, plums can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall, whilst an east facing wall will suit some of the tougher cultivars, a north facing wall is not really suitable[219]. This species is probably a hybrid of ancient origin between *P. spinosa* and *P. cerasifera*, coupled with chromosome doubling[17]. It does not cross-pollinate with the Japanese plum, *P. salicina*[200]. Prefers growing in a continental climate, mild winters tend to encourage earlier flowering with a greater risk of frost damage to the blossom. In Britain the best fruits are produced away from the western side of the country. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil

surface. The root pattern is sucking with new plants from runners away from the plant [2-1].

## 4.2.2 Hemerocallis middendorffii

Amur daylily, Middendorf, Daylily

4 tlin 8 cyuc 5 kcaak 2 tcan 1 dwat m hkuc  
hmmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prinklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis middendorffii is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Shoots Edible Uses: Leaves and young shoots - cooked[105, 116, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177, 183]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta Weaving The tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. (This report was for a plant labelled H. middendorffiana, which I have assumed is a mis-spelling of this species[K]). Attractive flowers.

dwatta Antidote Diuretic Vitamin C The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Meadows in high mountains of N. Japan[58]. Forests, forest margins, meadows and wet grasslands from near sea level to 2000 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses: Border, Container, Ground cover, Massing, Seashore. Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Individual flowers are short-lived, but the plant produces a succession of blooms and also flowers again in late summer[205]. The plant has a fibrous root system that does not extend far[205]. Plants take a year or two to become established after being moved but then form large clumps[200, 187]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

## 4.2.3 Crataegus missouriensis

4 tlin 8 cyuc 5 kcaak 0 tcan 2 dwat m hkuc  
hmmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprinklwis hpa7tmwatli xre7t hjonli

drutta Crataegus missouriensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. The size of a large cherry, the flesh is sweet, soft and fairly juicy[K]. The fruit is only about 10mm thick according to another report[235]. The fruit ripens in mid to late September in southern Britain[K], it makes a delicious dessert fruit and can also be used in making pies, preserves etc[K]. The fruit can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to North Carolina and Missouri. ksacta Rocky bluffs and river banks[235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has a good potential as a fruit crop in Britain. It regularly produces heavy crops of high quality, the tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A plant growing at Hillier Arboretum was about 3 metres tall (with a trunk 2 metres long) and 3 metres wide, it was fruiting well in 1993 and 1994[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before

they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.4 Hemerocallis middendorffii esculenta

4 tlin 8 cyuc 5 kcaak 0 tcan 1 dwat m hkuc  
hmmihmtut cyutli kyuctcup hwicli hrasljutnyikfrip hpa7tli flat-prikilwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis middendorffii esculenta is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcacka Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[105, 116, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 127, 177, 183]. The flowers are crisp and succulent with a delicious sweet flavour and no aftertaste[K]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. (This report was for a plant labelled *H. middendorffiana*, which I have assumed is a mis-spelling of this species[K])

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan ksacta Meadows in high mountains, N. and C. Japan[58, 205]. Forests, forest margins, grassy slopes, stony places and roadsides at elevations of 500 - 2500 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Individual flowers only live for one day[205]. Plants take a year or two to become established after being moved but then form large clumps[200, 187]. The roots are fibrous without any obvious swellings[205]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

## 4.2.5 Amelanchier alnifolia

Saskatoon, Saskatoon serviceberry, Serviceberry  
4 tlin 6 cyuc 5 kcaak 3 tcan 2 dwat 4 m hkuc  
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flat-prikilwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier alnifolia is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcacka Edible Parts: FruitEdible Uses: TeaEdible fruit - raw or cooked[3, 11, 46, 62, 101]. The fruit ripens in mid summer (early July in southern Britain), it is soft and juicy with a few small seeds in the centre. A very nice sweet flavour that is enjoyed by almost everyone who tries it, there is a hint of apple in the taste[K]. About the size of a blackcurrant, the fruit is produced in small clusters and the best wild forms can be 15mm in diameter[200, 212]. The fruit can also be dried and used as raisins or made into pemmican[101, 183]. The fruit is rich in iron and copper[226]. The leaves are a tea substitute[161, 257].

tcanta Shelterbelt Soil stabilizationPlants have a spreading, suckering root system and are used in windbreaks for erosion control[200]. Young branches can be twisted to make a rope[257]. Wood - hard, straight grained, tough. Used for tool handles etc. The wood can be made even harder by heating it over a fire and it is easily moulded whilst still hot[99]. The young stems are used to make rims, handles and as a stiffening in basket making[257]. Landscape Uses: Erosion control, Massing, Woodland garden. Hedging and Screens, Architectural City and Courtyard Gardens Cottage and Informal Garden, Wildlife Gardens (RHS).

dwatta Appetizer Birthing aid Contraceptive Diaphoretic Febrifuge Laxative Ophthalmic StomachicSaskatoon was quite widely employed as a medicinal herb by the North American Indians, who used it to treat a wide range of minor complaints[257]. It is little used in modern herbalism. An infusion of the inner bark is used as a treatment for snow-blindness[172]. A decoction of the fruit juice is mildly laxative. It has been used in the treatment of upset stomachs, to restore the appetite in children, it is also applied externally as ear and eye drops[257]. A decoction of the roots has been used in the treatment of colds[257]. It has also been used as a treatment for too frequent menstruation[257]. A decoction of the stems, combined with the stems of snowberry (*Symphoricarpos* spp) is diaphoretic. It has been used to induce sweating in the treatment of fevers, flu etc and also in the treatment of chest pains and lung infections[257]. A decoction of the plant, together with bitter cherry (*Prunus emarginata*) has been used as a contraceptive[257]. Other recipes involving this plant have also been used as contraceptives including a decoction of the ashes of the plant combined with the ashes of pine branches or buds[257]. A strong decoction of the bark was taken immediately after childbirth to hasten the dropping of the placenta. It was said to help clean out and help heal the woman's insides and also to stop her menstrual periods after the birth, thus acting as a form of birth control[257].

nrakta Western and Central N. America - Saskatchewan and south to Colorado and Idaho. ksacta Thickets, woodland edges and banks of streams[43] in moist well-drained soils[99, 200]. Small bushy forms grow on fairly dry hillsides[212].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for

two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring-takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Plants are fairly lime tolerant[200], they also grow well in heavy clay soils. Hardy to about -20°C according to one report[184], whilst another suggests that this species is hardy to about -50°C[11]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. This species is particularly interesting because it is quite compact and produces an excellent quality quite large fruit[K]. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very variable species, ranging from a thicket-forming shrub to a small tree in the wild[229]. It is occasionally cultivated for its edible fruit, there are several named varieties[183]. A stoloniferous species, spreading by suckers to form a thicket[11]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features:North American native, Blooms are very showy. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 4.2.6 *Fragaria vesca* 'Semperflorens'

Alpine Strawberry

4 tlin 8 cyuc 5 kcaak 0 tcan 3 dwat 0.3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwisslip hpa7tmwatli xre7t hjonli

drutta *Fragaria vesca* 'Semperflorens' is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to November, and the seeds ripen from June to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves Edible Uses: Coffee Tea Fruit - raw, cooked or made into preserves[183]. Sweet and succulent with an exquisite taste, they are far superior to the cultivated strawberry[K]. The fruit is fairly small, up to 15mm in diameter, but it is produced abundantly from early summer until the frosts of autumn[K]. Young leaves - raw or cooked[52, 105]. Added to salads or used as a potherb[183]. The fresh or dried leaves are used as a tea substitute[7, 177, 183]. The root has been used as a coffee substitute in India[240].

tcanta Compost Teeth The flowers are an alternative ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The fruit is used as a tooth cleaner[4]. The fresh fruit removes stains from teeth if it is allowed to remain for

about 5 minutes[4]. The fruit is also used cosmetically in skin-care creams[7]. It tones and whitens the skin, combats wrinkles, lightens freckles, soothes sunburn and whitens the teeth[244].

dwatta Astringent Diuretic Laxative Tonic The leaves and the fruit are astringent, diuretic, laxative and tonic[4, 9, 222]. The leaves are mainly used, though the fruits are an excellent food to take when feverish and are also effective in treating rheumatic gout[4]. A slice of strawberry is also excellent when applied externally to sunburnt skin[4]. A tea made from the leaves is a blood tonic[222]. It is used in the treatment of chilblains[53] and also as an external wash on sunburn[222]. The leaves are harvested in the summer and dried for later use[238]. The fruits contain salicylic acid and are beneficial in the treatment of liver and kidney complaints, as well as in the treatment of rheumatism and gout[244]. The roots are astringent and diuretic[4, 222]. A decoction is used internally in the treatment of diarrhoea and chronic dysentery[4, 244]. Externally it is used to treat chilblains and as a throat gargle[244]. The roots are harvested in the autumn and dried for later use[238].

nraкта Most of Europe, including Britain, to temperate Asia. ksakta Woodland and damp undergrowth[7].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced when plants are growing in such a position. Prefers some shade according to some reports[3, 31]. Plants are often found on clay soils[31] and on soils overlying chalk[13]. Alpine strawberries appreciate a mulch of pine or spruce leaves[18]. The alpine strawberry is often cultivated in the garden for its edible fruit. This fruit is fairly small but exquisitely flavoured and is freely produced from June to November. There are some named varieties[183]. It is not very feasible to grow this plant on a commercial scale because it is very labour intensive to pick and it is also hard to get the fruit to market in good quality. However, it is sometimes grown by specialised growers for the luxury market. The main drawback of growing this plant is that it tends to lose vigour after about 2 - 3 years, partly due to virus diseases and partly because the plant flowers and fruits so freely that it exhausts itself.

## 4.2.7 *Crataegus pedicellata*

Scarlet Haw, Scarlet hawthorn

4 tlin 8 cyuc 5 kcaak 2 tcan 2 dwat 7 m hkuc  
hmimhtut cyutli hgattcupha7n hwicli hrasjlutnyikfrip hpa7tli flatprik-lwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pedicellata* is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[K]. A very variable species, especially in its fruit which ranges considerable in size and quality[K]. Up to 10mm long and pear shaped, the flesh is sweet but dry and mealy[200]. Another report says that the fruit is up to 20mm in diameter[235] and we have often seen fruits this size, or even a bit larger[K]. We find the fruits of the best forms to have an excellent flavour and juicy texture when fully ripe, but with a hint of bitterness before then[K]. They are one of the later members of this genus to ripen their fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].



cantata Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Northeastern N. America - Connecticut to Ontario, Illinois and Pennsylvania. Naturalized in Britain. ksacta Self-sown in hedges and rough ground in south-eastern England.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°C[202]. A very variable species, it has been divided up into several different species by some botanists[82]. The sub-species C. pedicellata gloriosa. Sarg. has larger fruits than the type[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A user in Poland says that *Crataegus pedicellata* exists in the wild in Eastern Poland and can support winter temperatures at least until -30°C.

## 4.2.8 *Quercus ilex*

Holly Oak, Evergreen Oak

4 tlin 10 cyuc 5 kca3 3 tcan 2 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikli-wissliphsom hpa7tmwatli hjonli

drutta *Quercus ilex* is an evergreen Tree growing to 25 m (82ft) by 20 m (65ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and

saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Oil Seed Edible Uses: Coffee Oil Seed - raw or cooked[1, 2, 46, 61]. It can be sweet or bitter[K]. The seed is up to 3cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed from some trees contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. An edible oil is obtained from the seed[183]. One reader noted the Q. suber population of the Mamora forest in Morocco contains only sweet acorns and can be eaten raw, it has a similar taste to raw chestnuts. The skin removes quite easily *Quercus ilex* also exists with tannin-free acorns in the Moroccan forests, the locals say around 20 percent are sweet.

cantata Fodder Fuel Hedge Hedge Oil Repellent Shelterbelt Tannin Wood/Landscape Uses: Specimen, Street tree. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Very tolerant of maritime exposure and of trimming, it can be grown as a shelterbelt tree or hedge in maritime areas[11, 29, 49, 75]. Wood - strong, hard, durable. Used for furniture[46, 61, 89]. It makes a good charcoal[89] and a good fuel, burning well even if green[146]. The bark is a source of tannin[146]. Heat Zone: 9-2.

dwatta Astringent Dysentery Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Mediterranean. Occasionally naturalized in Britain in S. England[17]. ksacta Arid places, maquis, woods and hills on limestone[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: Tannin Management: Standard Other Systems: Dehesa Regional Crop Staple Crop: Balanced carb Prefers a good deep fertile loam which can be on the stiff side[11]. Thrives on shallow chalky soils[188]. Succeeds in all soils except those that are cold and poorly drained[98]. Grows well in sandy soils[188]. Young plants tolerate reasonable levels of side shade[200]. Very resistant to maritime exposure[11, 49, 75]. A very ornamental tree[1] but it is quite slow-growing[75]. Transplants badly unless moved regularly and this should be done as growth commences in late May or in September[11]. Fruits very freely in Britain[K]. The seed ripens in its first year[200]. The sub-species Q. ilex ballota is cultivated for its sweet-tasting edible seed in Portugal and Spain[K]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features: Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this tem-

perature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 4.2.9 *Pyrus communis sativa*

Pear  
4 tlin 8 cyuc 5 kcaak 3 tcan 0 dwat 5 m hkc  
hmimhtut cyuti hgtaccp hwicli hrasjlutnyikfrp hpa7tli flat-prikrlwis hpa7tmwatli dyatre7t hjonli

drutta *Pyrus communis sativa* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The flavour ranges from rather harsh and astringent (cultivars used for making alcoholic drinks) through to soft, sweet and very juicy. The best dessert fruits have an exquisite sweet flavour, usually with a very soft flesh, whilst cooking varieties have harder less sweet flesh[K].

tcanta Dye WoodA yellow-tan dye is obtained from the leaves[106, 115]. Wood - heavy, tough, durable, fine grained, hard. Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

nrakta A garden cultivar, probably derived from *P. communis*, *P. cordata* and *P. nivalis*[11]. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils[200]. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile, though plants can become chlorotic on very alkaline soils[200]. Established plants are drought tolerant[200]. Very hardy, tolerating temperatures down to below -15°C[200]. Widely cultivated for its edible fruit in temperate areas, there are many named varieties that can provide fruit from late July to April or May of the following year. This is the collective name for all the pear cultivars that have been derived from *P. communis*, probably through hybridization with *P. cordata* and *P. nivalis*. Where space is at a premium, or at the limits of their climatic range, pears can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall but, because of their relatively early flowering, they are not really suitable for north or east facing walls[219]. Most cultivars are not self-fertile and a number of cultivars have incompatible pollen, so care must be taken to ensure the provision of a suitable pollen partner[200]. Trees grow less well in grass, root secretions from the grass inhibiting the root growth of the pear[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.10 *Allium schoenoprasum sibiricum*

Giant Chives  
4 tlin 8 cyuc 5 kcaak 2 tcan 2 dwat 0.3 m hkc  
hmimhtut cyuti tcup hwicli hrasjlutnyikfrp hpa7tli flat-prikrlwis hpa7tmwatli xre7t hjonli

drutta *Allium schoenoprasum sibiricum* is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw, cooked or dried for later use. The leaves have a mild onion flavour and are an excellent addition to mixed salads, they can also be used as a flavouring in soups etc[90, 105]. This form has a stronger garlic flavour than common chives[183] The leaves are often available from late winter and can continue to produce leaves until early the following winter, especially if the plant is in a warm, sheltered position[K]. A good source of sulphur and iron[201]. The bulbs are rather small but can be used as spring onions[K]. They can be harvested with the leaves still attached and be used as spring onions[K]. They have a pleasant mild onion flavour. The flowers can be used as a garnish in salads etc[183]. The flowers of this species are rather dry and less desirable than the flowers of many other species[K].

tcanta Fungicide RepellentThe juice of the plant is used as an insect repellent, it also has fungicidal properties and is effective against scab, mildew etc[14, 18, 20]. The growing plant is said to repel insects and moles[14, 20].

dwatta Appetizer Digestive Hypotensive TonicThe whole plant has a beneficial effect on the digestive system and the blood circulation. It improves the appetite, is digestive, hypotensive and tonic[201]. It has similar properties to garlic (*A. sativum*), but in a much milder form, and it is rarely used medicinally[238].

nrakta N. America to E. Asia - Siberia, Japan. ksacta Calcareous or basic rock, gravels and shores, Alaska and southwards[43].

propta Seed - sow spring in a cold frame. Germination is usually free and easy, pot up the seedlings as soon as they are large enough to handle easily and plant out in the following spring. Division can be carried out at almost any time of the year but is probably best done in spring. The clumps should be divided at least every 3 or 4 years in order to maintain vigour[200], the divisions can be planted out direct into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[14, 37]. Succeeds in most soils[1, 37] and in light shade[203]. Grows well in heavy clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. This is a more robust form of *A. schoenoprasum*, the chive. It is often grown in the garden for its edible leaves which are available from late winter to the beginning of the next winter[K]. The bulbs divide rapidly and large clumps are quickly formed. There are some named varieties[183]. Regular cutting of the leaves ensures a continuous supply of young leaves and prevents flowering[33]. Plants can be moved into a frame or other protected environment in the autumn and will then produce leaves throughout the winter[33]. Do not do this every year or it weakens the plants. The bulbs should be planted fairly deeply[1]. A good bee plant[24]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. Helps to reduce the incidence of scab when it is grown under apple trees[201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 4.2.11 Aesculus spp

Horse chestnut

4 tlin 9 cyuc 4 kcaak 4 tcan 4 dwat 30 m hkuu

hmimhtut cyutli kyucup hwicli hyihshrajlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Aesculus* spp is a deciduous Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seed is rich in saponins[10, 21, 65]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Avoid in patients with kidney or liver disease. Avoid if taking warfarin as can interfere with anticoagulant therapy [301].

kcakta Edible Parts: SeedEdible Uses: The roasted seed is used as a coffee substitute[2, 7]. Seed - cooked. It can be dried, ground into a powder and used as a gruel[7, 46, 55, 61]. The seed is quite large, about 3cm in diameter, and is easily harvested. It is usually produced in abundance in Britain. Unfortunately the seed is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The seed contains up to 40% water, 8 - 11% protein and 8 - 26% toxic saponins[218]. The following notes apply to *A. californica*, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Saponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. The seed contains variable amounts of saponins, up to a maximum of 10%[240]. A starch obtained from the seed is used in laundering[100]. The bark and other parts of the plant contain tannin, but the quantities are not given[223]. A yellow dye is obtained from the bark[4]. The flowers contain the dyestuff quercetin[223]. Wood - soft, light, not durable. Of little commercial value, it is used for furniture, boxes, charcoal[2, 11, 46, 61]. Carbon Farming Solutions - Industrial Crop: starch, medicinal (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta Various medicinal qualities depending on the species. They include: Alterative; Analgesic; Antiinflammatory; Antirheumatic; Astringent; Bach; Diuretic; Expecto-rant; Febrifuge; Haemostatic; Narcotic; Tonic; Vasoconstrictor; Vulnery.

nrakta N. Temperate. ksacta Trees and shrubs native to the temperate Northern Hemisphere, with six species native to North America and seven to 13 species native to Eurasia.

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, put up the seedlings in early spring and plant them out into their

permanent positions in the summer.

nwatta Hypothetical Crop Industrial Crop: Medicinal Industrial Crop: Starch Management: StandardClimate: cold to warm temperate, Mediterranean.Humidity: semi-arid to humid. Landscape Uses: Firewood, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy tolerating poorer drier soils[11, 200]. Tolerates exposed positions and atmospheric pollution[200]. A very ornamental and fast-growing tree[1, 4], it succeeds in most areas of Britain but grows best in eastern and south-eastern England[200]. Trees are very hardy when dormant, but the young growth in spring can be damaged by late frosts. The flowers have a delicate honey-like perfume[245]. Trees are tolerant of drastic cutting back and can be severely lopped[200]. They are prone to suddenly losing old heavy branches[98]. The tree comes into bearing within 20 years from seed[98]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage, Not North American native, Naturalizing, Blooms are very showy. Carbon Farming Solutions - Cultivation: hypothetical. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

## 4.2.12 Quercus robur

Pedunculate Oak, English oak

4 tlin 8 cyuc 4 kcaak 5 tcan 3 dwat 30 m hkuu

hmimhtut hpa7tgattcuphja7n hwicli jlutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta *Quercus robur* is a deciduous Tree growing to 30 m (98ft) by 30 m (98ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Possible digestive complaints. May delay absorption of alkaloids and other alkaline drugs [301].

kcakta Edible Parts: SeedEdible Uses: Coffee Gum-Seed - cooked[2, 5, 8, 13]. Nourishing but indigestible[4]. Chopped and roasted, the seed is used as an almond substitute[8]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[63]. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[21, 61]. An edible gum is obtained from the bark[177]. Another report says that an edible manna is obtained from the plant and that it is used instead of butter in cooking[183]. This report probably refers to the gum[K].

tcanta Basketry Charcoal Compost Fuel Gum Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20, 201]. The bark is an ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The bark is very rich in calcium[18]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black dye and an excellent long-lasting

ink is made from the oak galls, mixed with salts of iron[4, 7, 66]. The colour is not very durable[4]. When mixed with alum, the dye is brown and with salts of tin it is yellow[4]. Trees can be coppiced to provide material for basket making, fuel, construction etc[23]. The wood is a source of tar, quaiacol, acetic acid, creosote and tannin[123]. Tannin is extracted commercially from the bark and is also found in the leaves[223]. On a 10% moisture basis, the bark contains 11.6% tannin and the wood 9.2%[223]. The bark strips easily from the wood in April and May[4]. A purplish dye is obtained from an infusion of the bark with a small quantity of copperas[4]. It is not bright, but is said to be durable[4]. Wood - hard, tough, durable even under water - highly valued for furniture, construction etc[4, 13, 61, 66]. It is also a good fuel[6] and charcoal[61].

**dwatta Antiseptic Astringent Bach Decongestant Dysentery Haemostatic Tonic**The oak tree has a long history of medicinal use. It is anti-inflammatory, antiseptic, astringent, decongestant, haemostatic and tonic[4, 7, 9, 13, 21, 165]. The bark is the part of the plant that is most commonly used[4], though other parts such as the galls, seeds and seed cups are also sometimes used[7]. A decoction of the bark is useful in the treatment of chronic diarrhoea, dysentery, intermittent fevers, haemorrhages etc[4]. Externally, it is used to bathe wounds, skin eruptions, sweaty feet, piles etc[9]. It is also used as a vaginal douche for genital inflammations and discharge, and also as a wash for throat and mouth infections[9]. The bark is harvested from branches 5 - 12 years old, and is dried for later use[9]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Despondency', 'Despair, but never ceasing effort'[209]. A homeopathic remedy is made from the bark. It is used in the treatment of disorders of the spleen and gall bladder[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Quercus robur* *Pedunculata* Oak for coughs/bronchitis, diarrhoea, inflammation of mouth and pharynx, inflammation of the skin (see [302] for critics of commission E).

**nrakta Europe**, including Britain, from Scandinavia south and east to Spain, the Urals and Crimea. **ksacta** Often the dominant woodland tree, especially on clay soils and in the eastern half of Britain, but avoiding acid peat and shallow limestone soils[17].

**propta Seed** - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

**nwatta** Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of shade[200]. Succeeds in heavy clay soils[13] and in wet soils so long as the ground is not water-logged for long periods[186]. Dislikes dry or shallow soils but is otherwise drought tolerant once it is established[186]. Tolerant of exposed sites though it dislikes salt-laden winds[186]. The oak is a very important timber tree in Britain, it is also a very important food plant for the caterpillars of many species of butterfly[30], there are 284 insect species associated with this tree[24]. It has often been coppiced or pollarded for its wood in the past[23], though this should not be done too frequently[186], about once every 50 years is the average. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Older trees have a thick corky bark and this can protect them from forest fires, young trees will often regenerate from the base if cut down or killed back by a fire[186]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Immune to attacks by the tortrix moth[1]. This species is notably resistant to honey fungus[88, 200].

## 4.2.13 Acer saccharum

Sugar Maple, Florida Maple, Hard Maple, Rock Maple  
4 tin 8 cyuc 4 kcac 4 tcan 2 dwat 30 m hkuc  
hmimhtut cyutli tcup hwicli hrasjutnyikfrip hpa7tli frusflat-  
prikhlwis hpa7tmwatli xre7t hjonli

**drutta** *Acer saccharum* is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

**ksacta Edible Parts: Inner bark Leaves Sap Seed****Edible Uses:** SweetenerThe sap contains quite a large proportion of sugar. This can be used as a refreshing drink, or be concentrated into a syrup by boiling off the water[1, 2, 11, 34, 57]. The syrup is used as a sweetener on many foods. The sap can be harvested in late winter or early spring[[142], the flow is best on a warm sunny day after a frost[213]. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100 litres per tree can be obtained[142]. The best sap production comes from cold-winter areas with continental climates. The sap contains 2 - 6% sugar, thus about 32 litres are required to make a litre of maple syrup[229]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[62, 105, 159, 213]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161]. The related Oregon Maple (*Acer macrophyllum*) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species.

**tcanta Companion Fodder Fuel Potash Preservative****Wood**The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy, strong, not very durable, it takes a high polish, remains smooth under abrasion and has a high shock-resistance[46, 61, 82, 171, 227]. It holds nails well, is fair in gluing, dries easily and shrinks moderately[227]. The wood weighs 43lb per cubic foot[235]. Considered by many to be the most valuable hardwood tree in N. America, the sugar maple is used for a wide range of applications including furniture, flooring, turnery, musical instruments and ship building[46, 61, 82, 171, 227]. Accidental forms with the grain curled and contorted, known as curly maple and bird's eye maple, are common and are highly prized in cabinet making[82]. The wood is also a very good fuel, giving off a lot of heat and forming very hot embers[82, 226]. The ashes of the wood are rich in alkali and yield large quantities of potash[82]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

**dwatta Blood tonic Diuretic Expectorant Hepatic****thalmic**A tea made from the inner bark is a blood tonic, diuretic and expectorant[222]. It has been used in the treatment of coughs, diarrhoea etc[222]. A compound infusion of the bark has been used as drops in treating blindness[257]. The sap has been used for treating sore eyes[257]. The inner bark has been used as an expectorant and cough remedy[257]. Maple syrup is used in cough syrups and is also said to be a liver tonic and kidney cleanser[222].

**nrakta Eastern N. America - Newfoundland to Georgia, west to Texas and Minnesota.** **ksacta** Found in a variety of soil types, doing best in deep rich well-drained soils from sea level to 1600 metres[229]. Rich usually hilly woods[43].

**propta Seed** - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate, sometimes taking two years[125]. The seed can be harvested 'green' (when it has fully devel-

ped but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Agroforestry Services: Crop shade Fodder: Bank Management: Standard Regional Crop Staple Crop: SugarLandscape Uses:Firewood, Screen, Specimen, Street tree, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98], though it is more likely to become chlorotic as a result of iron deficiency on alkaline soils. Grows well in heavy clay soils. Trees need full light and a lot of space[98]. This species is one of the most shade tolerant of the N. American maples[226]. It tolerates atmospheric pollution[200] and so is often used as a street tree, though it can suffer from soil compaction and the use of salt on the roads in frosty weather. Tolerates a pH in the range 4.5 to 7.3. Hardy to about -45°C when fully dormant[160]. A fast-growing tree for its first 40 years in the wild[229], this species is not a great success in Britain[1], though it does better than once thought[11]. It grows well in Cornwall[59]. In cultivation it has proved to be slow growing when young[11]. Trees can live for 250 years in the wild[229]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with its sub-species it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

## 4.2.14 *Quercus bicolor*

Swamp White Oak

4 tlin 8 cyuc 4 kcaac 3 tcan 2 dwat 25 m hkuc  
hmmihmtut cyutli tucphja7n hwlicl jltunykifrip hpa7tli flat-  
prikulives hpa7tmwatl hjonli

drutta *Quercus bicolor* is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[105, 161, 226]. A rather sweet flavour[159, 235].

The seed is quite large, about 2 - 3cm long and 15 - 20mm wide[82, 200], and unlike most other oaks, is attached to the tree by a long stem[183]. It matures in its first year[235]. The seed can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed from some trees can contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Roasted seed is a coffee substitute.

taanta Repellent Rust Tannin WoodThe leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20, K J]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark has been boiled with hemlock (*Tsuga* sp.) and soft maple bark (*Acer* spp), and the liquid used to remove rust. The mixture was also believed to prevent rust[257]. The wood is close-grained, strong, hard, tough, heavy[46, 82, 171, 229]. It weighs 48lb per cubic foot[235]. Trees do not self-prune and dead branches remain on the trees for many years. This does mean that the wood is usually quite knotty[226]. The wood machines well, though it can check and warp if not dried properly. It is of some importance commercially. And is used for construction, cabinet making, furniture, interior finishes, veneers, fence posts etc[6, 82, 171, 229, 338, 1050]. The wood makes a good fuel.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrrakta Eastern N. America - Quebec to Minnesota, Georgia and Arkansas. ksacta Bottomlands, stream margins and swamps[43]. Tolerant of poorly drained sites, it is frequently found in heavy mucky soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A relatively fast-growing tree in the wild, living 300 - 350 years[229], though it is relatively shallow-rooted and is considerably more susceptible to forest fires than most other oaks[226]. This species is one of the best of the white oaks for growing in this country[1]. However, it is said that the seed is rarely formed in Britain[105]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Trees do not commence bearing until about 25 - 30 years old, large crops being produced every 3 - 5 years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed of this species is attached to the tree by unusually long (by oak tree standards) stems[183]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North

Annual native, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 4.2.15 *Acer saccharum nigrum*

Black Maple

4 tlin 6 cyuc 4 kcaak 2 tcan 1 dwat 25 m hkc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikli-  
wis hpa7tmwatli hjonli

drutta *Acer saccharum nigrum* is a deciduous Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner bark Sap Seed Edible Uses: Sweetener The sap contains reasonable quantities of sugar and can be used as a drink or concentrated into a syrup by boiling off the water [1, 2, 11, 43, 34, 57, 142, 159]. The syrup is used as a sweetener on many foods. The sap can be harvested in late winter or early spring [142], the flow is best on a warm sunny day after a frost. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground [171]. Yields of 40 - 100 litres per tree can be obtained [142]. The best sap production comes from cold-winter areas with continental climates. Seed - boiled then roasted [62, 105, 159]. The seed is about 6mm long and is produced in small clusters [82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread [105, 161].

tcanta Fuel Preservative Wood The leaves are packed around apples, rootcrops etc to help preserve them [18, 20]. Wood - close grained, tough, hard, heavy. Used for furniture, ship building, etc [43, 46, 61, 82, 171]. It is a good fuel [82]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astrigent A decoction of the inner bark has been used in the treatment of diarrhoea [257].

nrakta Eastern N. America - Quebec to Alabama, west to South Dakota and Arkansas. ksacta Rich calcareous or alluvial woods [43]. Found in a variety of soil types, near streams, rivers and in rich woodlands, usually below 750 metres but up to 1650 metres in the south of its range [229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo [113]. An average of 95% germination can be achieved from viable seed [98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate, sometimes taking two years [125]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all [80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the

base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses: Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils [11, 98]. Chlorosis can often develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Grows well in heavy clay soils. Trees need full light and a lot of space [98]. Plants are hardy to about -45°C when fully dormant [160]. This species is not a great success in Britain [1], though it does better than once thought [11]. It grows well in Cornwall [59]. Slow growing when young [11]. Plants produce prodigious root growth but very little top growth in first year from seed [133]. Trees grow rapidly for their first 25 years in the wild, but then slow down and only occasionally surviving for more than 200 years [229]. A very ornamental tree [1] but a bad companion plant, inhibiting the growth of nearby plants [18, 20]. This species is commercially exploited in America for its sap [1, 11]. Along with *A. saccharum* and the sub-species *A. s. grandidentatum* it is the major source of maple syrup [11]. There are some named varieties [183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters [160]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

## 4.2.16 *Prunus cerasifera divaricata*

4 tlin 8 cyuc 4 kcaak 0 tcan 1 dwat 10 m hkc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Prunus cerasifera divaricata* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Seed Edible Uses: Fruit - raw or cooked [74]. Tastes like a Mirabelle plum [2, 11]. A very pleasant plum-like flavour when fully ripe with a mealy though juicy flesh [K]. It is high in citric acid, containing about 4.7% [74]. The fruit is about 30mm in diameter and contains one large seed [200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Rootstock Used as a rootstock for plums, peaches and apricots [74]. A green dye can be obtained from

the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

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

nrakta S.E. Europe to W. Asia. ksacta Mountain slopes in woody or shrubby thickets, on stony slopes, ravine bottoms, near water and montane river valleys to 2000 metres[74].

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

nwatta Requires a well-drained moisture retentive soil[11, 200]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Plants are hardy to about -25°C[184]. According to some botanists this plant should be named *P. divaricata* and *P. cerasifera* should be named *P. divaricata cerasifera*[11]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.17 *Crataegus holmesiana*

Holmes' hawthorn

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 10 m hkuc  
hmmihmtut cyuthl hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli  
flatprikwiwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus holmesiana* is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An excellent dessert fruit, it has an acid yet sweet flavour, is juicy but with a mealy texture, it makes very pleasant eating[K]. Some forms have fruits with a disagreeable flavour[82]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. The fruit is about 10mm in diameter[200]. A specimen at Cambridge Botanical garden has fruits up to 20mm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Ontario to Maine, south to New York and Pennsylvania. ksacta Rich moist hillsides and

the borders of streams and swamps[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11].

## 4.2.18 *Crataegus douglasii*

Black Hawthorn

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 9 m hkuc  
hmmihmtut cyuthl hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli  
flatprikwiwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus douglasii* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 95, 99, 101]. A very pleasant flavour with a sweet and juicy succulent flesh[46, 82, K], it makes an excellent dessert fruit and can be eaten in quantity[K]. The fruit can also be used for making pies, preserves etc, and can be dried for later use[183]. The fruit is about 8mm in diameter and is borne in small clusters[200]. The fruits I have eaten have been considerably larger than this[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Needles WoodThe spines on the branches are used as needles for lancing boils, removing splinters etc[99]. Wood - close-grained, heavy, hard and tough. Used for tool handles etc[82, 99, 101].

dwatta Antirheumatic Astringent Cardiotonic Dysentery Hypotensive Poulitice StomachicAn infusion of the shoots has been used to treat diarrhoea in children and sores in babies

mouths[257]. A poultice of the chewed leaves has been applied to swellings[257]. An infusion of the bark has been used in the treatment of diarrhoea and dysentery[257]. An infusion of the sapwood, bark and roots has been used as a stomach medicine[257]. The thorns have been used as a treatment for arthritis[257]. The point of the thorn was used to pierce an area affected by arthritic pain. The other end of the thorn was ignited and burned down to the point buried into the skin. This treatment was very painful but it was said that after a scab had formed and disappeared, the arthritic pain had also disappeared[257]. The thorns have been used as probes for boils and ulcers[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - British Columbia to Michigan, south to California. ksacta Open woods, banks of mountain streams and on rocky banks[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.19 *Crataegus acclivis*

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 8 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli  
flatprikwislip hpa7tmwatli xre7t hjonli

drutta *Crataegus acclivis* is a deciduous Tree growing to 8 m (26ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[K]. The fruit ripens in early September, it is about 18mm long with a pleasantly sweet juicy flesh and makes an excellent dessert fruit[K]. The fruit contains up to 5 seeds in the centre, these usually stick together and so the effect is like eating a cherry with its single large seed[K].

dwatta Cardiac Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - New York to the borders of southern Canada. ksacta Banks of streams and steep gorges[235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°C[202]. We have very little specific information on this plant, and it is regarded as no more than a form of *C. pedicellata* by most botanists[235]. However, a tree seen at Kew in early September 1997 had a good crop of almost ripe fruit. This fruit was more elongated than *C. pedicellata* and was also ripe about 4 weeks before that species[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.20 *Crataegus submollis*

Quebec Hawthorn

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 7 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli  
flatprikwislip hpa7tmwatli xre7t hjonli

drutta *Crataegus submollis* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species



is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161]. Sub-acid, dry and mealy[82]. Our experience has been that the fruit is sweet and somewhat juicy, it has a thick flesh with a nice flavour and makes an acceptable dessert fruit[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use[257]. It is about 20mm in diameter, is borne in large clusters and is easily harvested[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge HedgePlants are very tolerant of trimming and will soon resprout even if cut back into very old wood. They can be used as a hedge[50]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Quebec to Ontario, Massachusetts and New York. ksakta Wooded hillsides and open fertile ground[43]. Rich damp hillsides and the borders of woods and roads[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to about -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is sometimes confused with *C. coccinea*[50]. It is also very close to *C. mollis*, differing in having 10 stamens to a flower (as com-

pared to 20 in *C. mollis* [202]. It is considered to be part of *C. mollis* by some botanists[229].

## 4.2.21 *Crataegus succulenta*

Fleshy hawthorn

4 tlin 8 cyuc 4 kcaak 2 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgatyucyucuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwslip hpa7tmwlati xre7t hjonli

drutta *Crataegus succulenta* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101, 105]. Excellent for making jellies[183], it can also be dried for later use. A small fruit with a sweet, juicy and pulpy flesh[82, 183], it is up to 17mm in diameter[235]. Another report says that the fruit is large for a *Crataegus* species, it is about 35mm in diameter and is borne in small clusters[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Nova Scotia to North Carolina, west to Montana, Colorado and Utah. ksakta Thickets, pastures and woodland edges, especially in dry or rocky soils[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years

before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to *C. tomentosa*[11].

## 4.2.22 *Pyrus bretschneideri*

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 6 m hkuc  
hmmihtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prikliwslip hpa7tmwatli xre7t hjonli

*drutta* *Pyrus bretschneideri* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177, 200]. The fruit is up to 3cm in diameter[200].

nrakta E. Asia - N. China. ksacta Slopes, dry cold regions at elevations of 100 - 2000 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. This species is closely related to *P. ussuriensis* ovoidea[200]. This species is commonly cultivated in northern China, preferring sunny, dry, loamy soils. It includes many important forms with excellent fruit[266]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 4.2.23 *Crataegus durobrivensis*

Caughuawaga Hawthorn

4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 5 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

*drutta* *Crataegus durobrivensis* is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A reasonable size, it is up to 15mm in diameter[200], and is very acceptable for raw eating[K]. It is sweet and fairly juicy when fully ripe with a hint of apple in its flavour[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcontata Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America. ksacta Not known in a truly wild situation, it is possibly a hybrid *C. pruinosa* x *C. suborbiculata*[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Probably a natural hybrid, *C. pruinosa* x *C. suborbiculata*[43].

## 4.2.24 *Sambucus caerulea*

Blue Elder

4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 3 m hkuc  
hmmihtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prikliwslip hpa7tmwatli xre7t hjonli

*drutta* *Sambucus caerulea* is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The leaves, green fruits and stems of some (if not all) members of this genus are poisonous[9, 76, 226]. The fruit of this species has been known to cause stomach upsets

some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

**ksakta Edible Parts:** Flowers Fruit **Edible Uses:** Tea Fruit - raw, cooked or used in preserves[2, 3, 15, 85, 94, 183, 257]. Rather sweet and juicy but full of small seeds[82, 256]. This is the best flavoured of the North American elders[212]. The fruit is rather nice raw, seven people ate and enjoyed a small quantity of the raw fruit with no ill effects[K]. The fruit can be dried for later use[257]. A somewhat rank taste fresh[101], the fruit is usually dried before being used[183]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked in fritters etc[15, 85, 94, 183]. Very pleasant and refreshing raw[K]. A pleasant tea is made from the dried flowers[62, 183].

**tcanta Musical Repellent Tinder Wood** A decoction of the leaves, when watered on plants, repels caterpillars[94]. The dried flower stems repel insects and rodents[101]. The hollow stems can be used as flutes and pipes[257]. The pith of the stems has been used as a tinder for lighting fires[257]. Wood - light, soft, weak, coarse grained. Of no commercial value, though it is used locally for flutes, skewers, pegs, straws etc[82, 94, 99, 229].

**dwatta Analgesic Antiseptic Astringent Diaphoretic Emetic Febrifuge Haemostatic Laxative Pectoral Salve Stomachic Tonic** Haemostatic[94]. An infusion or extract made from the flowers, bark and root has been used to cure fevers and gripe, it is also laxative[226]. A decoction of the plant has been used as an antiseptic wash to treat itches[257]. The bark is analgesic and astringent[257]. An infusion has been used in the treatment of diarrhoea and rheumatism[257]. A decoction has been used as a wash in the treatment of swellings and pain[257]. An ointment made by mixing the bark with fat has been used externally in the treatment of burns, ulcers, skin irritations etc[226]. The fresh bark has been placed in a tooth cavity to ease the pain of toothache[257]. The inner bark is strongly emetic[257]. The leaves are analgesic, antiseptic, diaphoretic, febrifuge and purgative[257]. A decoction has been used in the treatment of new colds[257]. An infusion of the leaves and flowers has been used as a steam bath in the treatment of colds and headaches[257]. A decoction of the leaves has been used as an antiseptic wash on limbs affected by blood poisoning[257]. The crushed leaves have been used as a poultice to treat burns and swollen hands[257]. A decoction of the root has been used in the treatment of bladder problems and dyspepsia[257]. A decoction of the flowers has been used in the treatment of stomach troubles and lung complaints[257]. Applied externally, it has been used to treat sprains and bruises and as an antiseptic wash for open sores and itches[257]. A wine made from the fruit has been used as a tonic[257].

**nrakta Western N. America - British Columbia to California, east to Montana, Texas and Mexico.** ksakta Gravelly, rather dry soils on stream banks, margins of fields, woodlands etc[62, 82].

**propta Seed** - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

**nwatta** Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A fast-growing but short-lived tree in the wild[229]. A shrub at Kew in September 1993 was carrying a good crop of tasty fruits[K]. Plants in this genus are notably resistant to honey fungus[200].

## 4.2.25 Chaenomeles cathayensis

**Chinese Quince**

4 tin 8 cyuc 4 kcaok 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprkliwis hpa7tmwatli xre7t hjonli

**drutta** Chaenomeles cathayensis is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

**ksakta Edible Parts:** Fruit **Edible Uses:** Fruit - very harsh raw but fragrant when cooked[1, 3, 4, 11, 177]. It makes an excellent jelly[183] and a very good jam, it is especially good cooked with apples in apple pies[K]. The fruit is very large and can be 15cm long and 9cm wide[200].

**dwatta Antiemetic Antirheumatic Antispasmodic Digestive** The fruit is antiemetic, antirheumatic, antispasmodic and digestive[176]. It is used in the treatment of rheumatic pain, convulsions of the calf muscles, vomiting, dyspepsia and diarrhoea[176].

**nrakta E. Asia - China.** ksakta Scrub and hedges in W. Hubei[184]. Slopes, forest margins and roadsides at elevations of 900 - 2500 metres[266].

**propta Seed** - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

**nwatta** Easily cultivated in any reasonably good soil[1, 200]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[188, 200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25°C[200]. Plants are subject to canker, especially when growing in the milder moister areas of Britain[49]. Plants in this genus are notably resistant to honey fungus[200]. Fruits are usually freely produced in Britain, but they do not always ripen[11, 182]. The plant grows and fruits well on a south wall at Kew[K]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.26 Berberis buxifolia

**Magellan Barberry**

4 tin 8 cyuc 4 kcaok 3 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjutnyikfrip hpa7tli flatprkliwis hpa7tmwatli fyfxre7t hjonli

**drutta** Berberis buxifolia is an evergreen Shrub growing to 2.5 m (8ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**ksakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or used in conserves[3, 11, 69, 139, 177]. Freely borne in

Britain. Large and black with a pleasant flavour, they are eaten out of hand[183]. Said to be the best flavoured of the South American barberries, the fruit is hardly acid and but slightly astringent[2]. The green unripe fruits can be used like gooseberries in pies etc[2, 183]. The fruits are about 8mm long[200].

tcanta Dye Hedge HedgeA yellow dye is obtained from the root[139]. The dwarf form, var. 'Nana' makes a good dwarf hedge to 1 metre tall[182].

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta S. America - S. Chile and S. Argentina. Occasionally naturalized in Britain[17]. ksacta Coastal scrub, forest margins, clearings and moister areas in grass[69].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Roots in 4 - 8 weeks[113]. Pot up in spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils and in full sun[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -15°C[184], but they can be deciduous in cold winters[188]. The dwarf B. buxifolia nana is the form of this species that is most commonly found growing in Britain. It is very free flowering but to date (1994) we have not seen this form bearing fruit[K]. The species is supposed to be self-fertile so it is possible that this form is sterile. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and re-sprout well from the base[200].

## 4.2.27 Hemerocallis exaltata

4 tlin 8 cyuc 4 kcak 0 tcant 1 dwat 1 m hkuc hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flat-prikrlwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis exaltata is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[116, 205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan, it is only found on Tobishima Island, a small islet off W. Japan. ksacta Meadows[187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200, 205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -15°C[187]. Hybridizes freely with other members of this genus[200]. Some roots are short and enlarged, others long with spindle-shaped tuberous ends. The plant forms a compact clump[233], but it also produces rhizomes that tend to spread[205]. Individual flowers are very short-lived, they open in the morning and wither in the evening[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

## 4.2.28 Rosa villosa

Apple Rose

4 tlin 8 cyuc 4 kcak 1 tcant 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-prikrlwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa villosa is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit SeedEdible Uses: TeaFruit - raw or cooked[2, 3, 46, 61, 105]. A pleasant acid pulp, the fruit can also be used in preserves, jams etc[183]. The fruit is about 30mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Rich in vitamin C, there is 1303mg per 100g (fresh weight) of fruit[142]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The leaves are used as a tea substitute[46, 61, 183]. A pleasant tasting fruity-flavoured tea is made from the dried fruit[21, 46].

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

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Caucasus, W. Asia to Iran. ksacta Woods, hedgerows, scrub etc[17].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have

imibbed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most well-drained soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Formerly cultivated for its edible fruit which, from selected plants, can be 4cm wide[11]. There are some named varieties, 'Wolley Dod' has large fruits with a good flavour[183]. The flowers are semi-double, heavily scented and sweetly fragrant[183]. The foliage has an aroma like ripe apples[245]. Plants often produce suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 4.2.29 *Astrebla squarrosa*

Bull Mitchell grass

4 tlin 12 cyuc 4 kcaak 1 tcan 0 dwat 1.5 m hkuc  
thtut cyutli hqatkyuctcup hwicli hyishrasljutnyikfrrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Astrebla squarrosa* is a PERENNIAL growing to 1.5 m (5ft) by 0.1 m (0ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 10. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Cultivated in the past but largely or completely abandoned.

tcanta Providing habitat for organisms such as mammals.

nrakta Australasia. ksacta Heavy, cracking clays on plains and river flats, sometimes with *Lysiphylum* or *Excoecaria*, or in *Dicanthium-Eulalia* grassland and cleared Brigalow areas; flowers after rain.

propta Wild. Seed.

nwatta Historic Crop Management: Standard Staple Crop: Balanced carbClimate: subtropical to tropical. Humidity: semi-arid. Grow on clay soils, mainly between an upper limit of 600 mm average annual rainfall, and a lower limit of 200 mm, and even below in depressions where the water concentrates following rains e.g. in Sturt's Stony Desert. Mitchell grasses are deep rooted and become dormant during drought, allowing them to survive extended periods without rainfall. Carbon Farming Solutions - Cultiva-

tion: historic crop. Cultivated in the past but largely or completely abandoned. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

#### 4.2.30 *Hemerocallis fulva longituba*

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 1 m hkuc  
hmmihtut cyutli kyuctcup hwicli hrasljutnyikfrrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Hemerocallis fulva longituba* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[105, 116]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[205]. A pleasant nutty flavour.

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - C. and S. Japan ksacta Long cultivated, the plant is not known in the wild

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[200] but tolerating partial shade. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Unlike the type species, this form does produce viable seed[187]. Plants take a year or two to become established after being moved[200]. Individual flowers are short-lived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 4.2.31 *Hemerocallis littorea*

Coastal Day Lily

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 0.9 m hkuc  
hmmihtut cyutli kyuctcup hwicli hrasljutnyikfrrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Hemerocallis littorea* is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy

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

**pcista** Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

**kcakta** Edible Parts: Flowers Leaves Root Edible Uses: Leaves and young shoots - cooked. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked. A pleasant nutty flavour. This sub-species has a fibrous root system[205].

**tcanta** Weaving The tough dried foliage is plaited into cord and used for making footwear[205]. Attractive flowers.

**dwatta** Antidote Diuretic Vitamin C The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

**nrakta** E. Asia - Japan. **ksacta** Grassy places near the sea[58, 187].

**propta** Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta** Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[200] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are hardy to about -15°C[187]. The plant has a fibrous root system[205]. Individual flowers are short-lived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. Hybridizes freely with other members of this genus[200]. Unlike the type species, this form does produce viable seed[187]. Plants take a year or two to become established after being moved[200]. They can then spread quite freely[K]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 4.2.32 *Hemerocallis minor*

Grassleaf Day Lily, Small daylily

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat m hkuc hmimhtut cyutli kyuctup hwicli hrasljutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

**drutta** *Hemerocallis minor* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**pcista** Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

**kcakta** Edible Parts: Flowers Leaves Root Edible Uses: Leaves and young shoots - cooked[2, 20, 46, 61, 183]. They must be consumed when very young or else they become fibrous[K]. One report says that eating these leaves appears to stimulate or intoxicate to some extent[2]. Flowers and flower buds - raw or cooked[2, 20, 46, 61]. Considered to be a great delicacy[177]. The flowers are a traditional food

in China where they are steamed and then dried[266]. The flowers can be dried and used as a relish or a thickener in soups etc[178, 183]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[183, 205]. A radish-like flavour but not so sharp[205].

**tcanta** Weaving The tough dried foliage is plaited into cord and used for making footwear[205].

**dwatta** Anodyne Antidote Cancer Diuretic Febrifuge Vitamin C Anodyne, antidote, diuretic, febrifuge[178]. The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205].

**nrakta** E. Asia - N. China, Korea. **ksacta** Water meadows, elevated wet places with sandy soils, forest glades, mountain slopes and scrub[74].

**propta** Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta** Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. A very cold-hardy plant, tolerating temperatures down to about -25°C[187]. Hybridizes freely with other members of this genus[200]. A very ornamental plant, its roots are slender and not tuberous, whilst the rhizomes are not spreading[187]. The roots sometimes have bulbous swellings at their tips[205]. The flowers open in the evening and live for about 2 days[205]. The flowers have a powerful scent of honeysuckle[245]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 4.2.33 *Hemerocallis lilioasphodelus*

Yellow Day Lily

4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctup hwicli hrasljutnyikfrip hpa7tli flat-priklwis hpa7tmwatli fyfixre7t hjonli

**drutta** *Hemerocallis lilioasphodelus* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**pcista** Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

**kcakta** Edible Parts: Flowers Leaves Root Shoots Edible Uses: Leaves and young shoots - raw or cooked like asparagus or celery[85, 105, 183]. They must be consumed when very young or else they become fibrous[K]. Flower buds - raw or cooked. They taste somewhat like green beans[85, 105]. They contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Flowers - raw or cooked[85, K]. They can be dried and used as a thickener in soups etc[183]. If the flowers are picked just as they start to wither they can be used as a condiment[85]. The flowers are a traditional food in China where they are steamed and then dried[266]. Root - cooked[85, 105]. They taste like a blend of sweet corn

and satisfy[183]. We have found them to be tender but fairly bland with a slight sweetness[K]. The swollen roots are quite small and are only really worthwhile using if the plant is being dug up for divisions or some other reason[K].

**tcanta Weaving**The tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208].

**dwatta Antidote Cancer Diuretic Vitamin C**The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205].

**nrakta** Original habitat is obscure, possibly China. An occasional garden escape in Britain. **ksacta** Rocky mountain woods, wet meadows and riversides on foothills of the S.E. Alps in Europe[50].

**propta** Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta** Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88, 111]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are very cold-hardy, tolerating temperatures down to about -25°C[187]. A very vigorous plant, spreading by underground rhizomes[1]. The plant has a fibrous root system with occasional spindle-like swellings[205]. Cultivated as a food and medicinal plant in Japan[127]. Individual flowers are short-lived, they open at night and last for 20 - 76 hours. The plant produces a succession of blooms over a period of about 2 months[205]. The flowers are fragrant[205]. The flowers have a honeysuckle-like scent and this can pervade the air for a considerable distance when warmed by the summer sunshine[245]. Hybridizes freely with other members of this genus[200]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

## 4.2.34 *Hemerocallis citrina*

Citron daylily

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfripr hpa7tli flat-prikrlwis hpa7tmwatli dyatxre7t hjonli

**drutta** *Hemerocallis citrina* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite

(has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**pcista** Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

**kcakta Edible Parts:** Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. The flowers can be dried and used as a thickener in soups etc. The slender trumpets vary from 12 - 17cm long[205]. There can be from 7 to 65 buds on a flowering stem[205]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[205]. The flavour is somewhat radish-like but not so sharp[205].

**tcanta Weaving**The tough dried foliage is plaited into cord and used for making footwear[205].

**dwatta Antidote Diuretic Vitamin C**The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

**nrakta** E. Asia - China. **ksacta** Forest margins, grassy fields and slopes along valleys from near sea level to 2000 metres[266].

**propta** Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta** Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are hardy to at least -20°C[187]. Widely cultivated in China for its edible flowers, especially in Hunan province[266]. Hybridizes freely with other members of this genus[200]. This species is said to be self-incompatible[127, 205]. Many of the plants in cultivation under this name are *H. thunbergii*[205]. The sub-species *H. citrina vespertina* (Hara.)Erhardt. is a very free-flowering form, producing up to 75 buds per scape and capable of flowering from July to October if the weather is suitable[205]. The plant forms a loose spreading clump[K]. The roots form pseudobulbs[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Individual flowers are very short-lived, they open in the late afternoon and die in the morning[200]. However, plants produce a succession of flowers for several weeks of the summer. The number of flowers on a scape varies from 7 to 65[205]. The flowers have a lemony scent[205]. Another report says that they have a pronounced honeysuckle scent[245].

## 4.2.35 *Hemerocallis yezoensis*

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfripr hpa7tli flat-prikrlwis hpa7tmwatli xre7t hjonli

**drutta** *Hemerocallis yezoensis* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Edible Uses: Leaves and young shoots - cooked[105, 177]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[205]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta Weaving The tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin C The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and marshy meadows near the sea[187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. A very cold-hardy plant, tolerating temperatures down to about -25°C[187]. The roots are slender and not swollen[187]. The scapes carry between 4 and 12 blooms[205]. Hybridizes freely with other members of this genus[200]. It is closely related to *H. vespertina* Hara.[58]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

## 4.2.36 *Crataegus mollis*

Red Haw, Downy hawthorn

4 tlin 8 cyuc 4 kcakc 2 tcant 2 dwat m hkuc  
hmmihtkwytlh hgattcuphja7n hwclh hralsjnutnykfrlp hpa7tli  
flatprktlucwll hpa7tmwatlh xre7t hjonl

drutta *Crataegus mollis* is a deciduous Tree growing to 9 m (29ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Tea Fruit - raw or cooked[22, 46, 62, 101, 183]. Sub-acid, dry and mealy[82, 227]. The fruit is also used for making jellies and preserves[61, 95, 183]. Fairly large, it is about 20 - 25mm in diameter[200], with a thick flesh[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. A tea-like beverage can be made from the twigs[257].

tcanta Hedge Hedge The plant is tolerant of being trimmed and will even resprout if cut back into very old wood. It can be used as a hedge[50]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardio tonic Hypotensive Although not specifically mentioned has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern and Central N. America - Ontario to Alabama, west to Oklahoma. ksacta Open woods, usually in alluvial or fertile soils[43]. Frequently found in limestone soils[229].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses: Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11], the branches are almost thornless[229]. A rather variable species, it has been separated into several different species by some botanists[82]. This species is much confused with *C. chrysocarpa*[11] and with *C. coccinea*[50]. It is very closely related to *C. submollis*, differing in having 20 stamens to a flower (as compared to 10 in *C. submollis*)[202]. Special Features: North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].



## 4.2.37 Cornus mas

Cornelian Cherry, Cornelian Cherry Dogwood  
4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta Cornus mas is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Fruit Oil OilEdible Uses: Coffee Oil OilFruit - raw, dried or used in preserves[2, 3, 7, 9, 13, 183]. Juicy, with a nice acid flavour[11]. The fully ripe fruit has a somewhat plum-like flavour and texture and is very nice eating, but the unripe fruit is rather astringent[K]. It is rather low in pectin and so needs to be used with other fruit when making jam[9]. At one time the fruit was kept in brine and used like olives[183]. The fruit is a reasonable size, up to 15mm long, with a single large seed[K]. A small amount of edible oil can be extracted from the seeds[7]. Seeds are roasted, ground into a powder and used as a coffee substitute[183].

tcanta Dye Hedge Hedge Oil Oil Tannin WoodAn oil is obtained from the seed[7]. A dye is obtained from the bark[3, 7]. No more details are given. Another report says that a red dye is obtained from the plant, but does not say which part of the plant[4]. The leaves are a good source of tannin[7]. Wood - very hard, it is highly valued by turners[7]. The wood is heavier than water and does not float[7]. It is used for tools, machine parts, etc[7, 11, 13, 61].

dwatta Astringent Cholera Febrifuge NutritiveThe bark and the fruit are astringent, febrifuge and nutritive[7]. The astringent fruit is a good treatment for bowel complaints and fevers, whilst it is also used in the treatment of cholera[4, 254]. The flowers are used in the treatment of diarrhoea[4]. nrakta Europe. Naturalized in Britain[17]. ksacta Woodlands, especially in calcareous soils[7, 13].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Hedge, Screen, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[11], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Prefers a moist soil[108] and a sunny position[15] but also succeeds in light shade[188]. Plants are fairly wind resistant[K]. Plants grow and crop well in pots. A very hardy plant, tolerating temperatures down to about -25°C[184]. At one time the cornelian cherry was frequently cultivated for its edible fruit, though it has fallen into virtual disuse as a fruit crop in most areas[3]. It is still being cultivated in parts of C. Europe and there are some named varieties[183]. 'Macrocarpa' has larger fruits than the type[182]. 'Nana' is a dwarf form, derived from a yellow-fruited clone[182]. 'Variegata' has been seen on a number of occasions with very large crops of fruit, even in years when the type species has not fruited well[K]. 'Jolico' has well-flavoured fruits 3 times larger than the species. There are also a number of cultivars with yellow, white and purplish fruit. Seedlings can take up to 20 years to come into fruit.

Plants produced from cuttings come into fruit when much younger, though they do not live as long as the seedlings. A very ornamental plant[1] it flowers quite early in the year and is a valuable early food for bees[13, 108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.38 Hemerocallis thunbergii

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 0.5 m hkuc  
hmmihtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta Hemerocallis thunbergii is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds- raw or cooked[105, 177]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Attractive Flowers.

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - N. China, Japan, Korea. ksacta Mountains in C. and S. Japan[58].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Plants take a year or two to become established

after being moved[200]. They increase by means of runners[205] and form loose spreading clumps[K]. The roots are not swollen[233]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. The fragrant flowers are very short-lived, they open in the late afternoon and die in the morning[200, 205]. However, plants produce a succession of flowers for several weeks of the summer, each scape carrying between 4 and 20 blooms[205].

## 4.2.39 Hemerocallis dumortieri

Dumortier's daylily

4 tlin 8 cyuc 4 kcaak 3 tcan 1 dwat 0.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasljutnyikfrip hpa7tli flat-prikw  
wis hpa7tmwatli xre7t hjonli

drutta Hemerocallis dumortieri is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcacka Edible Parts: Flowers Leaves Shoots Edible Uses: Leaves and young shoots - cooked[105, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177, 205]. The flowers are crisp and juicy with a pleasant sweetness and no unpleasant after-taste[K]. They can be dried and used as a thickener in soups etc[183]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked.

tcanta Weaving The tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a slowly spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208].

dwatta Antidote Diuretic Vitamin C The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan, Korea. ksacta Meadows in the mountains of N. and C. Japan[58, 187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -20°C[187]. Hybridizes freely with other members of this genus[200]. Individual flowers only live for one day[205]. The flowers are sweetly scented[245]. Plants form a tight clump that spreads slowly[K]. The roots are cylindrical[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

## 4.2.40 Mentha x villosa alopecuroides

Apple Mint, Bowles' Mint

4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat 0.6 m hkuc  
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flat-prikw  
wis hpa7tmwatli xre7t hjonli

drutta Mentha x villosa alopecuroides is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcacka Edible Parts: Leaves Edible Uses: Condiment Tealeaves - raw or cooked[14]. A strong spearmint flavour, they are used as a flavouring in salads or cooked foods[183], this is also the main species that is used to make mint sauce. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent Strewing An essential oil is obtained from the whole plant. The plant repels insects and was formerly used as a strewing herb[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative Febrifuge Apple mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Central and southern Europe, including Britain, Mediterranean region, Azores.. ksacta Roadsides and in ditches in the S. and W. of England[5, 17]. Probably a hybrid, M. spicata x M. suaveolens.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. Prefers a slightly acid soil[16]. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Apple mint is commonly grown in the herb garden. There is at least one named variety, 'Bowles' mint' is said to be a superior form and it is the form usually cultivated commercially for mint sauce. Unlike most members of the genus, this species is resistant to the disease 'rust'[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a strong aroma of spearmint. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, help-

to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 4.2.41 *Hemerocallis multiflora*

4 tlin 8 cyuc 4 kcaak 0 tcan 1 dwat m hkuc  
hmmimtut cyutli kyucptuc hwicli hrasjlutnyikfrip hpa7tli flat-  
priklwis hpa7tmwatli xre7t hjonli

drutta *Hemerocallis multiflora* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcaakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. Relatively small for a day lily, but the flowers are crisp with a pleasant sweetness and no aftertaste - they make a delicious addition to salads[K]. The flowers can also be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[K]. We have found them to be tender but fairly bland with a slight sweetness[K]. The roots are slightly fleshy, with a swollen, tuberous part near the tip[266]. The swollen roots are quite small and are only really worthwhile using if the plant is being dug up for divisions or some other reason[K].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China in Hunan, Japan. ksacta Hill forests and openings in forests on hilltops at elevations of 700 - 1000 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[11] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. This species is closely related to *H. micrantha* and *H. plicata*[205]. Individual flowers are short-lived but the plant produces a succession of blooms. Each scape carries between 75 and 100 blossoms[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 4.2.42 *Sorbus aria*

Whitebeam, Chess-apple

4 tlin 8 cyuc 3 kcaak 4 tcan 1 dwat 12 m hkuc  
hmmimtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflat-  
priklwisslip hpa7tmwatli xre7t hjonli

drutta *Sorbus aria* is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used in preserves etc. The fruit is usually bletted if it is going to be eaten raw[2, 3, 5, 105, 115, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. Fruit from some trees has a pleasant mild flavour and a mealy texture, we like eating small quantities of it. The fruit can also be dried and ground into a powder and mixed with cereals such as wheat[2, 46, 66]. The fruit is about 10 - 12mm across[200].

tcanta Pioneer Shelterbelt WoodVery tolerant of exposed maritime conditions, it makes a good windbreak tree near the coast[75, 200]. A useful pioneer species, especially on chalky soils and in windy situations[186, K]. Wood - hard, heavy, close grained. Used for beams etc[11, 115].

dwatta Diuretic Emmenagogue LaxativeBoth the flowers and the fruit are mildly diuretic, laxative and emmenagogue[9]. An infusion is used in the treatment of painful menstruation, constipation and kidney disorders[9].

nrakta Central and S. Europe, from Britain and France to Spain, east to Macedonia and Transylvania. ksacta Woods and scrub, usually on chalk or limestone[3, 9, 13, 17].

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

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates acid sands and thin chalky soils[98, 200]. Does well on heavy clays[200]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Very tolerant of atmospheric pollution and of exposed maritime positions[186]. The whitebeam is one of the first colonizers of chalk scrub[186]. As well as being a good pioneer species for this situation, it will often survive through the development to woodland[186]. There are several named varieties selected for their ornamental value[188]. Trees cast a fairly dense shade when mature[186]. Regenerating well after cutting, it is suitable for coppicing[186]. The fruit is very attractive to birds[11]. Plants are susceptible to fire-blight[188]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.43 Malus sylvestris

Crab Apple, European crab apple  
4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 10 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfriphpa7tli flatprikl-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus sylvestris* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Oil Edible Uses: Oil Pectin Pectin Tea Fruit - raw or cooked[9, 15]. Used for jellies, preserves and juices[183]. The flavour improves considerably if the fruit is not harvested until it has been frosted[12]. The fruit is quite variable in size (it is about 2 - 4cm in diameter[200]) and quality. Whilst usually harsh and acid, some forms are quite sweet and can be eaten out of hand[K]. The fruit is rich in pectin and can be used in helping other fruits to set when making jam etc[61, 142]. Pectin is also said to protect the body against radiation[201]. An edible oil can be obtained from the seed[4]. It would only really be viable to use these seeds as an oil source if the fruit was being used for some purpose such as making cider and then the seeds could be extracted from the remaining pulp[K]. A very pleasant tea can be made from the leaves[7].

tcanta Dye Fuel Oil Pectin Pectin The fruit is a source of pectin[61, 142]. Pectin is used as a thickener in jams etc and as a culture medium in laboratories. A red to yellow dye is obtained from the bark[257]. The wood is an excellent fuel[67].

dwatta Anthelmintic Antibacterial Astringent Hypnotic Laxative Refrigerant The fruit is astringent and laxative[4, 9]. The crushed fruit pulp can be used as a poultice to heal inflammations or small flesh wounds[7]. The fruit is eaten to obviate constipation[240]. The bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[4, 240]. The leaves contain up to 2.4% of an antibacterial substance called 'florin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Greece and S.W. Asia. ksacta Woods, scrub and hedges, especially in oak woods, on neutral to calcareous soils[9, 17, 200].

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

nwatta An easily grown plant, it succeeds in most fertile soils, including heavy ones, preferring a moisture retentive well-drained loamy soil[1, 98, 200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[186, 200]. Fairly tolerant of cutting, it succeeds in a mixed hedgerow[186]. A parent of the cultivated apple[11], it is often used as a rootstock[50]. The fruit is a good wildlife

food source, especially for birds[200]. The plant has over 90 associated insect species[24]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.44 Malus floribunda

Japanese Crab, Japanese flowering crab apple  
4 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfriphpa7tli flatprikl-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus floribunda* is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105]. Up to 1cm in diameter[200]. It tastes like a soft fruit. Acid but nice, about the size of a large blackcurrant[K].

nrakta E. Asia - Japan? Probably not a truly wild species but a hybrid M. sieboldii x M. baccata or M. prun ksacta Not known in the wild.

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

nwatta Landscape Uses: Border, Espalier, Pest tolerant, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. The tree is a very good pollinator for the apple orchard[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

## 4.2.45 Crataegus punctata

Dotted Hawthorn,  
4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 10 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli  
flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus punctata* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow

semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[159]. Eaten out of hand or made into jellies, preserves etc[177, 183]. A good size, about 25mm in diameter, and borne in small clusters[200]. Ripening in October, it is quite apple-like in texture and appearance, making a good dessert fruit[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta MiscellanyWood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive MiscellanyA compound decoction of the shoots and bark has been used to stop menstrual flow[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Georgia, west to Minnesota and Oklahoma. ksacta Open rocky ground, thickets and pasture[43]. Rich hillsides[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[1], it grows very well in Britain, flowering and fruiting abundantly[11]. There are some named varieties selected for their ornamental value[200]. 'Ohio Pioneer' is a thornless form growing about 8 metres tall[200]. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage.

Heat Zones range from 1 (no heat days) to 12 (21 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 4.2.46 *Malus spectabilis*

Chinese Flowering Apple, Asiatic apple  
4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 9 m hkuc  
hmimhtut cyutli kcup hwicli hrasjlutnykfrkip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drudda *Malus spectabilis* is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. About 2 - 3 cm in diameter[200]. Bitter and harsh when eaten fresh[11], when stored in a cool dry place and allowed to blight it becomes quite acceptable[K].

nrakta E. Asia - China. ksacta Plains and mountain regions at elevations of 500 - 2000 metres[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental tree[1], it is much cultivated in China for its edible fruit[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.47 *Juniperus communis*

Juniper, Common juniper  
4 tlin 10 cyuc 3 kcaak 4 tcan 3 dwat 9 m hkuc  
hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnykfrkip hpa7tli frusflatprikliwislip hpa7tmwatli nyanhjen hjonli

drudda *Juniperus communis* is an evergreen Shrub growing to 9 m (29ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must

be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although the fruit of this plant is quite often used medicinally and as a flavouring in various foods and drinks, large doses of the fruit can cause renal damage. Juniper should not be used internally in any quantities by pregnant women[65, 165]. Diarrhoea with repeated use. Avoid in kidney disease. Do not use internally for more than 6 weeks [301].

kcakta Edible Parts: Fruit Leaves Seed Edible Uses: Coffee Condiment Tea Fruit - raw or cooked[2, 5, 9, 15]. It is usually harvested in the autumn when fully ripe and then dried for later use[12]. A soft, mealy, sweet, resinous flesh[82]. The fruit is often used as a flavouring in sauerkraut, stuffings, vegetable pates etc, and is an essential ingredient of gin[183]. The aromatic fruit is used as a pepper substitute according to one report[183]. An essential oil is sometimes distilled from the fruit to be used as a flavouring[183]. Average yields are around 1%[7]. The cones are about 4 - 8 mm in diameter and take 2 - 3 years to mature[82, 200]. Some caution is advised when using the fruit, see the notes above on toxicity. The roasted seed is a coffee substitute[177]. A tea is made by boiling the leaves and stems[161]. A tea made from the berries has a spicy gin-like flavour[183].

tcanta Fibre Fuel Hair Incense Repellent Resin Strewing Tinder A decoction of the branches is used as an anti-dandruff shampoo[172]. The essential oil distilled from the fruits is used in perfumes with spicy fragrances[238]. In hot countries the tree yields the resin 'Sandarac' from incisions in the trunk[4, 74]. This is used in the production of a white varnish[74]. The stems were at one time used as a strewing herb to sweeten the smell of rooms[14, 244]. The whole plant can be burnt as an incense and fumigant[66, 102, 146]. It was used during epidemics in the belief that it would purify the air and cleanse it of infection[244]. Fresh or dried juniper branches also make a good insect repellent[102, 172]. Many forms of this species are good ground cover plants for sunny situations[208]. Forms to try include 'Depressa Aurea', 'Dumosa', 'Effusa', and 'Repanda'[197]. 'Prostrata' can also be used[188]. The bark is used as cordage[61] and as a tinder[172]. Wood - strong, hard, fragrant, very durable in contact with the soil and very close-grained, but usually too small to be of much use[82, 229, 244, 245]. It makes an excellent fuel[66].

dwatta Antiseptic Aromatherapy Aromatic Carminative Diaphoretic Diuretic Rubefacient Stomachic Tonic Urinary Juniper fruits are commonly used in herbal medicine, as a household remedy, and also in some commercial preparations. They are especially useful in the treatment of digestive disorders plus kidney and bladder problems[4]. The fully ripe fruits are strongly antiseptic, aromatic, carminative, diaphoretic, strongly diuretic, rubefacient, stomachic and tonic[4, 7, 9, 21, 46, 165, 240, 254]. They are used in the treatment of cystitis, digestive problems, chronic arthritis, gout and rheumatic conditions[254]. They can be eaten raw or used in a tea[222], but some caution is advised since large doses can irritate the urinary passage[4]. Externally, it is applied as a diluted essential oil, having a slightly warming effect upon the skin and is thought to promote the removal of waste products from underlying tissues[254]. It is, therefore, helpful when applied to arthritic joints etc[254]. The fruits should not be used internally by pregnant women since this can cause an abortion[9]. The fruits also increase menstrual bleeding so should not be used by women with heavy periods[254]. When made into an ointment, they are applied to exposed wounds and prevent irritation by flies[4]. The essential oil is used in aromatherapy. Its keyword is 'Toxin elimination'[210].

nrakta Northern temperate zone, incl Britain, south to the mountains of N. Africa, Himalayas and California ksacta Chalk downs in S. England but only where there is least sunshine and most rain, heaths, moors, pine and birch woods in the north of Scotland on acid peat, often dominant on chalk, limestone and slate.

propta The seed requires a period of cold stratification.

The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses: Specimen. An easily grown plant, it succeeds in hot dry soils and in poor soils. Succeeds in most soils so long as they are well drained[186], preferring a neutral or slightly alkaline soil. Does well in chalky soils[1]. Grows well in heavy clay soils. Tolerates a pH range from 4 to 8[186]. Succeeds in light woodland but dislikes heavy shade[186]. Established plants are very tolerant of drought[186]. Although the fully dormant plant is cold-tolerant throughout Britain, the young growth in spring can be damaged by late frosts. All parts of the plant are very aromatic[245]. Juniper is a very polymorphic species that has a long history of culinary and medicinal use[244]. It is frequently grown in the ornamental and herb garden, there is a huge range of cultivars of widely diverse habits[11, 81]. At least some forms tolerate maritime exposure[186], there is a thriving colony in an exposed position at Land's End in Cornwall[81]. The fruits take 2 - 3 years to ripen on the plant[11]. Plants are usually very slow growing, often only a few centimetres a year[186]. Resists honey fungus[88]. Plants are sometimes attacked by a rust, this fungus has an aecidial stage on hawthorn (*Crataegus* spp.)[1]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms.

## 4.2.48 *Pyrus pashia*

Indian Wild Pear

4 tin 8 cyuc 3 kcak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-prikhwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pashia* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[2, 11, 51, 105, 158, 272]. Up to 2.5cm in diameter[194]. The fruit is usually bletted[183], but even then it is not sweet[146]. Tasty when fully ripe, even when dried[194]. Our experience is that the fully ripe fruit has a reasonable flavour and, when bletted, is sweet and very pleasant[K]. A mature tree yields about 45kg of fruit per year[194]. The fruit contains about 6.8% sugars, 3.7% protein, 1% ash, 0.4% pectin. Vitamin C is very low, about 1.2mg per 100g[194].

tcanta Rootstock Wood This plant can be used as a rootstock for the cultivated pear[194]. Wood - compact fine grained, hard, durable, liable to split and warp during seasoning. Used for small implements, walking sticks and fuel[51, 158, 266].

dwatta Astringent The juice of the ripe fruit is used in the treatment of diarrhoea[272].

nrakta E. Asia - Afghanistan to W. China. ksacta Shrub-berries in the Himalayas to 2700 metres[51].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary

domnancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200].

## 4.2.49 *Crataegus opaca*

Western Mayhaw

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 9 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli frusflatprikrlwis hpa7tmwatli xre7t hjonli

drutta *Crataegus opaca* is a deciduous Shrub growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[160]. Juicy and acid with a pleasant flavour[2]. It is up to 2cm in diameter[227]. The fruit is frequently used and much prized in parts of southern N. America where it is often gathered in quantity from the wild. Its acid flavour makes it a favourite for preserves and jellies[82, 183, 227]. The fruit can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard and strong, but not large enough for commercial use[227]. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Southern N. America - North Carolina to Mississippi. ksacta Deep depressions filled with water for most of the year, borders of swamps, low river banks etc[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. It thrives in acid soils[160]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy species, tolerating temperatures down to about -30°C[160]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a fetid smell somewhat like decaying fish. This attracts moegids which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Occasionally cultivated for its fruit in America, there are some named varieties[183].

## 4.2.50 *Amelanchier asiatica*

Korean Juneberry

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikrlwis hpa7tmwatli fylxire7t hjonli

drutta *Amelanchier asiatica* is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Edible Uses: Edible fruit, raw or cooked[3, 105, 177]. Of good quality[183], the fruit is sweet and juicy, contains a few small seeds at the centre and has a hint of apple in the flavour[K]. The fruit is rich in iron and copper[226]. The fruit is up to 15mm in diameter[266].

nrakta E. Asia - China, Japan, Korea. ksacta Hilly and mountainous regions[58]. On slopes by streams, mixed forests at elevations of 1000 - 2000 metres[266].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil, including chalk, so long as it is not too dry or water-logged[11, 200]. Plants succeed in quite shady positions but do not flower or fruit well there[K]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very ornamental plant[1], it is closely allied to *A. canadensis* and *A. laevis*, and is also very similar to *A. arborea*[11]. The sub-species *A. asiatica sinica* C. Schneid. is found in China. It has smaller fruits than the type species[200]. Hybridizes freely with other members of

genus[200]. Grafting onto seedlings of *A. lamarkii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

## 4.2.51 *Malus sieversii*

Crabapple

4 tlin 10 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuu  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Malus sieversii* is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. Large and well-flavoured[74]. The fruit is usually between 3 - 5cm in diameter, though it can be up to 7cm[266].

nrakta C. Asia - western Tibet to Kazakhstan and Russia... ksacta Mountain forests and slopes, streamsides in mountain valleys[74]. Mountain summits, slopes and valleys, often the dominant tree of forests, at elevations of 1200 - 1300 metres in Tibet[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This species is vulnerable to extinction because of its limited range and exploitation[266]. It is believed to be the principal ancestor of commercially grown apples[266]. A parent of the cultivated apple[11], the large well-flavoured fruit is possibly of economic interest[74]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.52 *Malus coronaria*

Garland Crab, Sweet crab apple

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 7 m hkuu  
hmmihtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Malus coronaria* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is

hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

kcakta Edible Parts: Fruit Edible Uses: Pectin Fruit - raw or cooked[159, 161]. Fairly large, it is up to 5cm in diameter[200]. Harsh and acid[11], it is mainly used for jellies[183] but can be eaten raw when it is fully ripe[101]. The fruits can be buried in the ground overwinter and will have lost much of their acidity by the spring[183]. The fruit can also be dried and stored for later use[257]. Rich in pectin, so it can be added to pectin-low fruits when making jams or jellies[226]. Pectin is also said to protect the body against radiation[201].

tcanta Pectin Rootstock Wood The plant can be used as a rootstock for cultivated apples, conferring a greater hardiness[226]. Wood - heavy, close-grained, not strong[46, 82, 229]. It weighs 43lb per cubic foot[235]. Used for making levers, the handles of tools, small domestic items and fuel[46, 82, 229].

dwatta Abortifacient Astringent Birthing aid Emmenagogue Lithotropic Ophthalmic An infusion of the bark has been used to ease a difficult birth and also in the treatment of gallstones, piles and as a wash for sore mouths[257]. A cold infusion of the bark has been used as a wash for black eyes, sore eyes and snow blindness[257]. A decoction of the root has been used to treat suppressed menses and so can cause an abortion, especially early in the pregnancy[257].

nrakta Eastern N. America - New York to South Carolina, west to Kansas. ksacta Bottoms, wooded slopes, thickets and clearings[43] in most soil types and moisture levels[159].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A slow-growing and short-lived tree in the wild[229]. The fruit is a good wildlife food source, especially for birds[200]. The flowers are sweetly scented[245]. This species is closely related to *M. ionensis*[1]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.53 *Crataegus pedicellata gloriosa*

Scarlet Haw

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 7 m hkuu  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Crataegus pedicellata gloriosa* is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft). See above for



USA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** FruitEdible Uses: Fruit - raw or cooked[K]. Up to 2cm long and pear shaped[11]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

**tcanta Wood -** heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

**dwatta Cardiotoxic Hypotensive**Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

**nrakta Eastern N. America - New York.** ksacta Not known

**propta Seed -** this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**nwatta** A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°C[202]. This sub-species has larger fruits than the type[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.54 *Crataegus chrysoarpa*

Fireberry Hawthorn, Red haw, Piper's Hawthorn, 4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 6 m hkcw hmimhtut cyutli hgattcupha7n hwicli hracijlutnyikfriphpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

**drutta Crataegus chrysoarpa** is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** FruitEdible Uses: Fruit - raw or cooked[161, 177]. Used mainly as a famine food[257]. A very pleasant flavour when ripe, with the added bonus of ripening in late summer before most other members of the genus[K]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. It is about 1cm in diameter and borne in small clusters[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. A tea can be made from the twigs[257]. (This probably means the young shoots with leaves-grained.)

**tcanta Wood -** heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

**dwatta Cardiotoxic Hypotensive Laxative**A decoction of the dried berries has been used as a mild laxative[257]. A compound decoction of the root has been used in the treatment of diarrhoea[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

**nrakta North-eastern N. America - Newfoundland to Pennsylvania, west to the Rocky Mountains.** ksacta Thickets and rocky ground along streams[43].

**propta Seed -** this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**nwatta** A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. A ten year old tree was seen at Kew Gardens in 2002. It was about 2.5 metres tall and was bearing a very good crop of fruit[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant

with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.55 *Crataegus pruinosa*

Frosted Hawthorn, Waxyfruit hawthorn

4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 6 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprikwiwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pruinosa* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177]. The flesh is thick[82]. A sweet yellow flesh[200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use[257]. The fruit is about 1cm in diameter[200]. The fruit is up to 16mm in diameter with a thin flesh[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Newfoundland to North Carolina, west to Wisconsin and Oklahoma. ksakta Thickets and rocky ground[43] in open woods[235]. Slopes of low hills, often in limestone soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of

this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.56 *Crataegus rotundifolia*

4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 6 m hkuc

hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprikwiwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus rotundifolia* is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A fair size fruit, to 15mm in diameter, with a reasonable sweet mealy taste, though when not fully ripe there is a distinct bitterness[K]. It makes an acceptable dessert fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America. ksakta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit,

also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A tree bearing this name at Kew in September 1993 was fruiting abundantly[K]. There is some confusion over the correct name of this species. *C. rotundifolia* Moench. is said to be a synonym for *C. chrysocarpa* phoenicea, *C. rotundifolia* Borchk. is a synonym of *C. chrysocarpa*. There is also a *C. rotundifolia* Lam, which is a synonym of *Amelanchier rotundifolia*[200].

#### 4.2.57 *Crataegus flabellata*

Fanleaf hawthorn

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 6 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprukwislip hpa7tmwatli xre7t hjonli

drutta *Crataegus flabellata* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet but very soft and mealy flesh, it makes an acceptable dessert fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is up to 15mm long and 8mm wide, it is borne in small clusters[82, 229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to South Carolina, west to Louisiana. ksacta Thickets and open woods[204]. Dry open places, borders of woods and the margins of high banks of streams[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with

protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A tree at Kew in September 1993 was fruiting heavily[K].

#### 4.2.58 *Crataegus coccinoides*

Kansas Hawthorn

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc  
hmmihtut cyutli hgatkpyuctuphja7n hwicli hrasjlutnyikfrp  
hpa7tli flatprukwislip hpa7tmwatli xre7t hjonli

drutta *Crataegus coccinoides* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 177]. Firm and sub-acid[82]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is borne in small clusters and is up to 17mm in diameter[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Central N. America - Illinois and Missouri to Kansas, Oklahoma and Arkansas. ksacta Dry thickets and calcareous hills[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their

final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 4.2.59 Crataegus altaica

Altai Mountain Thorn

4 tlin 8 cyuc 3 kcaok tcan 2 dwat 6 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli  
flatpruklwis hpa7tmwatli xre7t hjonli

drutta Crataegus altaica is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked. About 8mm in diameter, the fruit is yellow with a fairly dry mealy texture and a pleasantly sweet flesh[K]. The fruit can also be used in making pies, preserves, etc, and can also be dried for later use. The fruit ripens in August, making it one of the earliest ripening hawthorns[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta W. Asia - Altai Mountains. ksacta Not known  
propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their

final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. This species is closely related to *C. wattiana*[11]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 4.2.60 Crataegus laevigata

Midland Hawthorn, Smooth hawthorn, English Hawthorn

4 tlin 8 cyuc 3 kcaok 5 tcan 5 dwat 6 m hkuc  
pcimhmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp  
hpa7tli flatpruklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus laevigata is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Leaves Edible Uses: Coffee Tea Fruit - raw or cooked[2, 9, 12, 183]. A dry and mealy texture, they are not very appetizing[K]. The fruit can be used for jams and preserves[9]. The fruit pulp can be dried, ground into a meal and mixed with flour in making bread etc[46, 183]. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. Young leaves and young shoots - raw[5, 177]. A tasty nibble, they are nice in a salad[K]. Young leaves are a tea substitute[21, 46, 177, 183]. The roasted seed is a coffee substitute[12, 21, 183].

tcanta Charcoal Fuel Hedge Hedge Rootstock Wood A good hedge plant, it is very tolerant of neglect and is able to regenerate if cut back severely, it makes a good thorny stock-proof barrier[186] and resists very strong winds. It can be used in layered hedges[11, 29]. The plant is often used as a rootstock for several species of garden fruit such as the medlar (*Mespilus germanica*) and the pear (*Pyrus communis sativa*)[4]. Wood - very hard and tough but difficult to work[7, 46, 61]. It has a fine grain and takes a beautiful polish but is seldom large enough to be of great value[4]. It is used for tool handles and making small wooden articles etc[4, 7, 46, 61]. The wood is valued in turning and makes an excellent fuel, giving out a lot of heat, more so even than oak wood[4]. Charcoal made from the wood is said to be able to melt pig iron without the aid of a blast[4].

dwatta Antiarrhythmic Antispasmodic Astringent Cardiotonic Diuretic Hypotensive Malaria Sedative Tonic Vasodilator Hawthorn is an extremely valuable medicinal herb. It is used mainly for treating disorders of the heart and circulation system, especially angina[254]. Western herbalists consider it a 'food for the heart', it increases the blood flow to the heart muscles and restores normal heart beat[254].

## 4.2.61 Crataegus anomala

Arnold hawthorn

4 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 5 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprlikwvslip hpa7tmwatli xre7t hjonli

This effect is brought about by the presence of bioflavonoids in the fruit, these bioflavonoids are also strongly antioxidant, helping to prevent or reduce degeneration of the blood vessels[254]. The fruit is antispasmodic, cardiac, diuretic, sedative, tonic and vasodilator[4, 9, 21, 46, 165]. Both the fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222], they are also used to treat a heart muscle weakened by age, for inflammation of the heart muscle, arteriosclerosis and for nervous heart problems[21]. Prolonged use is necessary for the treatment to be efficacious[222]. It is normally used either as a tea or a tincture[222]. Hawthorn is combined with ginkgo (*Ginkgo biloba*) to enhance poor memory, working by improving the blood supply to the brain[254]. The bark is astringent and has been used in the treatment of malaria and other fevers[7]. The roots are said to stimulate the arteries of the heart[218].

nrakta Europe, including Britain, from Sweden to Spain, eastwards to Poland. ksacta Woods, hedges, thickets etc on clays and heavy loams, especially in E. Britain[17, 186]. Where found in hedges it is often as a relic of ancient woodland[186].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A true woodland species, it grows well in quite dense shade[17, 186]. A very hardy plant, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus[200]. Closely allied to *C. monogyna*, it often hybridizes with that species in the wild when growing in its proximity[186]. There are many named forms selected for their ornamental value[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. An important food plant for the larvae of many lepidoptera species[30]. Special Features:Not North American native, Blooms are very showy.

drutta *Crataegus anomala* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177, 235]. Juicy[43]. A very nice flavour, it makes a very good dessert fruit[K]. The fruit can also be used in making pies, preserves, etc, and can be dried for later use. The fruit is up to 20mm in diameter with a thick flesh[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to New York. ksacta Rocky banks and open woods on low limestone ridges[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. This species is growing in a number of botanical gardens in Britain, where it is fruiting very well[K]. Some botanists do not recognise it as a distinct species and place it as part of *C. pedicellata*[82]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedling trees take from 5 - 8 years

before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 4.2.62 *Crataegus columbiana*

Columbian Hawthorn

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 5 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli  
flatprkilwissip hpa7tmwatli xre7t hjonli

drudda *Crataegus columbiana* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[161, 166]. A very pleasant flavour, it is slightly mealy but juicy and can be eaten in quantity as a dessert fruit[K]. It is also used in making pies, preserves etc and can be dried for later use[161, 177]. The fruit is up to 11mm in diameter and is borne in small clusters[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - British Columbia to California, east to Idaho and Oregon. ksacta Meadows and near streams in California[71].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years

before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to *C. douglasii*[71].

## 4.2.63 *Sambucus racemosa*

American Red Elder

4 tlin 8 cyuc 3 kcak 1 tcan 1 dwat 4 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprkil-  
wis hpa7tmwatli xre7t hjonli

drudda *Sambucus racemosa* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. NC State University have noted Cyanogenic glycoside and alkaloids can cause low toxicity if eaten.

kcakta Edible Parts: Flowers Fruit Edible Uses: Fruit - raw or cooked[105, 161, 257]. A bitter flavour[183]. The fruit is quite nutritious, having a relatively high fat and protein as well as carbohydrate content[212]. The fruit can be dried prior to use, it will then lose some of its rank taste[183]. The fruit is about 5mm in diameter and is borne in large clusters making it easy to harvest[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked. The root is made into a tea-like beverage[105, 161, 183].

tcanta Repellent Straw Wood The stem is easily hollowed and can be used to make a whistle[212].

dwatta Anodyne Carminative Depurative Diaphoretic Diuretic Laxative Purgative Resolvent Vitamin C Vulnerary The bark and the leaves are used as a diuretic and purgative[212]. The blossoms have been used in the treatment of measles[257].

nrakta N. America - British Columbia to Newfoundland, south to Georgia, Iowa, Colorado and California. ksacta Moist to wet soils along streams, in woods and open areas from valleys to around 3,000 metres[212].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Closely related to *S. racemosa* and considered part of that species by some botanists[43]. Plants in this genus are notably resistant to honey fungus[200].

## 4.2.64 Crataegus x grignonensis

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 4 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus x grignonensis* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta A hybrid species of garden origin, *C. crus-galli* x *C. pubescens*. ksacta Not known in the wild.

propta Seed - this is a hybrid species and it will not breed true from seed. If this is no problem, then the seed is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245].

## 4.2.65 Sambucus pubens

American Red Elder

4 tlin 8 cyuc 3 kcaak 1 tcan 1 dwat 4 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Sambucus pubens* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcicta Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. NC State University have noted Cyanogenic glycoside and alkaloids can cause low toxicity if eaten.

kcakta Edible Parts: Flowers Fruit Edible Uses: Tea Fruit - raw or cooked[105, 161, 257]. A bitter flavour[183]. The fruit is quite nutritious, having a relatively high fat and protein as well as carbohydrate content[212]. The fruit can be dried prior to use, it will then lose some of its rank taste[183]. The fruit is about 5mm in diameter and is borne in large clusters making it easy to harvest[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked. The root is made into a tea-like beverage[105, 161, 183].

tcanta Musical The stem is easily hollowed and can be used to make a whistle[212].

dwatta Diuretic Purgative The bark and the leaves are used as a diuretic and purgative[212]. The blossoms have been used in the treatment of measles[257].

nrakta N. America - British Columbia to Newfoundland, south to Georgia, Iowa, Colorado and California. ksacta Moist to wet soils along streams, in woods and open areas from valleys to around 3,000 metres[212].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[11]. Tolerates atmospheric pollution and coastal situations[200]. Closely related to *S. racemosa* and considered part of that species by some botanists[43]. Plants in this genus are notably resistant to honey fungus[200].

## 4.2.66 Amelanchier sanguinea

Roundleaf Serviceberry, Gaspé serviceberry

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 3 m hkuc  
hmimhtut cyutli kyuactup hwicli hrasjlutnykfrip hpa7tli flat-  
prikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Amelanchier sanguinea* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**kcakta Edible Parts:** Fruit **Edible Uses:** Edible fruit - raw or cooked[101, 105]. A sweet flavour[177]. The fruit is produced in small clusters and is up to 11mm in diameter[229]. The fruit is rich in iron and copper[226].

**nrakta Eastern N. America - Maine to New Jersey, west to Minnesota and Iowa.** **ksacta** Open woods, rocky slopes and river banks on neutral to slightly calcareous soils[43].

**propta Seed** - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Prick the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

**nwatta** Prefers a rich loamy soil in a sunny position or semi-shade[1, 200], but thrives in any soil that is not waterlogged[11]. Grows well in heavy clay soils. Tolerates dry soils[200]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Plants produce suckers and form thickets[200]. Hybridizes with *A. stolonifera*, *A. laevis* and *A. bartramiana*. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

## 4.2.67 *Sambucus racemosa kamschat-ica*

Red Elder

4 tlin 8 cyuc 3 kcaak 2 tcan 2 dwat 3 m hkuc  
hmmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
lwis hpa7tmwatli xre7t hjonli

**drutta** *Sambucus racemosa kamschatatica* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. **Suitable for:** light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. **Suitable pH:** mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**pcicta** Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. The seed is said to be poisonous[21].

**kcakta Edible Parts:** Flowers **Fruit Edible Uses:** Fruit - raw or cooked[13]. The tastiest fruit in this genus[7]. Rich in vitamin C, the seed can be removed and the fruit used in jellies, preserves etc[183]. The fruit is about 5mm in diameter and is borne in large clusters, making it easy to harvest[200]. Some caution is advised, see notes above on toxicity. **Flowers** - raw or cooked.

**tcanta** **Repellent Straw Wood** The leaves are used to repel insects[6]. Wood - commonly used in the manufacture of domestic items. It can be hollowed out to make flutes, pipes, straws etc[7, 99].

**dwatta** **Anodyne** **Carminative** **Depurative** **Diaphoretic** **Diuretic** **Laxative** **Purgative** **Resolvent** **Vitamin C** **Vulnerary** - The leaves, stems and the roots are anodyne, carminative and vulnerary[13, 147]. A decoction is used in the treatment of traumatic injuries, fractures, rheumatoid arthralgia, gas pains, acute and chronic nephritis[147]. The fruit is depurative and laxative[7, 9]. The leaves are diuretic, resolvent and sudorific[7]. They are used externally to soothe abscesses and boils[7]. The root, and the oil from the seed, are purgative[7, 9].

**nrakta** Europe to W. Asia. Occasionally naturalized in N. Britain[17]. **ksacta** Woods, mainly in mountains[50].

**propta Seed** - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

**nwatta** Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position. Prefers cool moist conditions. Tolerates atmospheric pollution and coastal situations. Hardy to about -25°C[184]. Plants self-sow in N. Britain but they rarely fruit well in S. Britain[3, 182]. There are some named varieties developed for their ornamental value[182]. The flowers have a sweet smell, free from the fishy undertones found in some other members of the genus[245]. This subspecies has larger fruits and seeds than the type[200]. Plants in this genus are notably resistant to honey fungus[200].

## 4.2.68 *Chaenomeles speciosa*

Japanese Quince, Flowering quince

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 3 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prik-lwis hpa7tmwatli xre7t hjonli

**drutta** *Chaenomeles speciosa* is a deciduous Shrub growing to 3 m (9ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. **Suitable for:** light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. **Suitable pH:** mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Fruit **Edible Uses:** Fruit - cooked[3, 4, 177]. Very harsh and acid raw but fragrant when cooked[1, 11]. Used for jams, jellies etc and as a flavouring with cooked apples[183, K]. The fruit can be apple or pear-shaped and up to 6.5cm long x 6.5cm wide[200].

**tcanta** **Hedge Hedge** Plants can be grown as a medium sized hedge[11, 29, 200]. Some cultivars, such as 'Jet Trail' are suitable for ground cover[182].

**dwatta** **Analgesic** **Antiemetic** **Antiinflammatory** **Antispasmodic** **Astringent** **Cholera Digestive** The fruit is analgesic, anti-inflammatory, antispasmodic, astringent and digestive[147, 218, 238]. A decoction is used internally in the treatment of nausea, joint pains, cholera and associated cramps[147, 218, 238].

**nrakta** E. Asia - China. An occasional garden escape in Britain[17]. **ksacta** Long cultivated, its natural habitat is now obscure.

**propta** **Seed** - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into



individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Landscape Uses:Border, Espalier, Hedge, Massing, Woodland garden . Easily cultivated in any reasonably good soil[1, 11]. Prefers a deep moist well-drained loam[11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. This species is hardy to about -25°C[200]. Plants fruit freely in Britain, but the fruit does not always ripen. They do best when grown against a south-facing wall[11]. A very ornamental plant[1], there are many named varieties developed for their ornamental value[182, 183]. Closely allied to *C. japonica*[11]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.69 *Crataegus intricata*

Copenhagen hawthorn

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprkiwlwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus intricata* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or dried for later use[2, 105, 161]. Hard dry flesh[43]. Fruit we have eaten from this tree is mealy and fairly soft, with a pleasant sweet flavour[K]. It ripens in early September in southern Britain[K]. The fruit is up to 14mm in diameter and is borne in small clusters[229]. The skin is slightly hairy[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as

acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Maine to Georgia, west to Michigan and Oklahoma. ksacta Thickets and open rocky woods[43, 235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 4.2.70 *Mahonia aquifolium*

Oregon Grape, Hollyleaved barberry, Oregon Holly Grape, Oregon Holly

4 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 2 m hkuc  
pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli  
flatprkiwlwis hpa7tmwatli yifixre7t hjonli

drutta *Mahonia aquifolium* is an evergreen Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from January to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Barberry, goldenseal, oregon grape and other plants containing Berberine should be avoided during pregnancy and breastfeeding. Avoid if over active thyroid gland. High doses cause vomiting, lowered blood pressure, reduced heart rate, lethargy, nose bleed, skin and eye irritation and kidney infection. Liquorice as *Glycyrrhiza* species nullify berberine effects [301].

kcakta Edible Parts: Flowers FruitEdible Uses: Drink-Fruit - raw or cooked[2, 3, 5, 95]. The fruit is almost as large as a blackcurrant and is produced in large bunches so it is easy to harvest[K]. It has an acid flavour, but it is rather nice raw and is especially good when added to a porridge or muesli[K]. Unfortunately, there is relatively little

fish and a lot of seeds, though some plants have larger and juicier fruits[K]. The cooked fruit tastes somewhat like blackcurrants[K]. The fruit can also be dried and stored for later use[257]. Flowers - raw. They can also be used to make a lemonade-like drink[183].

tcanta Dye Hedge HedgeA yellow dye is obtained from the inner bark of the stem and roots[99, 101, 257]. It is green according to another report[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. This species can be grown as a low hedge and does not need trimming. Because of its suckering habit, it also makes a good dense ground cover plant though it can be slow to become established[197, 200].

dwatta Alterative Antibacterial Antipsoriatic Antiseborrheic Antitumor Blood tonic Chologogue Diuretic Dysentery Laxative Ophthalmic TonicOregon grape was often used by several native North American Indian tribes to treat loss of appetite and debility[254]. Its current herbal use is mainly in the treatment of gastritis and general digestive weakness, to stimulate the kidney and gallbladder function and to reduce catarrhal problems[254, 257]. The root and root bark is alterative, blood tonic, chologogue, diuretic, laxative and tonic[4, 21, 165, 257]. It improves the digestion and absorption and is taken internally in the treatment of psoriasis, syphilis, haemorrhages, stomach complaints and impure blood conditions[4, 238]. Externally, it has been used as a gargle for sore throats and as a wash for blurry or blood-shot eyes[257]. The roots are harvested in late autumn or early spring and dried for later use[238]. The fruit is an excellent gentle and safe laxative[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta Western N. America. Naturalized in Britain. ksacta Mixed coniferous woods to 2000 metres. It is found in woods and hedgerows in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Specimen, Woodland garden. A very easy plant to grow, thriving in any good garden soil[11, 200] and tolerating dense shade under trees[1, 28]. It grows well in heavy clay soils and also succeeds in dry soils if it is given a good mulch annually[197]. It dislikes exposure to strong winds[K]. Plants are hardy to about -20°C[184]. Very tolerant of pruning, plants can be cut back into old wood if they grow too large and straggly[238]. Spring is the best time to do this[238]. Suckers are fairly freely produced, with established plants forming dense thickets[200]. Most plants grown under this name are casual hybrids with *M. reprens*[67]. This species is easily confused with *M. pinata*[67], with which it also hybridizes[200]. The flowers are delicately scented[245]. A number of named forms have been developed for their ornamental value[182]. This species is notably resistant to honey fungus[88, 200]. This plant is the state flower of Oregon[95]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where

the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 4.2.71 *Rosa nutkana*

Nootka Rose, Bristly Nootka rose  
4 tin 8 cyuc 3 kcak 4 tcan 2 dwat 2.7 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlitutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli fyifkre7t hjonli

druuta *Rosa nutkana* is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[2, 101, 118, 161, 257]. The taste is best after a frost[172]. Juicy, pleasantly acid and a good source of vitamin C[183]. The fruit can be dried, powdered and added to tea as a flavouring or used in its own right as a fruity-flavoured tea[21, 101, 183]. The fruit is about 20mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Petals - raw. The petals are pleasantly aromatic, but you need to remove the bitter white base[172]. Young shoots - raw or cooked. Peeled and eaten in spring when they are still tender[101, 172, 177, 183, 257]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The peeled stems are used to make a beverage[257]. The leaves are used to make a tea[257].

tcanta Hedge HedgeThe plant makes a good informal hedge[1].

dwatta Analgesic Astringent Birthing aid Cancer Foot care Ophthalmic Stings Vitamin C Women's complaintsAn infusion of the roots and sprouts has been used as an eyewash for sore eyes[257]. A decoction of the roots has been used by women after giving birth and also in the treatment of sore throats[257]. A decoction of the bark has been taken to ease the labour pains of childbirth[257]. A poultice of the chewed leaves has been used to alleviate the pain of bee stings[257]. A decoction of the branches, combined with chokecherry (*Prunus virginiana*) and red willow (*Salix bonplandiana*), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The leaves have been placed in shoes as a protection from athletes foot[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta North-western N. America. ksacta Woods and open places at moderate elevations[60].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it

possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out directly into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Prefers a slightly acid soil[14]. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], it fruits well in Britain[11]. This plant is often wrongly grown under the name *R. californica*[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.72 *Berberis x stenophylla*

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 2.5 m hkuc  
hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flat-prikwis hpa7tmwatli fyfxre7t hjonli

drutta *Berberis x stenophylla* is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A delicious sub-acid flavour, though there are a lot of seeds to relatively little flesh[K]. Children generally love this fruit, along with some adults, though most adults seem to prefer it cooked in pies, preserves etc[K]. The fruit is not always very freely borne, growing the plants near to *B. darwinii* (which is one of its parents) seems to increase the yield[K]. The fruits are about 7mm long[200].

tcanta Dye Hedge HedgePlants are very tolerant of trimming and can be grown as a medium-size hedge. Their long arching branches look especially nice if the plants are allowed to grow as an untrimmed informal hedge that is very resistant to maritime exposure[29, 75]. It succeeds on top of Cornish hedges. The prickles make it impenetrable though it can be invasive. There are some named varieties of prostrate growth that are suitable for use as a ground cover[208]. 'Corallina' and 'Prostrata' have been especially mentioned[208]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A garden hybrid, *B. darwinii*. x *B. empetrifolia*. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Most of the seedlings revert back to one of the parents, usually *B. darwinii*[11]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Tolerates maritime exposure[75, 200]. Fairly slow growing[75]. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are many named varieties[182]. Plants sucker freely, forming thickets[182]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

#### 4.2.73 *Viburnum edule*

Mooseberry, Squashberry  
4 tlin 8 cyuc 3 kcaak 3 tcan 1 dwat 2.5 m hkuc  
hmimhtut cyutli tcup hwicli brasjlutnyikfrip hpa7tli flat-prikwis hpa7tmwatli dyatxre7t hjonli

drutta *Viburnum edule* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it is closely related to *V. opulus*, the raw fruit of which can cause nausea in some people if it is eaten in large quantities, although the cooked fruit is perfectly alright[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[11, 62, 101, 257]. The fully ripe fruits are mildly acid with a pleasant taste[183]. The ovoid fruit is about 8mm long and contains a single large seed[200]. The fruit can also be dried for winter use[183]. It is highly valued for jam[43]. It is best before a frost and with the skin removed[85, 172]. Another report says that the native Americans would often not harvest the fruit until it had been frosted[257]. Some caution is advised, see the notes above on toxicity. Flowers - used in fritters[172].

tcanta BasketryThe stems have been used to reinforce birch bark basket rims[257].

dwatta Antispasmodic Astringent Dysentery Odontalgic SalveThe bark is antispasmodic and astringent[172, 257]. An infusion of the crushed inner bark has been used in the treatment of dysentery and has also been used as a purgative[257]. The bark has been chewed and the juice swallowed in the treatment of whooping cough and 'cold on the lungs'[257]. A decoction of the stems has been used in the treatment of coughs[257]. An infusion of the leaves and stems has been used as a gargle in the treatment of sore throats[257]. The twig tips have been chewed and the juice swallowed in the treatment of sore throats[257]. A poultice of the chewed, unopened flower buds has been applied to lip sores[257]. A decoction of the roots has been used to treat sickness associated with teething[257].

nrakta E. Asia. Eastern N. America. ksacta Woods, thickets and cool mountain slopes[43].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Grows well in heavy clay soils. Prefers a slightly acidic soil[172]. Best if given shade from the early morning sun in spring[200]. Plants are possibly self-incompatible[11] and may need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Closely allied to *V. opulus*, but this species has no sterile flowers in the inflorescence and is a superior fruiting form[11].

## 4.2.74 *Monarda fistulosa*

Wild Bergamot, Mintleaf bergamot, Wild Bee-Balm, Lupine  
4 tlin 10 cyuc 3 kcaak 2 tcan 2 dwat 1.5 m hkuc  
htut cyutli kyuctup hwicli hrasjlutnykfrip hpa7tli flatprik-  
wis hpa7tmwatli fyifxre7t hjonli

drutta *Monarda fistulosa* is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

ckaakta Edible Parts: Flowers Leaves Edible Uses: Condiment Leaves - raw or cooked. The entire plant above ground level can be used as a potherb[183], though it is rather aromatic. It is also used as a flavouring in salads and cooked foods[46, 105, 183, 213]. The flowers make an attractive edible garnish in salads[183]. The fresh or dried leaves are brewed into a refreshing aromatic tea[183, 257].

tcanta Repellent The leaves have been used as an insect repellent[257].

dwatta Carminative Diaphoretic Diuretic Pectoral Stimulant Wild bergamot was often employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints, but especially those connected with the digestive system[257]. It is still sometimes used in modern herbalism. The leaves and flowering stems are carminative, diaphoretic, diuretic and stimulant[4, 222]. An infusion is used internally in the treatment of colds, catarrh, headaches, gastric disorders, aching kidneys, to reduce low fevers and soothe sore throats[213, 238, 257]. Externally, it is applied as a poultice to skin eruptions, cuts etc and as a wash for sore eyes[238, 257]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. The plant contains the essential oil 'bergamot oil' which can be inhaled to treat bronchial complaints[213]. The leaves also

contain 'thymol', an essential oil that can be used to expel gas from the digestive tract[213].

nrakta North-eastern N. America - Quebec to Minnesota, south to Texas. ksacta Dry thickets, clearings and woodland edges[43].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses: Massing. Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Grows well in heavy clay soils. Requires a moist soil and a sunny position[1, 200], though it also succeeds in light shade[187]. This species thrives when grown in a dry soil[233, 238, K]. It prefers alkaline soil conditions[238]. Plants are hardy to at least -25°C[187]. A very ornamental plant, there are several named varieties[1, 233]. A good bee plant[200]. Subject to mildew in dry summers[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.75 *Silphium integrifolium*

Prairie Rosinweed

4 tlin 8 cyuc 3 kcaak 2 tcan 1 dwat 1.8 m hkuc  
htut cyutli hqatkyuctup hwicli hyishrasjlutnykfrip hpa7tli  
flatprikwis hpa7tmwatli hjonli

drutta *Silphium integrifolium* is a PERENNIAL growing to 1.8 m (6ft) by 0.9 m (3ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

ckaakta Edible Parts: Oil Edible Uses: Oil Carbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Under development at the Land Institute to domesticate this species for use as an oilseed crop. Trials yielded 1.1t/ha of seed [1-1].

tcanta Oil Garden Ornamental. Compared to other *Silphium* species, it is shorter, less likely to topple over, and faster from seed to flower. More manageable than most perennial sunflowers as it spreads slowly, and it is not known to be allelopathic. Adapts well to prairies, wildflower/native plant gardens, naturalized areas, meadows or moist, open woodland areas. Attracts birds and butterflies

dwatta Native American peoples used the roots to treat pain from injuries [4].

nrakta Native to eastern North America, including Ontario in Canada and the eastern and central United States as far west as New Mexico. ksacta Mesic to dry black soil prairies, gravel prairies, clay prairies, hill prairies, openings in rocky upland forests, limestone glades, and areas along railroads, particularly where prairie remnants occur. This plant can survive significant degradation, and recovers readily from occasional wildfires. It competes well against most prairie grasses and forbs in mesic to dry areas.

propta Seed. Plants may be slow to establish in the garden, particularly when grown from seed. Plants often self-seed in optimum growing conditions. Plants develop tap-roots. Once established, division is not recommended.

nwatta Management: Standard Staple Crop: Protein-oil Under Development Climate: boreal to warm temperate. Humidity: semi-arid to humid. It needs full sun, poor to loamy soils, and mesic to dry conditions. Average, medium moisture, well-drained soils. Tolerates some light shade. Also tolerates some drought once established. Will grow in a variety of soils including sandy, loamy or clay ones. Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

## 4.2.76 *Symphytum asperum*

Prickly Comfrey

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Symphytum asperum* is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for *S. officinale*. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: Leaves Edible Uses: Gum Tea The following reports are for *S. officinale*, they are said to also apply to this species [200]. Young leaves - cooked or raw [2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious [183]. Young shoots can be used as an asparagus substitute [46]. The blanched stalks are used [183]. Older leaves can be dried and used as a tea [26]. The peeled roots are cut up and added to soups [183]. A tea is made from the dried leaves and roots [183]. The roasted roots are used with dandelion and chicory roots for making coffee [183].

tcanta Biomass Compost Gum The following reports are for *S. officinale*, they are said to also apply to this species [200]. The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap [26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun [100].

dwatta Anodyne Astringent Demulcent Emollient Expecto-  
ratorant Haemostatic Refrigerant Vulnerary The leaves are anodyne, mildly astringent, demulcent, emollient, expectorant, haemostatic, refrigerant and vulnerary. They are used as an external poultice in the treatment of cuts, bruises and sprains. Internally, they are used as a tea in the treatment of chest complaints. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process [4, 21, 26, 165]. The leaves are harvested in the summer and can be used fresh or dried.

nrakta Europe to W. Asia. Occasionally naturalized in Britain. ksacta Waste places in Britain [17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade [1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material [200]. Plants can be invasive, often spreading freely by means of self-sown seed. They are also very difficult to remove, the root system is very deep and even small fragments of root left in the soil can produce new plants.

## 4.2.77 *Symphytum uplandicum*

Comfrey

4 tlin 8 cyuc 3 kcak 4 tcan 5 dwat 1.2 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Symphytum uplandicum* is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: Leaves Edible Uses: Gum Tea Young leaves - cooked or raw [2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious [183]. Young shoots can be used as an asparagus substitute [46]. The blanched stalks are used [183]. Older leaves can be dried and used as a tea [26]. The peeled roots are cut up and added to soups [183]. A tea is made from the dried leaves and roots [183]. The roasted roots are used with dandelion and chicory roots for making coffee [183].

tcanta Biomass Compost Gum The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap [26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun [100]. Plants can

be grown as a ground cover when planted about 1.2 metres apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Astringent Demulcent Eczema Emollient Expectorant Haemostatic Refrigerant Vulnerary Comfrey is a commonly used herbal medicine with a long and proven history in the treatment of various complaints. The root and the leaves are used, the root being more active, and they can be taken internally or used externally as a poultice[4, 222]. Comfrey is especially useful in the external treatment of cuts, bruises, sprains, sores, eczema, varicose veins, broken bones etc, internally it is used in the treatment of a wide range of pulmonary complaints, internal bleeding etc[4, 238, K]. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165, 222, 238]. This substance is now synthesized in the pharmaceutical industry and used in healing creams[238]. The root and leaves are anodyne, astringent (mild), demulcent, emollient, expectorant, haemostatic, refrigerant, vulnerary[4, 21, 26, 165, 222]. Some caution is advised, however, especially in the internal use of the herb. External applications and internally taken teas or tinctures of the leaves are considered to be completely safe, but internal applications of tablets or capsules are felt to have too many drawbacks for safe usage[238]. See also the notes above on toxicity. The leaves are harvested in early summer before the plant flowers, the roots are harvested in the autumn. Both are dried for later use[238]. A homeopathic remedy is made from the fresh root, harvested before the plant flowers[232]. This has a very limited range of application, but is of great benefit in the treatment of broken bones and eye injuries[232].

nrakta A hybrid of garden origin, *S. asperum* x *S. officinale*[200]. ksacta Not known in a truly wild situation.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species that does not usually produce seed. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates moist soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Hardy to about -20°C[187]. A naturally occurring hybrid species (*S. asperum* x *S. officinale*), it does not set viable seed and so is not aggressive. The root system is very deep, fragments of root left in the soil can produce new plants. A number of named forms have been selected for their higher production of leaves[183]. Subject to attacks by the rust fungus, this can be alleviated by giving the plants a high potash feed, wood ashes are often used[26]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

## 4.2.78 *Berberis cooperi*

4 tlin 8 cyuc 3 kcaak 1 tcan 2 dwat 1.5 m hkuc  
hmmihtut cyutli tcup hwicli hyishrasljutnyikfrip hpa7tli flat-prikrlwis hpa7mwatli fyfxre7t hjonli

drutta *Berberis cooperi* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. An acid taste, but it is pleasant raw in small quantities[K].

tcanta Dye A yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Bhutan ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

## 4.2.79 *Amelanchier humilis*

Low serviceberry

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 1.8 m hkuc  
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flat-prikrlwis hpa7mwatli fyfxre7t hjonli

drutta *Amelanchier humilis* is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Fruit Edible Uses: Edible fruit - raw or cooked[105, 159, 177]. Sweet[43]. A very pleasant flavour, the fruit is juicy with a hint of apple in the taste and contains a few small seeds at the centre[K]. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Vermont to Alberta and south to New York and Iowa.. ksacta Rocky or sandy shores and banks, often calcareous[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly

in an outdoor seedbed[78, 80]. Grow the seedlings for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are often found growing on calcareous soils in the wild[43]. Hardy to about -25°C[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. This species produces suckers freely, forming thickets[184]. Closely related to *A. stolonifera*[11, 200]. Hybridizes with *A. stolonifera*, *A. arborea* and *A. bartramiana*. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

## 4.2.80 *Tragopogon dubius*

Yellow Salsify

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikhwis  
hpa7tmwatli xre7t hjonli

drutta *Tragopogon dubius* is a ANNUAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root Edible Uses: Root - raw or cooked[105, 183]. Fleshy[177]. Young stems, when 5-10cm high, and the bases of the lower leaves - raw or cooked. Used as a potherb[183].

nrakta Europe to W. Asia - Austria and N. France eastwards. ksacta Fields in Turkey, 400 - 1840 metres[93].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200].

## 4.2.81 *Berberis canadensis*

Allegheny Barberry, American barberry

4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 1.8 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli  
flatprikhwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis canadensis* is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Fruit Leaves Edible Uses: Fruit - raw or cooked. Agreeably acid[2, 22, 46, 95, 161], they are an acceptable raw fruit in small quantities but are more commonly used in preserves[177, K]. The fruits are about 9mm long[200]. Leaves - raw. A trailside nibble[102]. Flowers[102]. No more details.

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not

be used with Glycerhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. A tea made from the roots is used in the treatment of fevers and diarrhoea[222].

nrakta Eastern N. America - Virginia to Georgia, Alberta and Indiana. ksacta Banks of streams and dry woods[11, 43]. In woods or glades, on rocky slopes and near rivers at elevations of 100 - 700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. The plant is an alternate host of 'black stem rust' of cereals and so it is often grubbed out when growing wild in cereal-producing areas. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown[1-2].

## 4.2.82 *Brassica oleracea gongylodes*

Kohl Rabi

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.5 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prikhwis hpa7tmwatli fyifxre7t hjonli

drutta *Brassica oleracea gongylodes* is a BIENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Stem Edible Uses: Leaves - cooked[142]. Used as a vegetable, though the quality is not as good as cabbage. The young leaves can also be added to salads, though some people find them difficult to digest. A nutritional analysis is available[218]. Stem - raw or cooked. The plant produces a swollen stem just above ground level, and this is often used as a root vegetable[K]. It has a mild cabbage flavour; when finely grated it makes a good addition to mixed salads and, when cooked, is an excellent vegetable[K]. It is best eaten whilst fairly small and tender, between golf ball and tennis ball size. It becomes coarse with age[33, 116, 142]. A nutritional analysis is available[218].

dwatta Digestive Tonic The leaf is digestive and tonic[218].

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

propta Seed - sow April to August in situ. Earlier sowings can be made under cloches.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil, though it is best not grown in an acid soil[16, 33]. Tolerates a pH in the range 4.5 to 7.5. Prefers some shade and plenty of moisture in the growing season[20, 37]. Established plants are drought tolerant but the best stems are

formed when the plant does not go short of moisture[20, 37]. Succeeds in maritime gardens[200]. Very winter hardy, kohlrabi withstands severe frosts and so can be left in the ground all winter in most areas and be harvested as required. The young growing plant, however, is sensitive to low temperatures and a week at 10°C will cause the plants to bolt[200]. It grows best at a temperature between 18 and 25°C[200]. Kohlrabi is often cultivated for its edible swollen stem which can be available almost all year round from successional sowings. There are several named varieties and stem colour can range from white to green and purple[200]. Green forms are faster to mature and so more suitable for early sowings, the purple forms are harder and later to mature, they are used mainly for winter crops[200]. Very fast growing, the stems of some cultivars can be harvested 6 - 8 weeks after sowing[33]. The plant is more tolerant of drought and high temperatures than turnips, which it resembles in flavour, and so it is often grown as a substitute for that species[200]. Grows well with onions, beet and aromatic herbs which seem to reduce insect predations[18, 20, 201]. Plants also grow well with cucumbers, the roots of each species occupying different levels in the soil[201]. Grows badly with strawberries, runner beans and tomatoes[18, 20, 201].

## 4.2.83 *Primula veris*

Cowslip, Cowslip primrose

4 tlin 8 cyuc 3 kcaok 0 tcan 3 dwat 0.3 m hkuc  
hmmihmtut cyutli tcup hwicli hrasjlutnyikfrrip hpa7tli flatprikliw-  
wisslip hpa7tmwatli fyfkr7t hjonli  
drutta *Primula veris* is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Some people are allergic to the stamens of this plant, though such cases are easily treated[7]. Saponins may cause hypotension. Excessive/prolonged use may interfere with high blood pressure treatments. Possible Gastrointestinal irritation [301].

kcka Edible Parts: Flowers Leaves Edible Uses: Tea Young leaves - raw or cooked in soups etc[4, 7, 115, 148, 183]. They are not that tasty, but are available in late winter which adds somewhat to their value[K]. The fresh or dried leaves are used as a tea substitute[177, 183]. Flowers - raw, cooked or used in preserves, as a garnish etc[4, 183]. They make an ornamental addition to the salad bowl[238, K]. This species has become much less common in the past 100 years due to habitat destruction, over-collecting from the wild and farming practices. When it was more abundant, the flowers were harvested in quantity in the spring and used to make a tasty wine with sedative and nerve properties[238]. A related species *Primula elatior* is listed by the Council of Europe as a natural food flavouring [301].

dwatta Anodyne Antianxiety Antiechymotic Antiinflammatory Antispasmodic Diaphoretic Diuretic Expectorant Sedative Sternutatory Cowslips are an underused but valuable medicinal herb. They have a very long history of medicinal use and have been particularly employed in treating conditions involving spasms, cramps, paralysis and rheumatic pains[238]. The plant contains saponins, which have an expectorant effect, and salicylates which are the main ingredient of aspirin and have anodyne, anti-inflammatory and febrifuge effects[238]. This remedy should not be prescribed for pregnant women, patients who are sensitive to aspirin, or those taking anti-coagulant drugs such as warfarin[238]. The flowers and the leaves are anodyne, diaphoretic, diuretic and expectorant[7, 9, 21, 165]. They are harvested in the spring and can be used fresh or dried[238]. The yellow corolla of the flower is antispasmodic and sedative[4]. They are recommended for treating over-activity and sleeplessness, especially in children[254]. They are potentially valuable in the treatment of asthma and other allergic conditions[254]. At one time an oil was produced by maceration of the flow-

ers, this has an antiechymotic effect (treats bruising)[7]. The root contains 5 - 10% triterpenoid saponins which are strongly expectorant, stimulating a more liquid mucous and so easing the clearance of phlegm [254]. It has been dried and made into a powder then used as a sternutatory[7]. The root is also mildly diuretic, antirheumatic and slows the clotting of blood[9, 254]. It is used in the treatment of chronic coughs (especially those associated with chronic bronchitis and catarrhal congestion), flu and other febrile conditions[9]. The root can be harvested in the spring or autumn and is dried for later use[9]. The leaves have similar medicinal properties to the roots but are weaker in action[254]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney complaints and catarrh[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Primula veris* for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain but absent from the extreme north, to temperate Asia. ksacta Grassy places, fields and woods with calcareous soils[7, 9, 13, 24].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in autumn. This is best done every other year[200].

nwatta Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200]. Grows well in heavy clay soils and on chalk[187]. Prefers full sun and a well-drained alkaline soil if it is to survive well[187, 238]. Plants are hardy to about -20°C[187]. A very ornamental plant[1], it grows well in the spring meadow[24]. The flowers diffuse a sweet fragrance quite unlike all other flower scents. It has been likened by some to the breath of a cow (cuslippe is the Saxon word for this and thus the origin of the common name), by others to the sweet milky breath of a tiny child[245].

## 4.2.84 *Tragopogon porrifolius*

Salsify

4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 0.6 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrrip hpa7tli flatprikliw-  
hpa7tmwatli xre7t hjonli

drutta *Tragopogon porrifolius* is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcka Edible Parts: Flowers Leaves Root Seed Stem Edible Uses: Gum Root - raw or cooked[2, 5, 27, 33, 37, 89]. The young root can be grated in salads[12], older roots are best cooked[183]. The flavour is mild and sweet, and is said to resemble oysters[183, K]. The roots are harvested as required from October until early spring, or can be harvested in late autumn and stored until required[4]. Young shoots - raw or cooked[2, 12, 27, 33, 37, 52, 183]. The new growth is used in spring. A sweet taste[200]. Flowering shoots - raw or cooked[200]. Used like asparagus. Flowers - raw. Added to salads[183]. The sprouted seeds can be added to salads or sandwiches[183]. The root latex is used as a chewing gum[61, 105, 161, 183].

dwatta Antibilious Aperient Deobstruent Diuretic Salsify is a cleansing food with a beneficial effect upon the liver and gallbladder[254]. The root is antibilious, slightly aperient, deobstruent and diuretic[4, 21]. It is specific in the treatment of obstructions of the gall bladder and jaundice[240] and is also used in the treatment of arteriosclerosis and high blood pressure[254].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Found near the sea and estuaries in S.E. England[17].

propta Seed - sow in situ as early in the year as possible, in March if weather conditions permit[4]. Seed sowings



are often fall unless the soil is kept moist until the seedlings are growing well[4].

Success in ordinary garden soils, including heavy clays[4, 200]. Plants do not grow well in stony soils[4]. Prefers an open situation[37] and a cool moist root run[14, 20]. Salsify is occasionally cultivated in the garden for its edible root[2, 89], there are some named varieties[183]. Grows well with mustard[20].

## 4.2.85 *Juniperus communis nana*

Juniper

4 tlin 10 cyuc 3 kcaak 4 tcan 3 dwat 0.5 m hkuc  
hmmihmtut cyutli hgatkuyctcup hwicli hyishrasjlutnyikfrip  
hpa7tli frusflatprikrlwisslip hpa7tmwatli nyanhjen hjonli

drutta *Juniperus communis nana* is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although the fruit of this plant is quite often used medicinally and as a flavouring in various foods and drinks, large doses of the fruit can cause renal damage. Juniper should not be used internally in any quantities by pregnant women[65, 165].

kcakta Edible Parts: Fruit Edible Uses: Coffee Condiment Tea Fruit - raw or cooked[2, 5, 9, 15]. It is usually dried [12]. The fruit is often used as a flavouring in sauerkraut, stuffings, vegetable pates etc, and is an essential ingredient of gin[183]. The aromatic fruit is used as a pepper substitute according to one report[183]. An essential oil is sometimes distilled from the fruit to be used as a flavouring[183]. Average yields are around 1%[7]. The cones are about 4 - 8mm in diameter and take 2 years to mature[200]. Some caution is advised when using the fruit, see the notes above on toxicity. The roasted seed is a coffee substitute[177]. A tea is made by boiling the leaves and stems[161]. A tea made from the berries has a spicy gin-like flavour[183].

tcanta Fibre Fuel Hair Incentive Repellent Resin Strewing Tincture A decoction of the branches is used as an anti-dandruff shampoo[172]. Yields the resin 'Sandarac', used in the production of a white varnish[74]. The stems were at one time used as a strewing herb[14]. The whole plant can be burnt as an incense and fumigant[66, 102, 146]. It makes a good insect repellent[102, 172]. The bark is used as cordage[61] and as a tincture[172]. An excellent fuel wood[66]. Many forms of this species are good ground cover plants for sunny situations[208].

dwatta Antiseptic Aromatic Carminative Diaphoretic Diuretic Rubefacient Stomachic Tonic Urinary Juniper fruits are commonly used in herbal medicine, as a household remedy, and also in some commercial preparations. They are especially useful in the treatment of digestive disorders plus kidney and bladder problems[4]. The fully ripe fruits are strongly antiseptic, aromatic, carminative, diaphoretic, strongly diuretic, rubefacient, stomachic and tonic[4, 7, 9, 21, 46, 165, 240, 254]. They are used in the treatment of cystitis, digestive problems, chronic arthritis, gout and rheumatic conditions[254]. They can be eaten raw or used in a tea[222], but some caution is advised since large doses can irritate the urinary passage[4]. Externally, it is applied as a diluted essential oil, having a slightly warming effect upon the skin and is thought to promote the removal of waste products from underlying tissues[254]. It is, therefore, helpful when applied to arthritic joints etc[254]. The fruits should not be used internally by pregnant women since this can cause an abortion[9]. The fruits also increase menstrual bleeding so should not be used by women with heavy periods[254]. When made into an ointment, they are applied to

exposed wounds and prevent irritation by flies[4]. The essential oil is used in aromatherapy. Its keyword is 'Toxin elimination'[210].

nrakta Northern temperate zone, incl Britain, south to the mountains of N. Africa, Himalayas and California ksacta Rocks and moors on mountains and lowland bogs in N. Wales, N. England and Scotland[17].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Successes in hot dry soils and in poor soils. Succeeds in most soils so long as they are well drained[186], preferring a neutral or slightly alkaline soil. Does well in chalky soils[1]. Grows well in heavy clay soils. Tolerates a pH range from 4 to 8[186]. Succeeds in light woodland but dislikes heavy shade[186]. Established plants are very tolerant of drought[186]. Although the fully dormant plant is cold-tolerant throughout Britain, the young growth in spring can be damaged by late frosts. A very polymorphic species, there is a huge range of cultivars of widely diverse habits[11, 81]. At least some forms tolerate maritime exposure[186], there is a thriving colony in an exposed position at Land's End in Cornwall[81]. Seed takes 2 - 3 years to ripen on the plant[11]. Plants are usually very slow growing, often only a few centimetres a year[186]. Resists honey fungus[88]. Plants are sometimes attacked by a rust, this fungus has an aecidial stage on hawthorn (*Crataegus* spp.)[1]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

## 4.2.86 *Crataegus monogyna*

Hawthorn, Oneseed hawthorn

4 tlin 8 cyuc 3 kcaak 3 tcan 5 dwat m hkuc  
hmmihmtut cyutli hgattcuphja7n hwicli hyishrasjlutnyikfrip  
hpa7tli frusflatprikrlwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus monogyna* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Fruit Leaves Edible Uses: Coffee Tea Fruit - raw or cooked[2, 12]. Not very appetizing raw[9, K], it is normally used for making jams and preserves[9, 183]. The fruit can be dried, ground, mixed with flour and used for making bread etc[46]. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. Young shoots - raw[5, 177]. A pleasant nutty flavour[144], they are a good addition to the salad bowl[183]. A tea is made from the dried leaves[21, 46, 177, 183], it is a china tea substitute. The roasted seeds are a coffee substitute[12,

21, 46, 177]. The flowers are used in syrups and sweet puddings[183].

tcanta Fuel Hedge Hedge WoodA good hedge plant, it is very tolerant of being cut and of neglect and is able to regenerate if cut back severely, it makes a good thorny stock-proof barrier[186] and resists very strong winds. It is often used in layered hedges[11, 29]. The cultivar 'Stricta' has made a very good hedge 3.5 metres tall in an exposed maritime position at Rosewarne in N. Cornwall[K]. Wood - very hard and tough, difficult to work. Used for tool handles etc. Valued in turning[7, 46, 61]. A good fuel, giving out a lot of heat[4].

dwata Antispasmodic Astringent Cardiotonic Diuretic Hypotensive Malaria Sedative Tonic VasodilatorHawthorn is an extremely valuable medicinal herb. It is used mainly for treating disorders of the heart and circulation system, especially angina[254]. Western herbalists consider it a 'food for the heart', it increases the blood flow to the heart muscles and restores normal heart beat[254]. This effect is brought about by the presence of bioflavonoids in the fruit, these bioflavonoids are also strongly antioxidant, helping to prevent or reduce degeneration of the blood vessels[254]. The fruit is antispasmodic, cardiac, diuretic, sedative, tonic and vasodilator[4, 9, 21, 46, 165]. Both the fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222], they are also used to treat a heart muscle weakened by age, for inflammation of the heart muscle, arteriosclerosis and for nervous heart problems[21]. Prolonged use is necessary for the treatment to be efficacious[222]. It is normally used either as a tea or a tincture[222]. Hawthorn is combined with ginkgo (Ginkgo biloba) to enhance poor memory, working by improving the blood supply to the brain[254]. The bark is astringent and has been used in the treatment of malaria and other fevers[7]. The roots are said to stimulate the arteries of the heart[218].

nrakta Europe, including Britain, absent from Iceland, south and west the the Mediterranean and Afghanistan ksacta Woods, hedges, thickets etc, on most soils except wet peat and poor acid sands[9, 17].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Succeeds in all but the very poorest acid soils[186]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus and with *C. laevigata* in the wild[186, 200]. There are many named forms selected for their ornamental value[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flow-

ers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. In heavier shade they quickly become drawn and leggy, eventually dying[186]. An important food plant for the caterpillars of many lepidoptera species[30], there are 149 insect species associated with this tree[24]. Plants are susceptible to fireblight[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.87 *Mentha arvensis*

Corn Mint, Wild mint

4 tin 8 cyuc 3 kcak 3 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7ti flat-priklyw hpa7tmwatli xre7t hjonli

drutta *Mentha arvensis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A reasonably strong minty flavour with a slight bitterness, they are used as a flavouring in salads or cooked foods[5, 172, 183]. A herb tea is made from the fresh or dried leaves[21, 183]. An essential oil from the plant is used as a flavouring in sweets and beverages[183]. The leaves contain about 0.2% essential oil[218].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. The leaves also repel various insects[257]. An essential oil is obtained from the plant[238]. The yield from the leaves is about 0.8%[240]. The sub-species *M. arvensis piperascens* produces the best oil, which can be used as a substitute for, or adulterant of, peppermint oil[238]. Yields of up to 1.6% have been obtained from this sub-species[240].

dwatta Anaesthetic Cardiphlogistic Antiseptic Antispasmodic Aromatic Cancer Carminative Diaphoretic Emmenagogue Febrifuge Galactofuge Salve Stimulant Stomachic-Corn mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The whole plant is anaesthetic, antiphlogistic, antispasmodic, antiseptic, aromatic, carminative, diaphoretic, emmenagogue, galactofuge, refrigerant, stimulant and stomachic[147, 172, 218]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are a classical remedy for stomach cancer[218]. Another report says that this species is not very valuable medicinally[4]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, N. Asia and the Himalayas. ksacta Arable land, heaths, damp edges of woods[5, 17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them

out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°C[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. Polymorphic[200]. The whole plant has a very strong, almost oppressive, smell of mint[245]. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 4.2.88 *Hosta longipes*

4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 0.3 m hkuc  
pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Hosta longipes* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Leaves Stem Edible Uses: Young leaves and leaf stems - cooked. Sourish[105]. A very acceptable taste, but somewhat fibrous[K].

tcanta A good ground cover plant, succeeding in dense shade.

nrakta E. Asia - Japan, Korea. ksakta Usually found growing on trees or rocks in the wild[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can

thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Another report says that once established it is drought tolerant[187]. Does well in the semi-shade of a woodland[200] also succeeding in deeper shade[187]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A vigorous plant, forming medium sized clumps. The roots travel extensively[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus, especially with *H. kikutii*[200].

## 4.2.89 *Mentha arvensis piperascens*

Japanese Mint

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mentha arvensis piperascens* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked. Used as a flavouring in salads or cooked foods[5, 172, 183], they have a strong taste of peppermint[238]. A herb tea is made from the fresh or dried leaves[21, 183]. An essential oil from the plant is used as a flavouring in sweets and beverages[183]. The leaves contain about 0.2% essential oil[218].

tcanta Essential Repellent Strewing The plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An essential oil is obtained from the plant[238]. It can be used as a substitute for, or adulterant of, peppermint oil[238]. Yields of up to 1.6% have been obtained[240].

dwatta Anaesthetic Antiphlogistic Antiseptic Antispasmodic Aromatic Cancer Carminative Diaphoretic Emmenagogue Febrifuge Galactofuge Salve Stimulant Stomachic Japanese mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its essential oil[279] which has antiseptic properties and a beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The whole plant is anaesthetic, antiphlogistic, antispasmodic, antiseptic, aromatic, carminative, diaphoretic, emmenagogue, galactofuge, refrigerant, stimulant, stomachic and vasodilator[147, 172, 218, 279]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222, 279]. The leaves are a classical remedy for stomach cancer[218]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta E. Asia - China, Japan and Korea. ksakta Wet grasslands near rivers and lakes at elevations of 200 - 1100 metres in China[266].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual

plants when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

**nwatta** An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°C[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a very strong scent of peppermint[245]. Hybridizes freely with other members of this genus. Polymorphic[200]. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 4.2.90 *Mahonia repens*

Creeping Oregon Grape, Creeping barberry, Grape Oregon  
4 tlin 8 cyuc 3 kcaak 4 tcan 3 dwat 0.3 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprik  
lwis hpa7tmwatli xre7t hjonli

**drutta** *Mahonia repens* is an evergreen Shrub growing to 0.3 m (1ft) by 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**kcaakta** Edible Parts: Fruit Oil Edible Uses: Oil Fruit - raw or cooked[85, 183]. An acid flavour but it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. Used for making jams, jellies etc. They can also be made into a refreshing lemonade-like beverage[183]. When sugar is added, the fruit juice is similar to grape juice[212]. The fruit is about 9mm in diameter[200].

**tcanta** Dye Oil Soil stabilization A yellow dye is obtained from the inner bark of the stem and roots[155, 257]. It is green[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. Plants form suckers freely, making a good dense ground cover[11, 200], though they can be slow to become established[197] and will need weeding for their first few years after planting out[K]. The sub-species *M. repens rotundifolia* has been especially recommended[197]. A useful plant for preventing soil erosion on slopes[155].

**dwatta** Alternative Anaphrodisiac Antibacterial Antiseptic Antitumour Cholagogue Depurative Diuretic Dysentery Expectorant Febrifuge Laxative Salve Tonic The root and root bark is alterative, anaphrodisiac, antiseptic, cholagogue, depurative, diuretic, expectorant, febrifuge, laxative and tonic[4, 238]. It improves the digestion and absorption and is taken internally in the treatment of coughs, fevers, psoriasis, syphilis, haemorrhages, stomach complaints, kidney problems and impure blood conditions[4, 238, 257]. Externally, it is used as an antiseptic and healing wash or poultice on wounds and rheumatic joints[257]. The roots are harvested in late autumn or early spring and dried for later use[238]. A poultice of the fresh berries has been applied

to boils[257]. *Berberine*, universally present in rhizomes of *Mahonia* species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the *berberine*[218]. *Berberine* has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

**nrakta** Western N. America. ksacta Hills and slopes, often in partial shade[85], usually on dry slopes[155].

**propta** Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

**nwatta** Landscape Uses: Border, Erosion control, Ground cover, Massing. An easily grown plant, it thrives in any good garden soil[11], preferring one on the dryish side. Grows well in heavy clay soils. Succeeds in the light shade of trees[K]. This species is hardy to about -15°C if growing in a sheltered position[184]. Established plants sucker freely and form quite dense thickets[200]. The flowers are scented[245]. Resistant to honey fungus[88]. Special Features: North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 4.2.91 *Monarda didyma*

Bergamot, Scarlet beebalm, Horsemint, Oswego Tea, Bee Balm

4 tlin 10 cyuc 3 kcaak 3 tcan 2 dwat 0.9 m hkuc  
hmimhtut cyutli kcup hwicli hrasjlutnyikfrip hpa7tli flatprik  
wis hpa7tmwatli fyifxre7t hjonli

**drutta** *Monarda didyma* is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**kcaakta** Edible Parts: Flowers Leaves Shoots Edible Uses: Condiment Tea Leaves and young shoot tips - raw or cooked. They are used as a flavouring in salads, fruit salads, drinks etc[46, 61, 105, 183]. Flowers - raw. They are added as an attractive garnish to salads[183, 238, 244]. An excellent aromatic tea is made from the fresh or dried leaves and flower heads[21, 46, 105, 183]. The leaves give an Earl Grey flavour to China tea[238].

ta canta Companion Essential Pot-pourriLandscape Uses: Border, Container, Massing, Rock garden, Specimen. Attracts birds, North American native, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. Yields an essential oil, used in perfumery, as a hair tonic etc[46, 61]. The dried leaves and flowers are used to scent and add colour to pot-pourri[238]. Brings hummingbirds.

dwata Anthelmintic Carminative Diuretic Expectorant Febrifuge Rubefacient Stimulant UrinaryBergamot is often used as a domestic medicine, being particularly useful in the treatment of digestive disorders. The leaves and flowering stems are anthelmintic, carminative, diuretic, expectorant, febrifuge, rubefacient and stimulant[4, 222]. An infusion is used in the treatment of flatulent colic and sickness, it is also used as a diuretic to treat urinary disorders[4, 238]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. An essential oil from the herb is mainly used externally as a rubefacient in the treatment of rheumatism etc[4].

nrakta Eastern N. America - New York to Michigan, south to Georgia and Tennessee. ksacta Moist soils[235] in rich woods, thickets and bottom lands[43].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Grows well in heavy clay soils. Requires a moist soil and a sunny position[4, 200]. Prefers some shade[4] but succeeds in a sunny position so long as the soil does not dry out. Provide light shade in hotter zones. Plants are hardy to at least -25°C[187]. The flowers are rich in nectar and are very attractive to bees[4, 55, 244]. A good companion plant, it grows well with tomatoes[14, 20]. Bergamot is a very ornamental and aromatic plant, it is often grown in the herb garden, there are some named varieties[183, 233]. The leaves, stems and roots carry a delicious aromatic orange-like perfume when crushed[245]. Plants are subject to mildew in dry summers[200]. Special Features: The plant is heat tolerant in zones 10 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.92 *Mentha arvensis villosa*

American Wild Mint

4 tlin 8 cyuc 3 kcak 0 tcant 2 dwat 0.6 m hkuc  
hmimhtut cyutli tcup hwicli hras|lutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Mentha arvensis villosa* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is

hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Fragrant and pleasant tasting, the leaves are used as a flavouring in salads or cooked foods[183, 257]. A herb tea is made from the leaves[183, 257].

ta canta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An essential oil is obtained from the leaves, it is used as a flavouring for tooth-pastes etc[61]. It contains thymol and pulegone[213].

dwata Antiseptic Carminative Febrifuge StomachicAmerican wild mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A decoction of the ground leaves and stems is used to treat feelings of nausea[213]. The tea is also used in the treatment of colds, fevers, sore throats, gas, colic, indigestion etc[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta N. America - New Brunswick to Manitoba, British Columbia, Virginia, New Mexico and Nevada. ksacta Moist places at low to moderate elevations[204].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°C[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a very strong smell of mint[245]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 4.2.93 *Tussilago farfara*

Coltsfoot

4 tlin 8 cyuc 3 kcak 3 tcant 3 dwat 0.2 m hkuc  
hmimhtut cyutli tcup hwicli hras|lutnyikfrip hpa7tli flatprik-  
wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Tussilago farfara* is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA

hardiness. It is hardy to UK zone 5. It is in flower from February to April, and the seeds ripen from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

**pcista** The plant contains traces of liver-affecting pyrrolizidine alkaloids and is potentially toxic in large doses[222]. These alkaloids have not proved toxic at low dosages in tests and there is no suggestion that this plant should not be used medicinally[238]. Contraindicated during pregnancy and lactation [301]

**kcakta** Edible Parts: Flowers Leaves Oil Edible Uses: Oil Salt Tea Flower buds and young flowers - raw or cooked[46, 183]. A pleasant aniseed flavour[K], they add a distinctive aromatic flavour to salads[9]. Young leaves - raw or cooked[9, 46, 183]. They can be used in salads, added to soups, or cooked as a vegetable[238]. The leaves have a bitter taste unless they are washed after being boiled[179]. An aromatic tea is made from the fresh or dried leaves and flowers[183]. It has a liquorice-like flavour[238]. The dried and burnt leaves are used as a salt substitute[102, 183]. The slender rootstock is candied in sugar syrup[183].

**tcanta** Compost Oil Soil stabilization Stuffing Tinder The soft down on the underside of the leaves is used as a stuffing material[53, 54]. When wrapped in a rag, dipped in salt-petre and dried in the sun it makes an excellent tinder[4]. Plants have an extensive root system and are used to stabilize banks[200]. The leaves are a valuable addition to the compost heap[200].

**dwatta** Antitussive Astringent Bitter Demulcent Diaphoretic Eczema Emollient Expectorant Skin Stimulant Tonic An effective demulcent and expectorant herb, coltsfoot is one of the most popular European remedies for the treatment of a wide range of chest complaints[254]. It is widely available in health food shops. The leaves are commonly used in Europe, though the flowering stems (which contain higher levels of pyrrolizidine alkaloids) are preferred in China[254]. They are rich in mucilage and are the main parts used, though the root is also sometimes employed[4, 244]. Pyrrolizidine alkaloids have a toxic effect upon the liver, but are largely destroyed when the plant is boiled to make a decoction[254]. Some caution should be employed in the use of this remedy - the flowers should not be used except under professional supervision, the leaves should not be used for more than 4 - 6 weeks at a time, the herb should not be taken whilst pregnant or breast-feeding and it should not be given to children under the age of six[254]. Modern research has shown that extracts of the whole plant can increase immune resistance[254]. In a Chinese trial 75% of patients suffering from bronchial asthma showed some improvement after treatment with this plant, though the anti-asthmatic effect was short-lived[254]. The leaves are harvested in June and early July, the flowers are harvested when fully open and the root is harvested in the autumn. All can be dried and used as required[4]. The plant is antitussive, astringent, demulcent, emollient, expectorant, stimulant and tonic. It is widely used in the treatment of coughs and respiratory problems[4, 7, 9, 13, 21, 54, 165, 176, 218] and is often candied so that it can be sucked as a sweet[4]. The plant is of particular use in the treatment of chronic emphysema and silicosis, helping to relieve the persistent cough associated with these conditions[244]. Coltsfoot is particularly effective when used in combination with liquorice (Glycyrrhiza species), thyme (Thymus vulgaris) and wild cherry (Prunus serotina)[254]. A poultice of the flowers has a soothing effect on a range of skin disorders including eczema, ulcers, sores, bites and inflammations[7, 238]. A bitter, tonic and diaphoretic preparation can be obtained from the root[7].

**nraکتa** Europe, including Britain, from Norway south and east to N. Africa, western and northern Asia. **ksacta** Damp habitats, frequently on alkaline clays, in hedgebanks, roadsides, wasteland, often as a pioneer, and on dunes and shingle in coastal zones[200].

**propta** Seed - the plant does not usually require help with spreading itself around, but if required the seed can be sown in situ in early spring or autumn. Division of the roots is very easy and succeeds at almost any time in the year. The

divisions can be planted out direct into their permanent positions.

**nwatta** A very easily grown plant, it succeeds in most soils when grown in full sun[14]. It prefers a moist neutral to alkaline soil and will also succeed in partial shade[238]. Plants are hardy to about -29°C[238]. Coltsfoot is a very tough plant that is more than capable of looking after itself. When well sited its roots will spread very freely sending up new shoots at some distance from the clump even if growing amongst dense weed competition[K]. This can make it a problem weed in gardens[200], so either choose your site with care or find some means of restraining it such as by planting in a large tub that is buried in the ground[K]. The rhizomes can lay dormant in the soil for many years, emerging when the soil is disturbed[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

## 4.2.94 Acer pseudoplatanus

Sycamore, Great Maple, Scottish Maple, Planetree Maple  
4 tin 7 cyuc 2 kcak 4 tcan 1 dwat 30 m hkuc  
hmimhtut cyutli tcup hwicli vyhysrsljutnyikfrip hpa7tli flat-priklym hpa7tmwatli hjonli

**drutta** Acer pseudoplatanus is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at the fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

**kcakta** Edible Parts: Leaves Sap Seedpod Edible Uses: Sweetener The sap contains sugar and can be used as a drink or be concentrated into a syrup by boiling off the water[183]. The syrup is used as a sweetener on many foods. It can be harvested in late winter but is not produced in economic quantities[2, 4, 13, 105]. About 25 grams of sugar is obtained from a litre of the sap[4]. The sap can also be used to make a wine[183]. The flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. The keys of the developing seeds have a sweet exudation on them and this is often sucked by children[183]. The leaves can be wrapped round food such as buns when baking them and they impart a sweet flavour[66]. The related Oregon Maple (Acer macrophyllum) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species.

**tcanta** Charcoal Fuel Pioneer Preservative Shelterbelt Wood The trees are fast-growing and make a good windbreak for exposed and maritime areas[11, 200]. They are often used in shelterbelt plantings[200]. This species usually self-sows freely and is often the first tree to invade disused farmland, cleared woodland etc. Its ability to tolerate difficult environments make it a good pioneer species for re-establishing woodlands. When grown in Britain it is usually gradually displaced over a period of 200 years or more by native species until it becomes just a minor component of the woodland[K]. The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - very hard, heavy, elastic, easy to work, fairly resistant to insects. Used for carving, small domestic items, veneer etc[4, 13, 46, 171]. It is a good fuel and also makes a good charcoal that can be used as a fuel[115].

**dwatta** Astringent Vulnerary The bark has mild astringent properties and has been used to make a wash for skin problems and an eyewash for sore eyes[21]. The inner bark of the tree, containing the sweet sap, can be used as a dressing for wounds[21].

**nraکتa** Europe. Extensively naturalized in Britain[17]. **ksacta** Found in woodland, hedgerows etc. in Britain, in all but very poor soils[17].

**propta** Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak

stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. Seed should not be dried below 35% moisture[98]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars can be budded onto rootstocks of the species. Any grafting is best carried out in September rather than February.

**nwatta Landscape Uses:** Firewood, Seashore, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil and a sunny position[11, 17], but tolerates most conditions including poor soils and some shade[13, 17, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Dislikes wet soils[115]. Grows better in the cooler areas of the country[11]. Very wind-resistant, tolerating maritime exposure though it is often wind and salt pruned in very exposed areas[4, 11, 17]. A fairly aggressive tree, it self-sows freely and inhibits the growth of nearby plants[18, 20]. It is fast growing and establishes rapidly. It can supplant native trees, at least in the short-term, though recent evidence suggests that in the long term it does not usually become the dominant tree in British woodlands and it is often recommended for planting in broad-leaved woods by the Forestry Commission, especially in windy areas[K]. Plants are subject to sooty bark disease - this is not fatal and occurs most often in years that follow hot summers[11]. There are many named forms that have been selected for their ornamental value[200]. Trees take 25 years to come into bearing from seed[98]. **Special Features:** Not North American native, Naturalizing, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.95 *Quercus pubescens*

### Downy Oak

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 20 m hkcuc  
hmimhtut cyutli kyuctup hwicli jlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

**drutta** *Quercus pubescens* is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

**kcakta Edible Parts:** Seed **Edible Uses:** Seed - cooked. A famine food, used when all else fails[177]. The seed is up to 2cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed

to be bury in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

**tcanta Repellent Tannin Wood** A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, durable even under water, not very elastic. Used for furniture etc[46, 61].

**dwatta Astringent Dysentery** Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

**nrakta Europe.** **ksacta Woods and dry hills**[100] in both siliceous and limestone soils[11].

**propta Seed** - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

**nwatta** Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted. The seed ripens in its first year. Closely related to *Q. petraea*[1]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

## 4.2.96 *Acer campestre*

### Field Maple, Hedge maple

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 15 m hkcuc  
hmimhtut cyutli tcup hwicli hrsajlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

**drutta** *Acer campestre* is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta** The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[4]. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The syrup is used as a sweetener on many foods. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

**tcanta Charcoal Fuel Hedge Hedge Preservative Wood** The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fast growing plant and bearing clipping well, it makes an excellent clipped hedge and can also be used as part of a native wildlife hedge where it is only trimmed every 3 - 4 years[200, K]. It has also been used in topiary[200]. Wood - fine-grained, tough, elastic, hard to split, takes a high polish and is seldom attacked by insects. Trees are seldom large enough to supply much usable timber, but when available it is much valued by cabinet makers[4, 7, 13, 46, 115]. It is also used for cups bowls etc[115]. The wood of the roots is often knotted and is valued for small objects of cabinet work[4]. The wood is an excellent fuel[4]. A charcoal made from the wood is a good fuel[4, 115].

dwatta Anticholesterolemic[7]. A decoction has been used to bathe sore eyes[7]. The bark should be sundried and then stored in a dry place until required[7].

nrakta Europe, including Britain, from Sweden to Spain and east to western Asia and the Caucasus. ksacta Open deciduous woods, hedgerows and scrub, usually on basic soils[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Firewood, Pollard, Screen, Standard, Superior hedge, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] in a sunny position but tolerates some shade[11, 200]. Does well on chalky soils, tolerating a pH as high as 8, but becoming a shrub in such conditions[186]. Does not thrive in soils with a pH much below 6[186]. Grows well in heavy clay soils. Tolerates atmospheric pollution[200]. Growth is fast once the trees are established, but this later slows down and trees take about 50 years to reach maturity[186]. Frequently found as a shrub in light woodland, especially under oak. It is one of the first trees to colonize chalk grassland[186]. The field maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. A good bee plant[7]. This species has often been coppiced in the past for its wood[17]. Trees produce seed in about 10 years from sowing[98]. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 4.2.97 *Pyrus communis*

Wild Pear, Common pear  
4 tlin 9 cyuc 2 kcaak 3 tcan 1 dwat 13 m hkuc  
hmimhtut cyutli hgattcup hwicli hrsajlutnyikfrip hpa7tli flatprikliwis hpa7tmwattli xre7t hjonli

drudda *Pyrus communis* is a deciduous Tree growing to 13 m (42ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5]. The fruit of wild pears often remains very hard unless bletted[186]. It is more suitable for use in pies etc. The fruit is up to 5cm long[200].

tcanta Dye Shelterbelt WoodA yellow-tan dye is obtained from the leaves[106, 115]. Trees are sometimes used as part of a shelterbelt planting[227]. Wood - heavy, tough, durable, fine grained, hard. It weighs 51lb per cubic foot[227]. Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

dwatta Astringent Fibrifuge SedativeThe fruit is astringent, fibrifuge and sedative[240].

nrakta Europe. Naturalized in Britain[17]. ksacta Hedges, woodland margins etc in Britain[17].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[1, 200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types, if they are moderately fertile[200], avoiding only the most acid soils[186]. Dislikes very exposed positions[186]. Established plants are drought tolerant[200]. A very hardy plant, tolerating temperatures down to below -15°C[200]. Plants often sucker and can form dense thickets[186]. A parent of the cultivated pear, possibly by crossing with *P. nivalis* and *P. cordata*[11]. There are many hundreds of varieties of cultivated pears and they are widely cultivated in the temperate zone for their edible fruits. By selection of varieties fresh fruits can be obtained from late July to April or May of the following year. Special Features: Edible, Not North American native, Naturalizing, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.98 *Acer carpinifolium*

Hornbeam Maple  
4 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc  
hmimhtut cyutli tcup hwicli hrsajlutnyikfrip hpa7tli flatprikliwis hpa7tmwattli nyanhjen hjonli

drudda *Acer carpinifolium* is a deciduous Shrub growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - central and southern Japan ksacta Valleys and ravines in mountains all over Japan[58]. Common in temperate deciduous forests, usually in moist sites along streams at elevations of 200 - 1300 metres[275].



propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting is impossible for this species because no compatible rootstock has been discovered.

nwatta Of easy cultivation, it prefers a good moist well-drained soil[11], preferring a sunny position but tolerating some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. This species is dioecious, at least one male plant needs to be grown with up to 5 females if seed is required. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 4.2.99 *Pyrus elaeagnifolia*

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 10 m hkc  
hmimhtut cyutli hgatkuyctcup hwicli hrasjlutnykfrip hpa7tli  
flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus elaeagnifolia* is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The flesh is rather tough and gritty, but has a reasonable flavour when it is fully ripe[K]. The fruits are up to 2cm long[200].

nrakta S.E. Europe to W. Asia. ksacta Dry places in S. Europe[50]. Deciduous and coniferous forests, forest remnants etc, from sea level to 1700 metres in Turkey[93].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. The branches are thorny[200]. This species is closely related to *P. nivalis*[11].

## 4.2.100 *Crataegus phaenopyrum*

Washington Thorn, Washington Hawthorn  
4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 10 m hkc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli  
flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Crataegus phaenopyrum* is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62]. A dry flesh[43]. Very small, about 5mm in diameter, it often hangs on the tree all winter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Georgia, Illinois and Kansas. ksacta Thickets, open woods[43] and banks of streams in rich soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Espalier, Firewood, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant, there are some named varieties[1, 11, 200]. Special Features: North American native, Attractive flowers or blooms.

## 4.2.101 Crataegus crus

Cockspur Thorn, Cockspur hawthorn, Dwarf Hawthorn  
4 tlin 7 cyuc 2 kcaok 0 tcan 2 dwat 10 m hkuc  
hmimhtut cyutli hgatkuyctcuphja7n hwicli hrasjlutnyikfrp  
hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus crus-galli is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101, 105]. A dry flesh, it is used in jellies[43]. The fruit is about 1cm in diameter and is borne in small clusters[200]. It often persists on the tree until spring[200]. This suggests that it does not make very good eating[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge Hedge WoodVery amenable to trimming, the plant can even be cut right back into very old wood and will resprout freely. It is often used as a hedge[82]. Wood - fine-grained, hard and heavy. Used for tool handles etc[46, 61, 227].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Georgia, west to Louisiana. Locally naturalized in Europe[50]. ksacta Thickets and open ground, especially in dry or rocky places[43]. Usually found on the slopes of low hills in rich soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to spot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Screen, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°C[202]. A very ornamental plant[1, 11]. There are many named forms, selected

for their ornamental value[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This plant is often confused in cultivation with *C. prunifolia*. 'Splendens'[11]. Special Features:Attracts birds, North American native, Blooms are very showy.

## 4.2.102 Acer argutum

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 8 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprik-  
wis hpa7tmwatli nyanhjen hjonli

drutta Acer argutum is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or the sap can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - central and southern Japan. ksacta In cool temperate to lower subalpine forests, usually growing in moist sites at streamsides at elevations of 800 - 1900 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cuttings of this species root well.

nwatta Of easy cultivation, it prefers a good moist well-drained soil in a sunny position but tolerates some shade. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. This species prefers its trunk in the shade[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Dioecious, male and female plants must be grown if seed is required.

## 4.2.103 Malus florentina

Hawthorn-leaf crab apple  
4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 8 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrp hpa7tli flat-  
prikwis hpa7tmwatli xre7t hjonli

drutta Malus florentina is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. The oval fruit is about 15mm long and 8mm wide, it ripens in mid autumn and usually blets on the tree. When bletted, it has a mealy texture with a soft acid flesh, we found it refreshing in small quantities[K].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This species is a very good pollinator for the cultivated apples[200]. The fruit is a good wildlife food source, especially for birds[200]. A very ornamental tree, especially when flowering in the spring, it makes a good specimen tree in a lawn[11]. Some botanists believe this species to be a bigeneric hybrid between *M. sylvestris* and *Sorbus torminalis*. They have assigned the name *Malosorbus florentina* to the plant, but this is not generally accepted[11]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.104 *Malus transitoria*

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus transitoria* is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. About 15mm in diameter[200]. The fruits on our trees in Cornwall are a bit larger, up to 25mm in diameter[K]. The flavour is acid and astringent, but tolerable, in mid-October. It improves once the fruit has been frosted and so it is best to delay harvesting as long as possible[K].

tcanta RootstockThis species has been used as stock to graft apple trees in NE and NW Shaanxi[266].

nrakta E. Asia - China. ksacta Thickets on slopes or hills of the Loess Plateau at elevations of 1500 - 3900 metres[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This species is resistant to drought and cold temperatures[266]. This species is closely related to *M. toringoides*[200]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.105 *Malus toringoides*

Cutleaf crab apple

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus toringoides* is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. About 15mm in diameter[200]. The fruit is abundantly produced and hangs on the tree well into winter[200]. The flavour improves when the fruit has been frosted, so it is best to delay harvesting as long as possible[K].

nrakta E. Asia - China. ksacta Thickets on slopes at elevations of 2000 - 3000 metres[266]. Up to 3600 metres in Szechwan[109].

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

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

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. This species is closely related to *M. transitoria*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.106 *Malus hupehensis*

Chinese Crab, Chinese crab apple, Tea Crabapple, Flowering Tea Crabapple

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 7 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrif hpa7tli flatprikliw hpa7tmwatli fyifxre7t hjonli

**drutta** *Malus hupehensis* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

**kcaakta** Edible Parts: Fruit Edible Uses: Tea Fruit - raw or cooked[105, 177]. Up to 1 cm in diameter[200], it has a sour taste[183]. The leaves are a tea substitute[11, 46, 105]. Palatable and thirst quenching, it is much used in China and leaves are exported from Shasi for this purpose[183].

**tcanta** Rootstock Shelterbelt A vigorous branching tree, it makes a good windbreak[245]. This species is used as stock to graft apple trees in Hubei and Sichuan[266].

**nrakta** E. Asia - China, Japan. ksacta Mixed forests, slopes and valley thickets from sea level to 2900 metres[266].

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

**nwatta** Landscape Uses: Border, Espalier, Standard, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. Plants usually produce seed apomictically (a method that does not involve sexual fusion, so the seedlings are clones of the parent) and therefore they breed true to type[11, 200]. A very ornamental plant[1]. The flowers are sweetly scented[245]. The fruit is a good wildlife food source, especially for birds. Plants in this genus are notably susceptible to honey fungus[200]. Special Fea-

tures: Not North American native, Fragrant flowers, Attractive flowers or blooms.

#### 4.2.107 *Pyrus salicifolia*

Willow-Leaved Pear

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 7.5 m hkuc  
hmimhtut cyutli hgatkuyctcup hwicli hrasjlutnyikfrif hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

**drutta** *Pyrus salicifolia* is a deciduous Tree growing to 7.5 m (24ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

**kcaakta** Edible Parts: Fruit Oil Edible Uses: Oil Fruit - raw or cooked[2, 177]. The fruit is about 2 - 3 cm long[200]. Harsh and of no value[11]. The fruit is nice when it has been bletted[74].

**tcanta** Oil Soil stabilization Plants have extensive root systems and can be used for binding sands[74].

**nrakta** S.E. Europe to W. Asia. ksacta Dry stony sites, forest edges etc[74].

**propta** Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

**nwatta** Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. The dormant plant is very frost resistant[74]. A very ornamental plant[1].

#### 4.2.108 *Pyrus betulaeifolia*

Birch-Leaved Pear

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 7.5 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrif hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

**drutta** *Pyrus betulaeifolia* is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

**kcaakta** Edible Parts: Flowers Fruit Leaves Edible Uses: Tea Fruit - raw or cooked[2, 105, 177, 179, 183]. The fruit is quite small, about 15mm in diameter[200]. Leaves - cooked[179, 183]. Flowers[2, 183]. Dried, powdered and made into cakes[179]. The dried leaves are used to make tea[179].

**tcanta** Miscellany Rootstock This species has long been used as a rootstock for the cultivated pears by the Chinese[11], it is recently also being used as a rootstock in N. America and in Europe[183, 200].

**dwatta** Cholera Miscellany The leaves are used in the treatment of cholera, colic and cramps[218]. The cooked fruit is used to treat mucous diarrhoea[218].

**nrakta** E. Asia - N. China. ksacta Open slopes and plains from sea level to 1800 metres[266].

**propta** Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to

water. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A fast growing tree[11].

#### 4.2.109 *Pyrus phaeocarpa*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 7 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus phaeocarpa* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is up to 2cm long[200].

tcanta RootstockThis species is often used as stock to graft pear cultivars[266].

nrakta E. Asia - N. China. ksacta Slopes, mixed hillside forests of the Loess Plateau at elevations of 100 - 1200 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°C[200].

#### 4.2.110 *Malus lancifolia*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 6 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus lancifolia* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Up to 3cm in diameter[200].

tcanta The wood weighs 43lb per cubic foot.

nrakta Eastern N. America - Pennsylvania to Virginia, Illinois and North Carolina. ksacta Thickets[235].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. There is some confusion over the correct name of this species. [43] gives the name as a synonym of *M. coronaria lancifolia* (along with *M. bracteata* for which we also have a record) whilst [200] recognizes it as a separate species. In [82] it is treated as part of *M. coronaria*. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.111 *Pyrus elaeagnifolia kotschyana*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat m hkuc  
hmimhtut cyutli hgatyucup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus elaeagnifolia kotschyana* is a deciduous Tree. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The flesh is rather tough and gritty, but has a reasonable flavour when it is fully ripe[K]. The fruit is up to 2cm long[200].

nrakta W. Asia. ksacta Rocky limestone slopes and forests, 1000 - 1850 metres in Turkey[93].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. This sub-species differs from *P. elaeagnifolia* in having thornless branches[200]. Closely related to *P. georgica*[93].

#### 4.2.112 *Hosta montana*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hosta montana is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Stem Edible Uses: Young leaves - cooked [116]. White part of the leaf stem - cooked [105].

nrakta E. Asia - Japan. ksacta Woodlands and forest margins [251] in the hills and mountains of northern and central Japan [58].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture [233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry [200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity [200].

nwatta Thrives in most fertile soils if they are rich in humus [200]. Grows well in heavy clay soils and in sandy ones [208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added [208]. Prefers a pH between 6 and 7 [200]. Requires a rich soil that does not dry out readily [1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland [200, 233]. In general, the sunnier the position the moister the soil should be [233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta [208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position [200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant [233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits [233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk [111, K]. A polymorphic species, it hybridizes freely with other members of this genus [200].

## 4.2.113 *Stellaria media*

Chickweed, Common chickweed  
4 tlin 11 cyuc 2 kca2 2 tcan 3 dwat 6 hkc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikli-wis hpa7tmwatli fyifxre7t hjonli

drutta *Stellaria media* is a ANNUAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain saponins [7, 65]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish [K]. Report of paralysis attributed to excessive intake. Should not be used during pregnancy or during breastfeeding [301].

kcakta Edible Parts: Leaves Seed Edible Uses: Young leaves - raw or cooked as a potherb [2, 7, 9, 12, 52, 54, 183]. They can be available all year round if the winter is not too severe [85]. Very nutritious, they can be added to salads whilst the cooked leaves can scarcely be distinguished from spring spinach [4, K]. The leaves contain saponins so some caution is advised, see the note on toxicity at the top of the page. A nutritional analysis is available [218]. Seed - ground into a powder and used in making bread or to thicken soups [172, 183]. It would be very fiddly to harvest any quantity of this seed since it is produced in small quantities throughout most of the year and is very small [K]. The seed contains 17.8% protein and 5.9% fat [218].

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

dwatta Antirheumatic Astringent Carminative Demulcent Depurative Diuretic Emmenagogue Expectorant Galactogogue Kidney Laxative Ophthalmic Poulitice Refrigerant TB Vulnerary Chickweed has a very long history of herbal use, being particularly beneficial in the external treatment of any kind of itching skin condition [238]. It has been known to soothe severe itchiness even where all other remedies have failed [254]. In excess doses chickweed can cause diarrhoea and vomiting [254]. It should not be used medicinally by pregnant women [254]. The whole plant is astringent, carminative, demulcent, diuretic, expectorant, laxative, refrigerant, vulnerary [4, 7, 9, 21, 54, 165, 222]. Taken internally it is useful in the treatment of chest complaints and in small quantities it also aids digestion [254]. It can be applied as a poultice and will relieve any kind of roseola and is effective wherever there are fragile superficial veins [7]. An infusion of the fresh or dried herb can be added to the bath water and its emollient property will help to reduce inflammation - in rheumatic joints for example - and encourage tissue repair [254]. Chickweed is best harvested between May and July, it can be used fresh or be dried and stored for later use [4, 238]. A decoction of the whole plant is taken internally as a post-partum depurative, emmenagogue, galactogogue and circulatory tonic [218]. It is also believed to relieve constipation and be beneficial in the treatment of kidney complaints [244]. The decoction is also used externally to treat rheumatic pains, wounds and ulcers [4, 218, 222]. The expressed juice of the plant has been used as an eyewash [244].

nrakta A cosmopolitan plant, found in most regions of the world, including Britain. ksacta Growing almost anywhere, it is a common garden weed [7, 17].

propta Seed - this species should not need any encouragement, you are much more likely to be trying to get rid of it than trying to introduce it (eating it is one way of doing that!) [K].

nwatta A very easily grown plant, it prefers a moist soil and a position in full sun or partial shade [52, 238]. It can be very lush and vigorous when grown in a fertile soil [1], but in infertile soils it will flower and set seed whilst still very small. A very common garden weed, chickweed grows, flowers and sets seed all year round. The flowers open around 9 o'clock in the morning and remain open for about 12 hours [4]. They do not open in dull weather [4]. The leaves fold up of a night time, enfolding and protecting the tender buds of new shoots [4]. A food plant for the caterpillars of many butterfly species. Special Features: Edible, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A self-seeding annual [1-2]. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

## 4.2.114 *Crataegus sanguinea*

4 tlin 8 cyuc 2 kca2 0 tcan 2 dwat 6 m hkc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Crataegus sanguinea* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to September.

The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[2, 105, 177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge Hedge Very tolerant of trimming, it can even be cut right back into the old wood and will soon resprout. It makes a good hedge[74]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - northern China, Mongolia, Siberia. ksacta Open forests, forest edges, river banks etc[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.115 *Crataegus maximowiczii*

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat m hkuc  
hmmihtkt cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikliw hpa7tmwatli xre7t hjonli

drutta *Crataegus maximowiczii* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is

hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - Siberia to N. Japan. ksacta Riverain deciduous forest strips, crests, meadows of flooded valleys, forest edges and dry mountain slopes[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to *C. sanguinea*[200].

#### 4.2.116 *Polygonatum multiflorum*

Solomon's Seal, Eurasian Solomon's seal  
4 tlin 8 cyuc 2 kcaok 0 tcan 3 dwat m hkuc  
pcimhmim cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli  
flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta *Polygonatum multiflorum* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is

drutta Polygonatum multiflorum is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the fruits are poisonous[10, 19, 65]. It has laxative properties and can increase the laxative effects of aloe, rhamnus, senna and yellow dock. May lead to gastrointestinal irritation with prolonged use. Over-dose leads to nausea, diarrhoea, gastric complaints [301].

kcakta Edible Parts: Leaves Root Edible Uses: Young shoots - cooked. Boiled and used as an asparagus substitute, they make an excellent vegetable[2, 4, 115] and are widely used in Turkey[244]. Root - cooked[177, 179]. Rich in starch[115]. The root should be macerated for some time in water in order to remove bitter substances[4]. Normally only used in times of famine, the root was powdered and then made into a bread by the North American Indians[244].

tcanta Cosmetic Plants can be grown for ground cover when spaced about 30cm apart each way[208]. A distilled water made from the whole plant is used as a cosmetic to improve the complexion[244].

dwatta Astringent Demulcent Dysentery Emetic Poulitce Tonic Solomon's seal has been used for thousands of years in herbal medicine. It is used mainly in the form of a poultice and is believed to prevent excessive bruising and to stimulate tissue repair[254]. The root is astringent, demulcent, emetic and tonic[4, 21, 61, 240]. An infusion is healing and restorative, it is good in the treatment of stomach inflammations, chronic dysentery etc[4]. It is used with other herbs in the treatment of pulmonary problems, including tuberculosis, and women's complaints[4, 254]. The powdered roots make an excellent poultice for bruises, piles, inflammation etc[4]. The root is harvested in the autumn and dried for later use[4]. The plant should not be used internally except under professional supervision[254]. A distilled water made from the whole plant has been used as a skin tonic and is an ingredient of expensive cosmetics[244]. The dried powdered roots and flowers have been used as a snuff to promote sneezing and thus clear the bronchial passages[244].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, and temperate Asia to Japan. ksakta Woodland, usually on limestone[187].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Succeeds in dry shade if the soil is rich in humus[190]. Grows well in heavy clay soils. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Another report suggests that they tolerate drought so long as the soil is rich in humus[190]. A very ornamental plant[1], growing well on the woodland edge[24]. There are some named forms[188]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

#### 4.2.117 Malus x micromalus

Kaido Crab Apple

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

hmihtut cyutli tcup hwicli wrajsrlutnykfrrip hpa7tli flatprik-wis hpa7tmwatli xre7t hjonli

drutta Malus x micromalus is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[183]. About 15mm in diameter[200].

tcanta Rootstock Used as a rootstock for the cultivated apple, *M. sylvestris domestica*, it is said to be the best dwarfing rootstock from seed[183].

nrakta A hybrid of garden origin, *M. baccata* x *M. spectabilis*[200]. ksakta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.118 Rosa multiflora

Japanese Rose, Multiflora rose

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

hmihtut cyutli tcup hwicli wrajsrlutnykfrrip hpa7tli flatprik-wis hpa7tmwatli xre7t hjonli

drutta Rosa multiflora is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit Seed Stem Edible Uses: Fruit - raw or made into preserves, pies etc[105, 177, 183]. The fruit is about 7mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. The fruit is rich in carotene (81.4mg per 100g) and vitamin C[218]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young leaves and shoots - raw or cooked[105, 177, 183]. Used as they emerge from the ground in spring. The young leaves contain more than 200mg per



100g of vitamin C[18]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The seed contains about 8% oil[218].

**tcanta Essential Hedge Hedge Rootstock Soil stabilization Tannin**The plant is fairly wind tolerant and can be grown as a shelter hedge though it can be damaged by salt laden winds[75]. The plant has a dense sturdy habit and makes an excellent hedge[245]. The root contains 23-25 per cent of tannin[266]. An essential oil obtained from the fresh flowers is used in the cosmetic industry[266]. The plant also has an extensive root system and is used for soil stabilization[11, 200]. This species can also be used as a rootstock for other species of rose, especially for ramblers and when grown on poor soils[11, 200].

**dwatta Anodyne Antidote Astringent Cancer Carminative Diuretic Hypoglycaemic Laxative Poulitice Vitamin C**The leaves are poulticed and applied to sores[218]. The fruit is anodyne, diuretic, hypoglycaemic and laxative[218]. It is also antidotal to fish poisoning[218]. It is used to treat constipation and arthralgia pain[279] and as an application to foul ulcers, wounds, sprains and injuries[240]. The seed is laxative and diuretic[218]. The root is rich in tannins. It is astringent and carminative[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bioactive compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

**nrakta E. Asia - China, Japan, Korea. ksacta** On slopes, in scrub, or by rivers at elevations around 1300 metres in China[266].

**propta Seed.** Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

**nwatta** Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Succeeds on poor soils[200]. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], more than 100 blooms can be produced in a single cluster[245]. These flowers possess a delicious sweet fruity perfume[245]. Plants often self-layer[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.119 *Cotoneaster microphyllus*

4 tlin 8 cyuc 2 kcaak 3 tcan 1 dwat m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli

flatprikliwslip hpa7tmwatli xre7t hjonli

**drutta** *Cotoneaster microphyllus* is an evergreen Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** FruitEdible Uses: Fruit - raw[272]. It is sweet when fully ripe[158]. A watery flavour[272]. It is possibly edible[177]. The fruit is about 7mm in diameter[200].

**tcanta Basketry Dye Incense Soil stabilization WoodA** rose-tan dye is obtained from the fruit. The leaves are used for incense[272]. The plant has an extensive root system and a creeping habit above ground. It makes a good soil binder[272]. The sub-species *C. microphyllus cochleatus* can be used as a ground cover plant in a sunny position[188, 208]. It forms a dense carpet of growth[208]. The branches are used for making baskets[146, 158, 272]. Wood - hard, close and even grained[146, 158]. Used for fuel[272].

**dwatta Astringent**The stolons are said to be astringent[240].

**nrakta E. Asia - Himalayas. ksacta** Trailing on rocks or spreading on grassy hillsides, 1200 - 5400 metres[158]. Rocky slopes, rocky mountain areas, thickets and river valleys at elevations of 2000 - 4200 metres[266].

**propta Seed.** Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

**nwatta** An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -25°C[184, 200]. A very ornamental plant[1], there are some named forms[202]. Most forms are quite slow-growing[200, 202]. It hybridizes freely with other members of this genus[200] and often self-sows in British gardens[219]. A low-growing plant, the branches often root when they come into contact with the soil[219]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Plants are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 4.2.120 *Crataegus jonesiae*

Miss jones' hawthorn

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 6 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

**drutta** *Crataegus jonesiae* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen in October. The species is hermaphrodite (has both male and fe-

male organs) and is pollinated by Midge. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and mealy in one report[82], juicy according to others[11, 200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 1.5cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Maine. ksacta Rocky shores of sounds and bays[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Closely related to *C. chrysocarpa* and considered to be no more than a form of that species by some botanists[229]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.121 *Avena barbata*

Slender oat

4 tlin 8 cyuc 2 kcaak 2 tcan 0 dwat m hkuc  
thtut cyutli hqatkyuctcup hwicli hyishrasjlutnykfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Avena barbata is a ANNUAL at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kaakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[57]. Rather small[257]. The seed ripens in the latter half of summer and, when harvested and dried, can store for several years. It has a floury texture and a mild, somewhat creamy flavour. It can be used as a staple food crop in either savoury or sweet dishes. The seed can be cooked whole, though it is more commonly ground into a flour and used as a cereal in all the ways that oats are used, especially as a porridge but also to make biscuits, sourdough bread etc. The seed can also be sprouted and eaten raw or cooked in salads, stews etc. The roasted seed is a coffee substitute.

tcanta Fibre Mulch Paper ThatchingThe straw has a wide range of uses such as for bio-mass, fibre, mulch, paper-making and thatching[171]. Some caution is advised in its use as a mulch since oat straw can infest strawberries with stem and bulb eelworm.

nrakta Europe to Asia. ksacta Dry wasteland, cultivated ground and meadows, especially on heavier soils[74, 200].

propta Seed - sow in situ in early spring or in the autumn. Only just cover the seed. Germination should take place within 2 weeks.

nwatta Succeeds in any moderately fertile soil in full sun[200]. A triploid species, it is rarely cultivated for its edible seed[57]. Oats are in general easily grown plants but, especially when grown on a small scale, the seed is often completely eaten out by birds. Some sort of netting seems to be the best answer on a garden scale.

#### 4.2.122 *Malus kansuensis*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Malus kansuensis* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A very acid flavour even when fully ripe[K]. We have seen fruit that has bled whilst still on the tree - at this stage the flesh has become very soft and mealy but still has a very acid flavour[K]. The fruit can be up to 1cm in diameter[200].

nrakta E. Asia - N. China. ksacta Mixed forests, among shrubs at elevations of 1500-3300 metres[266].

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

away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. This species is closely related to *M. toringoides*[11]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.123 *Malus x soulardii*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc  
hmmihmtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus x soulardii* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[200]. Fairly large, the fruit is up to 5cm in diameter[200].

nrakta A hybrid of garden origin, probably *M. ioensis* x *M. pumila*[200]. ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. There are several named varieties selected for their ornamental value[200]. 'Wynema' has large edible fruits up to 5cm in diameter. It has a biennial bearing habit[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.124 *Malus glaucescens*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc  
hmmihmtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus glaucescens* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs)

and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Aromatic, it is 3 - 4cm in diameter[200].

nrakta The wood weighs 44lb per cubic foot[235].  
ncanta Eastern N. America - Ontario to Michigan, south to New Jersey, South Carolina, Iowa and Missouri. ksacta Glades and open woods in rich soils[82].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. This species is closely related to *M. glabrata*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.125 *Crataegus canbyi*

Cockspur hawthorn, Dwarf Hawthorn, Cockspur Hawthorn  
4 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 5 m hkuc  
hmmihmtut cyutli hgatyuctuphja7n hwicli hrasljutnyikfrp  
hpa7tli flatprikliwisli hpa7tmwatli xre7t hjonli

drutta *Crataegus canbyi* is a deciduous Shrub growing to 5 m (16ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[82]. The fruit is about 12mm in diameter and is borne in small clusters[200]. It has a thick, bright red, juicy flesh[82]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - fine-grained, tough, hard and heavy. Used for tool handles etc[82].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it

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nrakta Eastern N. America - Pennsylvania and Delaware. ksacta Hedges and thickets[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Screen, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°C[202]. This species is closely related to *C. crus-galli*[11]. It hybridizes freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Special Features:Attracts birds, North American native, Blooms are very showy.

#### 4.2.126 *Malus halliana spontanea*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Malus halliana spontanea* is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is slightly larger than the type species, to 1cm in diameter[200].

nrakta E. Asia - Japan? ksacta Not known in a truly wild situation.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This sub-species has slightly larger fruits than the type, they are up to 1 cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.127 *Malus halliana*

Hall crab apple

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Malus halliana* is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. 6 - 8 mm in diameter[200]. A healthy tree at Kew in September 1989 had small acid fruits[K].

nrakta E. Asia - Japan? ksacta Not known in a truly wild situation.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. The sub-species *M. halliana spontanea*. (Mak.)Koidz. has slightly larger fruits than the type, they are up to 1 cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.128 Crataegus rivularis

River Hawthorn

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 4 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drudda Crataegus rivularis is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[212]. The flesh is thin, dry and mealy[227]. The fruit can also be dried for later use or for making into pemmican[212]. The fruit is high in sugar but low in fats and protein[212]. The fruit is about 10mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - Wyoming to Idaho, New Mexico, Arizona and Nevada. ksacta Thickets and rocky ground[43]. Borders of streams, 900 - 2,500 metres in Texas[27].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. There is some doubt over the correct name for this species. [200] suggests that it is a synonym for *C. douglasii* but also records it as a distinct species[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell some-

what like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 4.2.129 Malus sargentii

Sargent's apple, Sargent Crabapple

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 4 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

drudda Malus sargentii is a deciduous Shrub growing to 4 m (13ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. Large for a crab apple[183], it is up to 1cm in diameter[200].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

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

nwatta Landscape Uses:Border, Pest tolerant, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Of doubtful botanical standing, it is considered to be synonymous with *M. sieboldii* by some Japanese botanists[182]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. This species is considered to be no more than a part of *M. sieboldii* by many botanists[58]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

## 4.2.130 Crataegus jackii

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drudda Crataegus jackii is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177, 235]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 12mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatka Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Ontario. ksacta Calcareous ridges and banks of streams[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.131 *Cornus quinquevervis*

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Cornus quinquevervis* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: A specimen of this species seen growing at Kew in September 1994 was carrying a few red fruits about 30mm long and 12mm wide - these were not fully ripe and were slightly astringent but they showed some potential[K]. There must be some doubt about the validity of the name of the Kew plant since the botanical description of the plant says that the fruits are black, globose and 6mm in diameter[266].

nrakta E. Asia - China. ksacta Hillsides, mountain forests and thickets by streams from sea level to 2500 metres[266].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. Plants in this genus are notably resistant to honey fungus[200].

#### 4.2.132 *Crataegus uniflora*

Dwarf hawthorn

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikwlisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus uniflora* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[161, 177]. The fruit is about 10mm in diameter and is borne in small clusters[200]. The fruit is usually borne singly, or in groups of up to 3 fruits[235]. It can be up to 16mm in diameter and has a firm flesh[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatka Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - New York to Florida, west to Texas and Oklahoma. ksacta Sandy or rocky banks or woods[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold

stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species is often confused with *C. tomentosa*. L.[235]. It hybridizes freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 4.2.133 *Malus toringo*

Toringo crab

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltunykfrp hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus toringo* is a deciduous Tree growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. It is best after a frost, the cold helping to produce more sugars in the fruit[2, 105]. Up to 2cm in diameter[200]. nrakta E. Asia - Japan. ksacta Mountains[58].

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

a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. This species is closely related to *M. floribunda*[11]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.134 *Ligustrum obtusifolium*

Border privet

4 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltunykfrp hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Ligustrum obtusifolium* is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least one member of this genus is recorded as being mildly toxic and it is quite possible that other members of the genus also contain toxins[65].

kcakta Edible Parts: Edible Uses: Coffee Tea The roasted seed is a coffee substitute[61, 177]. Leaves are a tea substitute[177].

tcanta Wax A commercial insect wax is produced on the branches as a result of eggs being laid by insects[11]. Another report says that the wax is produced by the plant due to the stimulation of the feeding insects[61]. Yet another report says that the wax is produced by the insects[178]. It is used for candles and as a polish for earthenware pots, book edges etc[178]. The sub-species *L. obtusifolium regelianum* and its cultivar 'Dart's Perfection' make a good carpeting ground cover about 1.2 metres tall. They should be spaced about 2.5 metres apart each way[208].

nrakta E. Asia - China, Japan. ksacta Thin woods and thickets in lowland and hills all over Japan[58]. Hills, gullies and woods at elevations of 100 - 600 metres in China[266].

propta The seed does not require any pre-treatment and can be sown in the spring in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December. High percentage[78].

nwatta Landscape Uses: Foundation, Hedge, Screen, Superior hedge. A very tolerant and easily grown plant, it succeeds in any soil that is not impoverished or water-logged[11, 182]. Grows well in heavy clay soils. A very ornamental plant[1]. Polymorphic[58]. Prefers hotter summers than are normally experienced in Britain[11]. Closely related to *L. ovalifolium*[200]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Invasive, Attractive flowers or blooms.

#### 4.2.135 *Cornus sanguinea*

Dogwood, Bloodtwig dogwood

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltunykfrp hpa7tli flatprik-  
wisslip hpa7tmwatli xre7t hjonli

drutta *Cornus sanguinea* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium

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

**pcista** Contrary to some reports, the fruit is not poisonous, but the leaves can cause skin irritations to sensitive people[65].

**kcakta** Edible Parts: Fruit Oil OilEdible Uses: Oil Oil-Fruit - raw or cooked[105]. A bitter flavour, it can also have an emetic effect on the body[1, 7, 11]. It is not worthwhile[115]. The fruit is about 8mm in diameter[200]. An oil is obtained from the seed[2], it is edible when refined[75].

**tcanta** Basketry Charcoal Dye Fuel Hedge Hedge Oil Oil WoodThe seed contains 45% of a non-drying oil[74], it is used in soap making and lighting[7, 13, 100, 115, 177]. A non-drying oil is also obtained from the pericarp, it is used for lighting[74]. The pericarp contains 19 - 35% oil[74]. A greenish-blue dye is obtained from the fruit[13, 74]. The young stems are very flexible and are used in basketry[7, 13, 74, 100]. Wood - tough, hard. Used for small items such as stool handles, turnery etc[11, 61, 115]. A good quality charcoal is obtained from the wood[115], the wood also makes an excellent fuel[115].

**dwatta** Astringent Emetic FebrifugeThe bark is astringent and febrifuge[7]. It is used to treat fevers[254]. The leaves are sometimes used externally as an astringent[7]. The fruit is emetic[7].

**nrakta** Europe, including Britain, from Scandanavia to Spain, east to Sicily and Greece. Rare in S.W. Asia. **ksacta** Mixed woods, scrub and hedgerows, especially on calcareous soils[7, 13, 186].

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

**nwatta** An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Plants are relatively shade tolerant, though they are not happy when growing in dense shade[186]. They grow badly when exposed to strong cold winds[186]. Plants are hardy to about -25°C[184]. The flowers have a rather unpleasant smell to most people, though they are attractive to insects[186]. Plants have a suckering habit and can quickly form dense thickets[186]. They can be coppiced regularly and will throw up long straight stems after being cut back[186]. Plants in this genus are notably resistant to honey fungus[200].

#### 4.2.136 *Malus brevipes*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 3 m hkuc  
hmimhtu cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

**drutta** *Malus brevipes* is a deciduous Tree growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**pcista** All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should

only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

**kcakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177].

**nrakta** N. America. **ksacta** Not known

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

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.137 *Amelanchier parviflora*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 2 m hkuc  
htut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprikwis  
hpa7tmwatli fyifxre7t hjonli

**drutta** *Amelanchier parviflora* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

**kcakta** Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked. The fruit is rich in iron and copper[226].

**tcanta** Wood - fine grained, hard, very heavy, reddish. Used for small articles[74].

**nrakta** W. Asia - Turkey. **ksacta** Not known

**propta** Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

**nwatta** Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Fairly lime tolerant[200]. Plants are hardy to about -20°C[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A group of young plants about



into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

## 4.2.138 Rosa gallica

French Rose

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasljutnykifrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta Rosa gallica is a deciduous Shrub growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: FlowersEdible Uses: Condiment-Petals - raw or cooked. They can be added as a decorative garnish to salads[238], and can also be crystallised or preserved in syrup. They are also dried and used as a flavouring in tea, beverages, cakes etc[177, 183]. The dried petals and flower buds are an important ingredient in the Northern African spice mixture 'ras-el-hanout'[238]. Rose water, made by cold-infusing the petals, is used as a flavouring in various confections, especially 'Turkish Delight'[238]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Essential Pot-pourriAn essential oil obtained from the flowers is used in perfumery[100], as an additive to bath water and in skin care preparations[238]. Rose water, made by a cold infusion of the petals, is also added to bath water and skin care preparations[238]. The dried petals and buds are used in pot-pourri[238].

dwatta Antibacterial Aromatherapy Astringent Cancer TonicThe petals are antibacterial, astringent and tonic[4, 61]. They are taken internally in the treatment of colds, bronchial infections, gastritis, diarrhoea, depression and lethargy[238]. Externally, they are used to treat eye infections, sore throats, minor injuries and skin problems[238]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavonoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The essential oil from the flowers is used in aromatherapy to counter depression, anxiety and negative feelings[238].

nrakta S. and C. Europe. ksacta Hedges and woods, usually on calcareous soils[100].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings

into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], the flowers have a spicy fragrance[245]. It is cultivated for its essential oil in Eastern Europe[100]. There are some named varieties[200]. 'Officialis' is the Apothecary's rose, it has been cultivated for its medicinal virtues[200]. Plants produce suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.139 Rosa rubiginosa

Sweet Briar, Sweetbriar rose

4 tlin 8 cyuc 2 kcaok 0 tcan 3 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasljutnykifrip hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta Rosa rubiginosa is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - cooked[2, 62]. It is used in making jellies etc[105, 183]. The taste is best after a frost[172]. The fruit is up to 25mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. A pleasant tasting fruity-flavoured tea is made from the fruit, it is rich in vitamin C[21]. Petals - raw or cooked. Remove the bitter white base[172]. Used in confectionery[177, 183]. Young shoots - raw[172]. Used as they come through the ground in spring. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Hedge HedgeThe plant makes a good low hedge[1, 11]. The prickles on the stem make it a useful security hedge[245].

dwatta Aperient Astringent Cancer Skin Stomachic Vitamin CThe flowers and hips are aperient, astringent and stomachic[21, 46]. An infusion of dried rose petals can be used to treat headaches and dizziness, with honey added the infusion is used as a heart and nerve tonic and a blood purifier[21]. A decoction of the petals is used to treat mouth sores[21]. The seed is rich in vitamin E and an oil extracted from the seed is used externally in the treatment of burns, scars and wrinkles[238]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavonoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of

cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Caucasus and Himalayas. ksacta Open copses and old hedgerows[4]. Usually found on calcareous soils, it is one of the first shrubs to colonize chalk grassland[11, 17].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[14, 200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Grows well on chalk. A very ornamental plant[1]. The leaves are apple-scented[188]. The flowers are slightly scented[245]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.140 *Rosa woodsii*

Western Wild Rose, Woods' rose, Tehachapi rose  
4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 2 m hkuc  
hmimhtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikliw hpa7tmwatl xre7t hjonli

drutta *Rosa woodsii* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Stem Edible Uses: Tea/Fruit - raw or cooked[101, 155, 257]. They are used in making jams, jellies etc. The taste and texture are best after a frost[116]. The fruit can also be dried and used to make a pleasant tasting fruity-flavoured tea[183]. The fruit is up to 15mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young shoots - raw[172]. Harvested whilst still tender in the spring, they are best peeled[257]. Petals - raw. Remove the bitter white base[172]. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to

remove the seed hairs[102]. The bark, young shoots, leaves and fruit have all been used to make tea-like beverages[257].

dwatta Analgesic Astringent Cancer Diuretic Foot care Poultice Salve Stings Women's complaints The seeds have been used as a poultice to produce a drawing effect for treating muscular pains[257]. An infusion of the leaves has been used as a spring tonic[257]. A poultice of the chewed leaves has been used to allay the pain of bee stings[257]. The leaves have been placed in the shoes as a protection from athletes foot[257]. The roots are blood tonic and diuretic[257]. A decoction of the roots has been used by adults and children in the treatment of diarrhoea and intestinal influenza[257]. A decoction of the root or inner bark has been used in the treatment of colds[257]. An infusion of the fruits has been used in the treatment of coughs[257]. Various parts of the plant have been used to make poultices to apply to burns, sores, cuts, swellings and wounds[257]. A decoction of the branches, combined with chokecherry (*Prunus virginiana*) and red willow (*Salix bonplandiana*), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Central and Western N. America -Minnesota to Missouri, Northwest Territory, New Mexico and Colorado. ksacta Moist soils of draws, hillsides, along streams and in open valleys. It often forms thickets in open positions[212].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most well-drained soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Closely related to and hybridizes in the wild with *R. blanda*[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.141 *Berberis gagnepainii*

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 2.4 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishras|lutnyikfrip hpa7tli flatprikliw hpa7tmwatl fyifxre7t hjonli

drutta *Berberis gagnepainii* is an evergreen Shrub growing to 2.4 m (7ft 7in) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf

all year, in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruits are about 10mm long[200].

tcanta Dye Hedge HedgeThe plant makes an impenetrable hedge that can be trimmed or left to its own devices[29, 182, 200]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China in Sichuan. ksacta Thickets and woodlands, 2000 - 4000 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A number of cultivars have been selected for their ornamental value[200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

#### 4.2.142 *Berberis verruculosa*

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hyishrasjltutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis verruculosa* is an evergreen Shrub growing to 1.8 m (6ft) by 1.8 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Poor quality[K]. The fruits are about 10mm long[200].

tcanta DyePlants can be grown as a medium-size hedge[29]. They are quite tolerant of trimming though are best left untrimmed. They make an effective dense barrier[K]. Plants can be grown as a tall ground cover when planted about 1 metre apart each way[208]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this

nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Woods, thickets and rocky places, 1300 - 4100 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -20°C[184]. Hybridizes freely with other members of this genus[1]. A very ornamental[1] but slow-growing plant[200]. The flowers are sweetly scented[245]. Can be pruned back quite severely, it resprouts well from the base[200].

#### 4.2.143 *Berberis concinna*

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjltutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis concinna* is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruits - raw[272]. The fleshy oblong berries are up to 18mm long[111].

tcanta DyeA yellow dye is obtained from the roots and stems.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in Sikkim, Nepal and Tibet. ksacta Forms thickets in open spaces at elevations of 3000 - 3600 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. A

very ornamental plant[11]. Plants can be pruned back quite severely and resprout well from the base[200].

#### 4.2.144 *Hosta sieboldiana*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 1 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Hosta sieboldiana* is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177].

tcanta A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 60cm apart each way[208].

nrakta E. Asia - Japan. ksacta Rich fertile soils in mountain valleys and forest margins[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A robust plant, densely clump-forming[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A very ornamental plant[1], there are many named forms[187]. Hybridizes freely with other members of this genus[200]. This species usually breeds quite true from seed[233].

#### 4.2.145 *Rosa x damascena*

Damask Rose

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 1.5 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli fyifxre7t hjonli

drutta *Rosa x damascena* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

poista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: CondimentYoung shoots - raw or cooked[105, 177]. Best used when they are still red-coloured, they are peeled before being eaten[183]. Petals - cooked. They are the source of 'attar of roses' and 'rose water', and are used as a flavouring for drinks, sweets, baked goods, ice cream etc[183]. The petals are also used to make jam[74]. Fruit - raw or cooked. The fruit is about 25mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The leaves are used as a seasoning. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta EssentialAn essential oil obtained from the flowers is much used for perfumery and as a flavouring[1, 46, 57, 171]. 1000g yields 0.5g of oil[61].

dwatta Aperient Astringent Cancer Cardiac TonicThe petals are applied externally as an astringent[240]. They are also made into a preserve and used as a tonic that helps to put on weight[240]. The buds (the report does not say if it is leaf or flower buds) are aperient, astringent, cardiac and tonic[240]. They are used for removing bile and cold humours[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta W. Asia. ksacta Not known in a truly wild situation, this species is probably a hybrid involving *R. centifolia*[11, 74].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. The plant resists frost[74]. A very ornamental plant[1], the flowers are very fragrant[245]. This species is commonly cultivated for its essential oil[57]. It is a parent of many varieties of perpetual-flowering garden roses[1]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.146 Berberis everstiana

4 tin 8 cyuc 2 kcaok 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli  
flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis everstiana is a SHRUB growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. The fleshy oblong fruit is about 15mm long.

tcanta DyeA yellow dye is obtained from the root and bark.

dwatta Antibacterial Cancer Dysentery Ophthalmic (Stomachic)Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - northern India, Nepal and Tibet. ksacta Open rocky places at elevations of 3000 - 4000 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Pot up in the spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Closely related to *B. tsangpoensis*[11]. Plants can be pruned back quite severely, they respout well from the base[200].

## 4.2.147 Lamium purpureum

Red Dead Nettle, Purple deadnettle

4 tin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Lamium purpureum is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked as a potherb[2, 4, 5, 8, 54, 62, 183]. The plant is a short-lived annual, but seeds can germinate at almost any time of the year and so the leaves are often available all year round.

dwatta Astringent Diaphoretic Diuretic Purgative StypticThe whole plant is astringent, diaphoretic, diuretic, purgative and styptic[4, 46]. A decoction of the plant is particularly

useful for checking any kind of haemorrhage, whilst the fresh bruised leaves can be applied to external cuts and wounds[4].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean and Israel. ksacta Roadsides, waste places and as a common weed of cultivated land[17].

propta Seed - plants usually self sow freely and should not require human intervention. When required, the seed can be sown in situ as soon as it is ripe.

nwatta An easily satisfied plant, it tolerates most soils and conditions. Grows well in heavy clay soils. Dislikes shade. A common garden weed, usually flowering at almost any time of the year and the seed is capable of germinating even in the winter if the weather is mild[17]. In rich soils the plant can grow quite lushly, in poor soils it will only grow a few centimetres tall before flowering and spreading its seed. The plant is easily controlled, however, and never really becomes a pest[K]. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4, 24]. Grows well with potatoes[14].

## 4.2.148 Primula denticulata

Drumstick Primula

4 tin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.3 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Primula denticulata is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw[105, 177]. They make a very attractive addition to salads[183].

tcanta Plants can be grown as a ground cover, they are best spaced about 35cm apart each way[208].

nrakta E. Asia - Himalayas. ksacta Shrubberies and open slopes in moist situations, often along drains, 1500 - 4500 metres[51, 145].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Root cuttings[200].

nwatta Easily grown in any moist soil in sun or part shade[187, 200]. Prefers a damp position[133, 200]. Grows well in heavy clay soils[208]. Dislikes very light or dry soils[1]. Grows well in the shade of a north-facing wall[208]. Plants are hardy to about -25°C[187]. A very ornamental plant, there are many named varieties[187]. It can be grown in a wild garden, rock garden or the flower border[1].

## 4.2.149 Hemerocallis forrestii

4 tin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.4 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis forrestii is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked. They must be consumed

very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. Root - raw or cooked. The roots are swollen and conspicuously enlarged at each end[200]. The roots are slightly fleshy, with a large, globose, swollen, tuberous part near the tip[266].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote DiureticThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - W. China in Yunnan Province. ksacta Dry ridges and rocky banks around 250 metres[205]. Forests, grassy slopes and limestone cliffs at elevations of 2300 - 3200 metres in SW Sichuan and NW Yunnan[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Some reports say that this species is not hardy in Britain[205], whilst another says that it is hardy to zone 5 (tolerating quite heavy frosts[200]). There is a plant at Kew Botanical Gardens that bears this name and appears to be fully hardy, growing near the base of a west-facing brick wall[K]. It is possible that the plant is actually a hybrid H. forrestii x H. middendorffii[205]. Hybridizes freely with other members of this genus[200]. Individual flowers are very short-lived, usually withering within 24 hours of opening. The plants produce a succession of blooms over a period of a month or more[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 4.2.150 Hosta crispula

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.6 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Hosta crispula is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckaak Edible Parts: StemEdible Uses: Leaf stems - raw or cooked[K]. Crisp and sweet but rather fibrous and chewy[K].

tcanta A good ground cover plant[197]. Plants should be spaced about 45cm apart each way[208].

nrakta E. Asia - Japan. ksacta Not known in a truly wild situation, it is probably of garden origin[200].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Another report says that the plant should be grown in full shade[251]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Requires some protection from the wind[188, 251]. A very slow-growing plant[251], it is in general fully hardy in Britain, but the young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. This plant is not recognised as a species by some authorities, who see it as a garden hybrid H. 'Crispula'[251]. Especially when grown in less than ideal conditions, this species is easily confused with H. 'Thomas Hogg' and H. fortunei 'Albo-marginata'[200]. Hybridizes freely with other members of this genus[200]. There are some named forms selected for their ornamental value[200]. This species is prone to virus disease[188, 251].

#### 4.2.151 Tragopogon crocifolius

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.8 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Tragopogon crocifolius is a ANNUAL/BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kckaak Edible Parts: Leaves RootEdible Uses: Root - cooked[2, 177]. Leaves - raw or cooked[105].

nrakta S. Europe - Italy. ksacta Cultivated land and stony ground in the mountains[45].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200].

#### 4.2.152 Petasites albus

Butterbur

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.6 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli nyanhjen hjonli

drutta Petasites albus is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kckaak Edible Parts: StemEdible Uses: The small fleshy petioles (leaf stems) are very palatable when cooked and eaten like asparagus[7].

tcanta A good ground cover for the wilder areas of the garden[200]. It is too invasive to be used in small gardens

is only suitable for covering large areas[208]. The leaves were at one time used by peasants as a head covering[7].

dwatta Antitussive Emmenagogue Homeopathy Hypnotic Sedative VulneraryThe root is emmenagogue, hypnotic, sedative and vulnerary[7, 172]. The ground or finely chopped rhizome has a healing effect when applied to slow-healing or weak ulcers, or to suppurating wounds[7]. An infusion of the leaves is a specific remedy for coughs[7]. A homeopathic remedy is made from the roots[7]. It is used in the treatment of wounds, ulcers etc[7].

nrakta N. and C. Europe. Naturalized in Britain. ksacta Waste ground, roadsides, plantations and woods[17], often in damp soils[1].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Prefers partial shade[31]. Prefers a heavy soil[208]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required.

#### 4.2.153 *Symphytum tuberosum*

Tuberous comfrey

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Symphytum tuberosum* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for *S. officinale*. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: Edible Uses: CoffeeWhen roasted until brown and brittle, and then finely ground, the root is used as a coffee substitute. It has a smoothness that is not found in real coffee[183].

tcanta A good, and sometimes rampant, ground cover plant for a shady border or woodland.

nrakta Europe, including Britain, south and east from Germany to Spain, S.w.Russia and Turkey. ksacta Woods, scrub and by rivers[187].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will

make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade. Grows well in heavy clay soils. Hardy to about -20°C[187]. Plants form extensive patches, spreading by means of a creeping tuberous rhizome[187]. Plants are dormant in summer[187].

#### 4.2.154 *Hosta undulata*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.3 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Hosta undulata* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root StemEdible Uses: Young leaves and leaf stems - cooked[105, 177]. Root[105, 177]. No more details are given.

tcanta A good ground cover plant, succeeding in dense shade but rather slow to spread[197]. Plants should be spaced about 25cm apart each way[208]. The sub-species *H. undulata erromena* has been specially mentioned[197] and this can be spaced about 60cm apart each way[208].

nrakta This species is a hybrid of garden origin. ksacta Not known in a truly wild situation.

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A vigorous plant, forming medium sized clumps[200]. A hybrid species of garden origin, the flowers are sterile[200].

#### 4.2.155 *Hosta longissima*

Swamp Hosta

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Hosta longissima* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to

October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves Stem Edible Uses: Young leaves and leaf stems - cooked[105, 177].

nrakta E. Asia - Japan. ksacta Swampy grassland and other wet places, often exposed to full sun in the spring but then shaded in the summer by the long grasses it grows amongst[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. A plant of boggy places, it is flood tolerant[187]. Does well in the semi-shade of a woodland[200] also succeeding in deeper shade[187]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. The rhizome creeps extensively[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A polymorphic species, it hybridizes freely with other members of this genus[200].

## 4.2.156 *Mimulus lewisii*

Great Purple Monkey Flower, Purple monkeyflower  
4 tin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc  
hmmihtut cyutli tucpha/nhs6 hwicli hrasjlutnyikfrip  
hpa7tli flatprikwis hpa7tmwatli hjonli

drutta *Mimulus lewisii* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The flowers are pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves Edible Uses: Leaves and stems - raw or cooked[172].

dwatta Poultice Poultice[172].

nrakta Western N. America - Alaska to Mexico. ksacta Moist areas, stream edges and wet slopes[172]. In and along streams from moderate to high elevations[60].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late

spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. This species tolerates slightly drier conditions than *M. guttatus*, it prefers a rich soil in light woodland[200]. Hardy to at least -20°C[187]. Another report says that plants are only hardy in the milder parts of Britain[233]. There is some confusion over the naming of this plant, the entry on edibility may refer to *M. luteus*, which is closely related to this species.

## 4.2.157 *Populus trichocarpa*

Western Balsam Poplar, Black cottonwood  
4 tin 8 cyuc 1 kcak 4 tcan 3 dwat 40 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatprikwis  
hpa7tmwatli nyanhjen hjonli

drutta *Populus trichocarpa* is a deciduous Tree growing to 40 m (131ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Inner bark Sap Edible Uses: Inner bark - raw or dried. It is usually ground into a powder and used as a flour, this is normally mixed with other flours for making bread etc[172, 177]. It is best used in the spring[172]. The inner bark is mucilaginous[257] and extremely sweet, but it sours or ferments rapidly and so, unlike most inner barks, it cannot be dried for winter use, though it can be sun-dried for more immediate use[256]. Catkins - raw or cooked. A bitter flavour[172]. Sap - used for food[257].

tcanta Adhesive Basketry Containers Cork Dye Fuel Insulation Paint Rooting hormone Scourer Soap Soap making String Stuffing Waterproofing Wood An extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A yellow dye is obtained from the leaf buds[257]. The bark of large trees is thick and corky. It is made into containers for carrying and storing food, also as a lining for underground food stores[99]. The inner bark has been shredded, spun together with red or yellow cedar inner bark (*Thuja plicata*, *Juniperus* spp and *Chamaecyparis nootkatensis*) and used as a twine[257]. A glue is made from the aromatic gum on the spring buds[99, 226, 257]. Very strong, it can also be used as a waterproofing for wood etc[99]. When mixed with pigment it can be used as a paint[99]. A string is made from the roots[99]. The supple young branches have been used as lashings or tying thongs[257]. The seed fluff is used as a stuffing material for pillows etc[99]. The wood ashes are a soap substitute[99], they can also be mixed with oil to make a soap[99]. The white inner bark is also a soap substitute, it can be dried and stored for later use[99]. The inner bark has also been used as a scouring pad[257]. The roots have been used for making baskets[257]. Wood - soft, moderately strong, easily worked, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Used in making crates, packing material the staves of barrels, woodenware and for pulp[11, 82, 99, 229]. It makes an excellent fuel[99].

dwatta Anodyne Antiinflammatory Antiscorbutic Antiseptic Balsamic Diuretic Expectorant Febrifuge Stimulant Tonic Western balsam poplar has a long history of herbal use. It was commonly used by many native North American Indian tribes who valued it especially for its antiseptic and expectorant properties, using it to treat lung complaints, wounds, skin conditions etc[257]. It is still commonly employed in modern herbalism with much the same uses. The leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They also contain salicin, a



acid that probably decomposes into salicylic acid (aspirin) in the body[213]. The buds are antiscorbutic, antiseptic, balsamic, diuretic, expectorant, stimulant and tonic[4, 226, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta Western N. America - Alaska to Oregon. ksacta Moist woods, ravines, shores, prairies and park lands[204]. propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercropA very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acidic soils and on thin dry soils[11] but this species is more tolerant of acid soils than other members of the genus[11]. It dislikes shade and is intolerant of root or branch competition[11, 200]. Plants are reasonably wind resistant, but they do not grow well in exposed upland sites[11]. Many forms of this species are susceptible to bacterial canker, the female clone 'Fritzi Pauley' is resistant[11, 200]. A very fast growing[11] and ornamental tree[1], it does well in western Britain where trees have reached 25 metres tall in 20 years[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required.

## 4.2.158 Salix caprea

Goat Willow, Kilmarnock Willow, Pink Pussy Willow, Pussy Willow

4 tlin 9 cyuc 1 kcaak 4 tcan 2 dwat 10 m hukc  
hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrp  
hpa7tli flatprikhwis hpa7tmwatli nyanhjen hjonli

drutta Salix caprea is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or

wet soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172]. The source of an edible manna[183]. No further details.

tcanta Basketry Charcoal Hedge Leather Pioneer Shelterbelt Tannin WoodLandscape Uses: Border, Massing, Pollard, Standard, Specimen. The stems are very flexible and are used in basket making[61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark is tough and flexible, it is used as a substitute for leather[115]. The bark contains around 10% tannin[223]. The plant is fast growing and tolerant of maritime exposure, it can be used as a windbreak hedge and shelterbelt though it is of untidy habit[75]. The seeds are very light and so can travel some distance in the wind. The plant is therefore able to find its way to areas such as cleared woodland where the soil has been disturbed. Seedlings will grow away quickly, even in exposed conditions and the plant will provide good shelter for the establishment of woodland plants. Thus it makes a good pioneer species and, except in wetter and moorland-type soils, will eventually be largely out-competed by the other woodland trees. Its main disadvantage as a pioneer plant is that it has an extensive root system and is quite a greedy plant, thus it will not help as much in enriching the soil for the other woodland plants as other pioneer species such as the alders, *Alnus* species[K]. Some cultivars can be grown as ground cover[208]. 'Pendula' is female whilst 'Kilmarnock' is a male, they should be spaced about 1.5 metres apart each way[208]. Wood - soft, elastic, easily split. Used for baskets, rugs etc[46, 61]. A good quality charcoal is made from the wood[46, 61]. Dynamic accumulator.

dwatta Anodyne Aphrodisiac Astringent Febrifuge Ophthalmic StimulantThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. A decoction of the leaves is used in the treatment of fevers[240]. A distilled water from the flowers is aphrodisiac, cordial and stimulant[240]. It is used externally in the treatment of headaches and ophthalmia[240]. The ashes of the wood are useful in the treatment of haemoptysis[240]. The stems and the leaves are astringent[240]. A gum and the juice of the trees are used to increase visual powers[240].

nrakta Europe, including Britain, from Norway south and east to Spain, temperate Asia and Syria. ksacta Woods, scrub and hedges, usually on basic soils, to 840 metres[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Cuttings of this species do not root well[200]. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Cuttings of this species do not root well[200].

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1], but prefers a damp, heavy soil in a sunny position. Grows in drier soils than any other British species of *Salix*[186]. Rarely thrives on chalk[200]. Plants are found most frequently on basic soils in the wild[17]. Tolerates atmospheric pollution and exposed positions, including maritime exposure[75, 186]. A fast growing tree, it establishes well[75]. The tree has an untidy habit[75]. A light demanding tree, it becomes tall and drawn when grown in woodland, though it grows well along the sunnier edges[186]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Trees are very tolerant of cutting, they coppice well[186]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Wetlands plant, Attractive flowers or blooms.

## 4.2.159 Salix viminalis

Osier. Basket Willow

4 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 6 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrrip hpa7tli flatprik-lwis hpa7tmwatli nyanhjen hjonli

drutta Salix viminalis is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - cooked. Not very palatable[172].

tcanta Basketry Fodder Soil stabilization TanninThe stems are very flexible and are used in basket making[11, 23, 46]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The annual yield can be around 12 tonnes per hectare, 40% of which is class 1[74]. The bark contains about 10% tannin[223]. Often planted along the banks of rivers and lakes to prevent soil erosion[1].

dwatta Anodyne Antirheumatic FebrifugeAntirheumatic, febrifuge[13]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Europe, incl Britain, from Scandinavia south and east to France through temperate Asia to Japan. ksacta By rivers and streams, also on deep moist alluvial soils, avoiding very acid soils[186].

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

nwatta Fodder: Bank Industrial Crop: Biomass Industrial

Crop: Tannin Management: Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Dislikes heavy shade and dry soils[186]. Rarely thrives on chalk[200]. Tolerates atmospheric pollution[186]. A fast growing tree, it is very wind resistant[K]. Widely cultivated for basket making, there are many named varieties[11, 17]. Trees are usually coppiced annually for this purpose, they do not respond so well to pollarding. It should be cut back almost to ground level each year when being grown for basket making since this encourages the production of long flexible shoots[11].

In very good conditions plants can put on 4 metres or more of new growth in a year when treated in this way. A very important food source for the caterpillars of many butterfly species[30], it is also a valuable early pollen source for bees[11, 186]. The plants are rich in insect life[186]. Best planted into its permanent position as soon as possible[11]. The root system is rather aggressive and can cause problems with drains[200]. Plants are best not grown within 10 metres of buildings. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

## 4.2.160 Viburnum lantana

Wayfaring Tree, Wayfaring Tree Viburnum

4 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 5 m hkuc

hmmhtut cyutli kyuctcup hwicli hrasjlutnyikfrrip hpa7tli flatprik-lwis hpa7tmwatli fyifxre7t hjonli

drutta Viburnum lantana is a deciduous Shrub growing to 5 m (16ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It cannot tolerate atmospheric pollution.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A famine food, it is only used when all else fails[177]. The oblong fruit is about 8mm long and contains a single large seed[200].

tcanta Rootstock StringThe young stems can be used as a twine[6]. This species is used as a rootstock for all forms of viburnums that require grafting[202].

nrakta Europe, including Britain, from Belgium south and east to Spain, Greece and W. Asia. ksacta Open woodland and woodland edges, especially on calcareous soils[10, 17].

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

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. Unlike most members of the genus, this species succeeds on dry soils[186]. It prefers a deep rich moist loamy soil in sun or semi-shade[11, 200], growing well on chalk and on chalky clays[98]. Intolerant of water-logged soils[186]. Best if given shade from the early morning sun in spring[200]. Dislikes atmospheric pollution[186]. Plants regenerate well after cutting[186]. This plant is a good indicator of limy soils[186]. Tolerates light shade in a woodland[186]. One report says the plant is self-sterile[11], another that it is self-fertile[17]. It would be wise to grow at least two genetically distinct plants of the same species in order to make sure that fruit and seed is produced. Special Features: Not North American native, Naturalizing, Fragrant flowers, Blooms are very showy.

## 4.2.161 Salix purpurea

Purple Osier. purpleosier willow

4 tlin 8 cyuc 1 kcaak 4 tcan 3 dwat 5 m hkuc

htut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrrip hpa7tli flatprik-lwishsom hpa7tmwatli nyanhjen hjonli

drutta Salix purpurea is a deciduous Tree growing to 5 m (16ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender.

is in flower from March to April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry moist or wet soil.

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

kcakta Edible Parts: Inner bark Leaves Edible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172].

tcanta Basketry Fodder Hedge Repellent Soil reclamation Soil stabilization Tannin The stems are very tough and flexible and are used in basket making[11, 13, 23, 115]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark is much disliked by rabbits, so a closely woven fence of this plant can be used as a protective barrier[115]. The bark contains about 10% tannin[223]. Plants can be grown as a hedge[29], the var. 'Gracilis' is suitable for a small hedge on damp sites[182, 200]. It can be kept dense by annual clipping[11]. The plant has an extensive root system and is used in soil reclamation and stabilization projects along estuaries[199]. Dynamic accumulator.

dwatta Anodyne Antiinflammatory Antiperiodic Antiseptic Astringent Diaphoretic Diuretic Dysentery Febrifuge Hypnotic Sedative Tonic The bark is anodyne, anti-inflammatory, antiperiodic, antiseptic, astringent, diaphoretic, diuretic, febrifuge, hypnotic, sedative and tonic[4, 9, 21]. It is a very rich source of salicin, which is used in making aspirin[199]. The bark of this species is used interchangeably with *S. alba*. It is taken internally in the treatment of rheumatism, arthritis, gout, inflammatory stages of auto-immune diseases, diarrhoea, dysentery, feverish illnesses, neuralgia and headache[238]. The bark is removed during the summer and dried for later use[238]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238], cancerous sores and chronic dysentery[218]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. The twigs are used in the treatment of cancer, dysentery and ulcers[218]. The bark of the stem and roots is anodyne and styptic[218]. It is used in the treatment of rheumatism[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Salix / Willow* for diseases accompanied by fever, rheumatic ailments, headaches (see [302] for critics of commission E).

nrakta Europe, including Britain, from Belgium south and east to N. Africa, temperate Asia to Japan. ksacta Wet places in lowland areas[13, 17], preferring neutral or alkaline soils[186].

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

nwatta Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Copice Other Systems: SRC Regional Crop Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Plants prefer an alkaline or neutral soil, rarely doing well in acid conditions[186]. Said to prefer a sandy soil[23, 199], plants are tolerant of dryish soils[11]. Plants are tolerant of salt water[199]. A very ornamental plant[1], it is cultivated for its branches which are used in basket making[11], there are some named varieties[131]. Plants are coppiced annually for this purpose[186] A very important food plant for the caterpillars of many butterfly species[30] and a good bee plant, providing an early source of nectar

and pollen[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants should be put into their permanent positions as soon as possible[11]. Dioecious. Male and female plants must be grown if seed is required.

## 4.2.162 *Tamarix gallica*

Manna Plant, French tamarisk

4 tin 8 cyuc 1 kcaac 0 tcan 2 dwat 4 m hkuc  
htu cyulthi kyuctuc hwicli hrasljutnykfrp hpa7tli flatprk-  
wissliphsom hpa7tmwatli xre7t hjonli

drutta *Tamarix gallica* is a deciduous Shrub growing to 4 m (13ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Manna Edible Uses: A manna is produced by the plants in response to insect damage to the stems[2, 105]. It is sweet and mucilaginous[105]. There is some confusion over whether the manna is produced by the plant, or whether it is an exudation from the insects[4]. The insects in question live in the deserts around Israel, it is not known if the manna can be produced in Britain[K].

tcanta Dye Fuel Hedge Hedge Soil stabilization Tannin Wood Very tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens[7, 11, 49, 75]. It dislikes being trimmed[75]. The plant has a rather open habit, however, and so is not tremendously effective at reducing wind speeds[K]. The extensive root system of this plant makes it suitable for use in erosion control in sandy soils[149]. The plant contains a high level of tannin[7]. Galls produced on the plant as a result of insect damage contain up to 40% tannin[240]. The tannin can be used as a dyestuff for fabrics[7]. (No details are given about the colour, though it is likely to be some shade of brown.) Wood - fairly hard, not strong, close grained, takes a high polish, it is often twisted or knotty[61, 149, 227]. Used for general construction, poles, turnery[61, 149]. It makes a good fuel, burning well even when green due to the wax content of the wood[74].

dwatta Astringent Detergent Diuretic Dysentery Expecto- rant Laxative The branchlets and the leaves are astringent and diuretic[7]. An external compress is applied to wounds to stop the bleeding[7]. The manna produced on the plant is detergent, expectorant and laxative[240]. Galls produced on the plant as a result of insect damage are astringent[240]. They are used in the treatment of diarrhoea and dysentery[240].

nrakta W. Europe - France. Naturalized in Britain[17].

ksacta Damp ground near the coast[17, 100].

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

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species flowers on the current year's growth[227]. Any pruning is best carried out in spring, hedges are also best trimmed at this time[188]. Plants are tolerant of severe pruning, sprouting freely from old wood[K]. The very closely related *T. anglica* is often included in this species. A good bee plant[74]. This species is notably resistant to honey fungus[88, 200].

## 4.2.163 Cornus amomum

Silky Dogwood

4 tlin 8 cyuc 1 kcaok 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Cornus amomum* is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 161, 177]. Said to be very good to eat[2]. The fruit is 8mm in diameter[235].

tcanta Teeth The powdered bark is used as a tooth powder[61].

dwatta Antiperiodic Astringent Diuretic Poulitice Stimulant Stomachic VD The dried root-bark is antiperiodic, astringent, stimulant (mild), tonic[4]. The flowers are said to have similar properties[4]. A tea or tincture of the astringent root bark has been used as a quinine substitute and also in the treatment of chronic diarrhoea[4]. It has also been employed in the treatment of painful urination, chest congestion etc[257]. The bark was also used as a poultice on external ulcers and as a wash for gonorrhoea sores[4, 257]. The glycoside 'cornin' found in the bark has astringent properties[4]. The fruits are used as a bitter digestive tonic. A tincture of them has been used to restore tone to the stomach in cases of alcoholism[4].

nrakta Eastern N. America - Newfoundland to Ontario, south to Florida and Texas. ksacta Swamps and damp thickets[43]. Low woods and along the sides of streams[235].

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

nwatta Landscape Uses: Border, Massing, Specimen, Woodland garden. An easily grown plant that thrives in Britain, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Wetlands plant, Attracts butterflies, Attractive flowers or blooms.

## 4.2.164 Tamus communis

Black Bryony

4 tlin 8 cyuc 1 kcaok 0 tcan 2 dwat 3.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli nyanhjen hjonli

drutta *Tamus communis* is a PERENNIAL CLIMBER growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, flies. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow

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

pcista The whole plant is poisonous due to its saponin content[7]. Although toxic, saponins are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The toxic effect of this plant is not caused by saponins, but by calcium oxalate crystals which are found mainly in the fruit[65].

kcakta Edible Parts: Leaves Edible Uses: Young shoots - cooked[2, 4, 61, 65]. A decidedly bitter flavour[7]. An asparagus substitute, it is best if the water is changed once whilst cooking[115]. See notes at top of the page regarding possible toxicity.

dwatta Antieczymotic Antirheumatic Cathartic Diuretic Emetic Haemolytic Poulitice Rubefacient The root is antieczymotic, diuretic, emetic, haemolytic and rubefacient[4, 7, 9]. Use with caution, the plant is rich in saponins, has a very powerful cathartic affect and ranks as a dangerous irritant poison[4, 7]. It is not normally used internally, but the macerated root is applied externally as a poultice to bruises, rheumatic joints etc[4, 7]. This should not be done without expert advice since it can cause painful blisters[9]. The root is used fresh[9] or can be harvested in the autumn and dried for later use[7].

nrakta Europe, south and east from Britain and Belgium to N. Africa, Hungary, E. Mediterranean, W. Asia. ksacta Hedgerows, scrub, woodland edges and copses, avoiding acid soils[1, 9].

propta Seed - sow in a cold frame in early spring or as soon as the seed is ripe in the autumn. Prick out the seedlings into individual pots once they are large enough to handle, and plant out in the summer or in late spring of the following year.

nwatta Requires a moist well-drained fertile soil[17]. A climbing plant, the weak stems support themselves by twining around other plants and are capable of growing quite high up into shrubs and trees[4]. Dioecious. Male and female plants must be grown if seed is required.

## 4.2.165 Kerria japonica

Bachelor's Button, Japanese rose, Jew's Mallow, Japanese Kerria

4 tlin 9 cyuc 1 kcaok 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta *Kerria japonica* is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain small quantities of hydrogen cyanide (prussic acid). In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Leaves Edible Uses: Young leaves - cooked[105, 177]. The leaves contain a small amount (0.002%) of hydrogen cyanide and are also a rich source of vitamin C (200mg per 100g)[218]. Some caution is advised, see the notes above on toxicity. Fruit[177]. No more details are given, but this report is somewhat suspect, the plant does not produce a fleshy fruit and the seed case certainly does not look edible[K]. The fruit is a dry, somewhat plump achene about 5mm in diameter[200].

dwatta Vitamin C Women's complaints A decoction of the flowering shoots is used in the treatment of coughs and women's complaints[178, 218].

nrakta E. Asia - China, Japan. A rare garden escape in Britain. ksacta By rivers and on rocks in gorges in the mountains[184]. Thickets on mountain slopes at elevations of 200 - 3000 metres[266].

propta Seed - we have no details on this species but suggest sowing the seed as soon as it is ripe in a cold frame. Sow stored seed as soon as possible in a cold frame, it is likely to require a period of cold stratification. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers, removed with care from established plants during the dormant season[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings of young shoots. Young basal shoots in early summer work quite well. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering.

nwatta Landscape Uses: Container, Foundation, Pest tolerant, Massing, Specimen. Succeeds in most aspects in any good loamy soil[1]. Succeeds in very poor soils[202]. Grows well in heavy clay soils. Prefers a moist well-drained soil in a sunny position with shade from the midday sun[200]. Hardy to about -20°C[184]. Plants are moderately fast growing[202]. They sucker freely and can be invasive[202]. Some named forms have been developed for their ornamental value[182]. This species is notably resistant to honey fungus[200]. The flowers are said to be usually unisexual but we do not know if the plants are dioecious or monoecious. Special Features: Not North American native, Attractive flowers or blooms.

#### 4.2.166 *Berberis sieboldii*

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctup hwicli hyishrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis sieboldii* is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177].

tcanta Dye A yellow dye is obtained from the root. dwatta Antibacterial Cancer Dysentery Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (*Liquorice*) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - C. Japan. ksacta Not known propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature

wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 182, 200]. Grows well in heavy clay soils. Prefers a lime-free soil[182]. Prefers a dry sunny position[11]. A very ornamental plant[1], it is closely related to *B. vulgaris*[200]. This species is probably an alternate host of 'black-stem rust' of wheat and is best not cultivated in cereal growing areas[K]. Hybridizes freely with other members of this genus[1]. Plants produce suckers freely, forming thickets[182]. They can be pruned back quite severely and will resprout well from the base[200].

#### 4.2.167 *Lysimachia vulgaris*

Yellow Loosestripe, Garden yellow loosestripe 4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta *Lysimachia vulgaris* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves Edible Uses: Young leaves[105, 177]. No more details are given.

tcanta Dye A yellow dye is obtained from the flowers[13, 100]. A brown dye is obtained from the rhizomes[13]. The growing plant repels gnats and flies, it has been burnt in houses in order to remove these insects[4].

dwatta Antidiarrhoeal Astringent Demulcent Dysentery Expectorant An astringent herb, yellow loosestripe is principally used to treat gastro-intestinal conditions such as diarrhoea and dysentery, to stop internal and external bleeding and to cleanse wounds[254]. The herb is astringent, demulcent and expectorant[4, 61]. It is harvested when in flower in July and dried for later use[4]. The plant can be used internally or externally and is useful in checking bleeding of the mouth, nose and wounds, restraining profuse haemorrhages of any kind and in the treatment of diarrhoea[4]. It makes a serviceable mouthwash for treating sore gums and mouth ulcers[254].

nrakta Most areas of Europe and Asia, including Britain, but excluding the extreme north and south. ksacta Marshes, streams and in shallow water in reed swamps[187]. Shady places near water, avoiding acid soils[4, 17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings, March to April in a cold frame. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in a moist or wet loamy soil in sun or partial shade[187]. Prefers a shady position[111]. Grows well in heavy clay soils. Hardy to at least -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very ornamental plant[1]. The sub-species *L. vulgaris davurica*. (Ledeb.) Kunth. is the form used for food in China and Japan[177].

#### 4.2.168 *Monarda clinopodia*

White Basil-Balm, White bergamot 4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.3 m hkuc

hmmihtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli fyfjxre7t hjonli

drutta Monarda clinopodia is a PERENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe fresh or dried leaves and flower heads are brewed into a tea. Said to be excellent when mixed with other teas[183].

nrakta Eastern N. America - New York to Illinois, Georgia and Kentucky. ksacta Woods and thickets[235].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1]. Requires a moist soil and a sunny position[1, 200]. Likes some shade. A good bee plant. Plants are subject to mildew in dry summers[200].

## 4.2.169 Sambucus ebulus

Dwarf Elder, Dwarf elderberry

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1.2 m hkuc

hmmihtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli fyfjxre7t hjonli

drutta Sambucus ebulus is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: FruitEdible Uses: TeaFruit - cooked. It is used as a flavouring in soups etc[177]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Leaves are used as a tea substitute[105, 177]. Some caution is advised, see the notes above on toxicity.

tcanta Dye Hair Ink RepellentA blue dye and an ink are obtained from the fruit[13, 46, 61, 115]. The root juice is used to dye hair black[4]. The leaves are said to repel mice and moles[4, 115]. Plants make a dense ground cover when spaced about 1 metre apart each way[208]. They are best used in large areas, roadsides etc[208]. Our experience to date (1995) is that the plants spread vigorously but do not form a dense cover and so do not exclude other plants[K].

dwatta Antiphlogistic Antirheumatic Appetite Suppressant Cholagogue Diaphoretic Diuretic Expectorant Homeopathy Poultice PurgativeThe leaves are antiphlogistic, cholagogue, diaphoretic, diuretic, expectorant and laxative[4, 7, 9, 13, 21, 240]. The fruit is also sometimes used, but it is

less active than the leaves[4]. The herb is commonly used in the treatment of liver and kidney complaints[4]. When bruised and laid on boils and scalds, they have a healing effect[4]. They can be made into a poultice for treating swellings and contusions[4]. The leaves are harvested in the summer and can be dried for later use[7]. The root is diaphoretic, mildly diuretic and a drastic purgative[4, 7, 9]. Dried, then powdered and made into a tea, it is considered to be one of the best remedies for dropsy[4, 240]. It should only be used with expert supervision because it can cause nausea and vertigo[9]. A homeopathic remedy is made from the fresh berries or the bark[9]. It is used in the treatment of dropsy[9].

nrakta Europe, including Britain, from the Netherlands south and east to the Mediterranean and Himalayas. ksacta Waste ground, woods, hedgerows and scrub. especially on calcareous soils[7, 13].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Division of suckers in spring or autumn. Very easy.

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A very invasive plant, sending up new shoots a metre or more away[K]. It can be used for naturalising in the rougher parts of the garden[233], growing well on rough banks etc[1]. The whole plant, when bruised, emits a most unpleasant fur-like smell[245]. The bark, in particular, smells like stale perspiration[245].

## 4.2.170 Narcissus jonquilla

Jonquil

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

hmmihtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta Narcissus jonquilla is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no records for this species, many if not all members of this genus are poisonous[K].

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw or candied and made into desserts[183].

tcanta EssentialAn essential oil obtained from the flowers is used in perfumery[61, 100, 171]. 1 kg of flowers yields 1g absolute of essential oil[46].

nrakta Europe - Mediterranean. ksacta Rocky hillsides, often on limestone[90], also in meadows and damp places[50].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them

for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils[1]. Grows well in heavy clay soils. Easily grown in a dry sunny position[90]. Prefers an alkaline soil with a pH between 7 and 8[200]. A very ornamental plant[1], it is widely cultivated around the Mediterranean for its essential oil[50]. The blooms, which are almost intoxicatingly scented, have an undertone of orange in their perfume[245]. The double form, 'flora Pleno' is even more powerfully scented[245].

## 4.2.171 Hosta clausa

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.2 m hkuc  
hmmihmtut cyutli tcup hwicli hrasjlutnyikfril hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta Hosta clausa is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Edible Uses: Young leaves - cooked[105, 177].

tcanta The plant has a stoloniferous habit and makes an excellent dense ground cover[251].

nrakta E. Asia - Korea. ksacta Along the banks of rivers where it is subject to periodic inundation[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A spreading plant with stoloniferous roots, forming medium size clumps[200, 233]. A triploid species that is not often found in the wild, it does not flower very freely and indeed there are forms that do not flower at all[251]. The cultivar 'Normalis' flowers more freely and is very showy, but is less stoloniferous and therefore less suitable for ground cover[251]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus[200].

## 4.2.172 Paeonia officinalis

Peony, Common peony

4 tlin 10 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc  
hmmihmtut cyutli tcup hwicli hrasjlutnyikfril hpa7tli flatprikli-  
wis hpa7tmwatli fyifxre7t hjonli

drutta Paeonia officinalis is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The entire plant is poisonous if taken in large doses[7, 21].

kcakta Edible Parts: Flowers Edible Uses: Condiment-Flowers - cooked. They can be used as a vegetable[177] or to scent tea[183]. The hot seeds are ground into a powder and used as a spice in ale or in the food that accompanies it[183]. (Does this mean that the seed is heated before grinding, or that it has a hot flavour?[K])

dwatta Anticonvulsant Antirheumatic Antispasmodic Diuretic Epilepsy Sedative Tonic Peony root has been used medicinally for over 2,000 years and it gained a reputation as a treatment for epilepsy and to promote menstruation. This species was very popular up to the 16th century, but is little used in contemporary European herbalism, though it is sometimes employed where an antispasmodic and sedative are required[238, 254]. The root is antispasmodic, diuretic, sedative and tonic[4, 7, 21]. The root is harvested in the autumn from plants that are at least two years old and is dried for later use[4]. It has been successfully employed in the treatment of convulsions and spasmodic nervous affections such as epilepsy[4, 7]. It has also been used in the treatment of whooping cough whilst suppositories are sometimes made of the root to relieve anal and intestinal spasms[254]. This remedy should be used with caution and not at all by pregnant women. Large doses can be toxic[7, 21, 254]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta Europe - France to Albania. ksacta Rocky woodlands and meadows[1, 7], usually on limestone[187].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Landscape Uses: Border, Foundation, Seashore, Specimen. Requires a deep rich soil, preferably neutral or slightly alkaline[1, 233], doing quite well in sun or light shade[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[200]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Plants can be naturalised in grass so long as the soil is good[233]. Hardy to about -25°C[187]. A very variable plant, there are at least 4 sub-species[250]. There are a number of named forms, selected for their ornamental value[187]. A long-lived plant, living for 50 years or more in gardens[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. This species can spread fairly freely by means of its tuberous rootstock[233]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-

fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Special Features: Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Fragrant flowers.

#### 4.2.173 *Paeonia lactiflora*

Chinese Peony, Peony

4 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 0.8 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasljutnyikfrip hpa7tli flat-  
priklwis hpa7tmwatli fyifxre7t hjonli

drutta *Paeonia lactiflora* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) and no shade. It prefers dry or moist soil.

kcakta Edible Parts: Root Seed Stem Edible Uses: Root - cooked and eaten in a broth[2, 4, 46, 183]. Stems - cooked[177]. Seed - powdered and mixed with tea[4, 183].

dwatta Alternative Analgesic Anodyne Antibacterial Anti-inflammatory Antiseptic Antispasmodic Astringent Carmi-native Diuretic Emmenagogue Expectorant Febrifuge Hypotensive Nervine Tonic Women's complaints The root of Chinese peony has been used for over 1,500 years in Chinese medicine. It is known most widely as one of the herbs used to make 'Four Things Soup', a woman's tonic, and it is also a remedy for gynaecological problems and for cramp, pain and giddiness[254]. When the whole root is harvested it is called Chi Shao Yao, if the bark is removed during preparation then it is called Bai Shao Yao[250]. The root is alterative, analgesic, anodyne, antibacterial, anti-inflammatory, antiseptic, antispasmodic, astringent, carminative, diuretic, emmenagogue, expectorant, febrifuge, hypotensive, nervine and tonic[176, 218, 238, 279]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. It is taken internally in the treatment of menstrual disorders, injuries, high blood pressure, pre-menstrual tension and liver disorders[238]. It should only be used under the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The roots are harvested in the autumn from cultivated plants that are 4 - 5 years old and are boiled before being sun-dried for later use[238, 250]. The roots of wild plants are harvested in the spring or (preferably) in the autumn and are sun-dried for later use[238]. The root is an ingredient of 'Four Things Soup', the most widely used woman's tonic in China[254]. The other species used are *Rehmannia glutinosa*, *Ligusticum wallichii* and *Angelica sinensis*[254]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - Siberia to Mongolia. ksacta Dry open stony slopes, riverbanks and sparse woodland edges[74]. Woods and grasslands at elevations of 400 - 2300 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division

with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Landscape Uses: Border, Foundation, Massing, Seashore, Specimen. An easily grown and undemanding plant[250], it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Prefers a rich heavy soil that is well-drained but remains moist in the summer[187]. The species is hardy to about -25°C, but there are many named varieties some of which are hardy to about -50°C[187]. Cultivated as a medicinal plant in China[178]. A very ornamental[1] and long-lived plant, surviving in gardens for 50 years or more[200]. Many hundreds of named varieties have been developed for their ornamental value[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover if it is transplanted[1]. Plants should be planted with their crowns no more than 3cm below soil level. If planted deeper they do not flower so well[187]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

#### 4.2.174 *Hosta sieboldii*

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasljutnyikfrip hpa7tli flat-  
priklwis hpa7tmwatli xre7t hjonli

drutta *Hosta sieboldii* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves Stem Edible Uses: Young leaves and leaf stems - cooked[105, 177]. Not very tasty[116].

tcanta Suitable for ground cover, the plants should be spaced about 35cm apart each way[208].

nrakta E. Asia - Japan. ksacta Lowland moors and meadows, usually fully exposed to the sun[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. This species tolerates dryish conditions[121]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In



general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. The leaves turn yellowish when the plant is grown in full sun[121]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Forming medium-sized clumps, the rhizome is short and creeping[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. There are some named forms, selected for their ornamental value[187]. Hybridizes freely with other members of this genus[200].

## 4.2.175 *Solidago virgaurea*

Goldenrod

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.6 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfripr hpa7tli flatprikwis hpa7tmwatli fyifxre7t hjonli

drutta *Solidago virgaurea* is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Mild allergic reactions. Avoid during pregnancy and breast feeding. Care if chronic kidney disease. Irrigation therapy is contraindicated in oedema cases [301].

kcakta Edible Parts: Edible Uses: TeaA tea is obtained from the leaves[46, 61, 183].

tcanta DyeMustard, orange and brown dyes can be obtained from the whole plant[168]. A yellow dye is obtained from the leaves and flowers[4, 100].

dwatta Anthelmintic Anticoagulant Antifungal Anti-inflammatory Antirheumatic Antiseptic Aromatic Astringent Carminative Diaphoretic Diuretic Febrifuge Hypoglycaemic Stimulant TB UrinaryGoldenrod is a safe and gentle remedy for a number of disorders. In particular, it is a valuable astringent remedy treating wounds and bleeding, whilst it is particularly useful in the treatment of urinary tract disorders, being used both for serious ailments such as nephritis and for more common problems such as cystitis[254]. The plant contains saponins that are antifungal and act specifically against the *Candida* fungus which is the cause of vaginal and oral thrush[238, 254]. It also contains rutin which is used to treat capillary fragility, and phenolic glycosides which are anti-inflammatory[238]. The leaves and flowering tops are anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, carminative, diaphoretic, mildly diuretic, febrifuge and stimulant[4, 7, 9, 21, 147, 165]. A good vulnerary herb, it has also proved of value when used internally in the treatment of urinary infections, chronic catarrh, skin diseases, influenza, whooping cough, bladder and kidney stones etc[4, 238]. Due to its mild action, goldenrod is used to treat gastro-enteritis in children[254]. It makes an excellent mouthwash in the treatment of thrush[7]. The plant is gathered in the summer and dried for later use[7]. The seed is anticoagulant, astringent and carminative[218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney and bladder disorders, rheumatism and arthritis[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Solidago virgaurea* for infection of the urinary tract, kidney and bladder stones (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, temperate Asia and N. America. ksacta Dry woods, grassland, rocks, cliffs, hedgebanks, dunes etc on acid or calcareous soils[17].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large

enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta An easily grown plant, it succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The bruised plant smells like wild carrots[4]. The sub-species *S. virgaurea minima* is only 10cm tall and wide[188]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

## 4.2.176 *Paeonia anomala*

Anomalous peony, Common Peony

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatprikwis hpa7tmwatli fyifxre7t hjonli

drutta *Paeonia anomala* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - dried and cooked with protein foods[74, 250]. Young shoots - cooked[177].

dwatta Antispasmodic Antitussive Astringent Febrifuge Hypotensive StomachicThe root is astringent and stomachic[61]. The Chinese herb Chi Shao Yao is made from the whole root of a number of peony species, especially *P. lactiflora*, but also occasionally this species[250]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta Europe to C. Asia. ksacta Coniferous woods, rocky hillsides amongst shrubs and in dry steppe grassland[187]. Forest margins and clearings[74].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta An easily grown plant, it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing

on clay take longer to become established but produce better blooms[250]. Very cold resistant[74], tolerating temperatures down to at least -25°C[187]. A very ornamental[74] and long-lived plant, specimens can survive in the garden for at least 50 years[200]. This species is closely related to *P. veitchii*, differing mainly in only having one flower to a stem[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

## 4.2.177 *Lysimachia nummularia*

Creeping Jenny, Moneywort, Creeping Charlie  
4 tlin 8 cyuc 1 kcaok 0 tcan 2 dwat 0.2 m hkuc  
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip  
hpa7tli flatprikwls hpa7tmwatli fyifxre7t hjonli

drutta *Lysimachia nummularia* is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Edible Uses: Tea A tea is made from the leaves and flowers[46, 61, 177, 183].

tcanta Can be used as a ground cover plant in moist soils but requires weeding for the first year or so. Plants should be spaced about 60cm apart each way and form a carpet, rooting as they spread[208].

dwatta Antidiarrhoeal Antiscorbutic Astringent Diuretic Vulnerary The whole herb, used fresh or dried, is antiscorbutic, mildly astringent, diuretic and vulnerary[4, 9, 46]. For drying, the herb is harvested in June[4]. Creeping Jenny is a very good wound-herb, the fresh leaves being bruised and applied externally to the affected area[4]. An infusion is used to treat internal bleeding and diarrhoea[9].

nrakta Europe, including Britain, from Sweden south and east to Spain, N. Greece and the Caucasus. ksacta Damp situations in pastures and by the sides of streams, avoiding acid soils[4, 9].

propta Seed - sow spring or autumn in a cold frame[200]. This species rarely produces seed in Britain[17]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses: Container, Ground cover, Rock garden, Woodland garden. An easily grown plant, succeeding in a moist loamy soil[1]. Grows well in heavy clay soils. Grows well in marshy soil and in shallow water in pond margins[24, 56]. Prefers a shady position[111] but also succeeds in full sun[188]. Plants are hardy to at least -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very ornamental plant[1]. Special Features: Attractive foliage, Invasive, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms.

## 4.2.178 *Hosta plantaginea*

August Lily  
4 tlin 8 cyuc 1 kcaok 0 tcan 1 dwat 0.6 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prikwls hpa7tmwatli xre7t hjonli

drutta *Hosta plantaginea* is a PERENNIAL growing to 0.6 m (2ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower

from May to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista One report suggests the plant may be poisonous[178].

kcakta Edible Parts: Leaves Stem Edible Uses: Young leaves and leaf stems - cooked[105, 177]. One report suggests the plant may be poisonous[178].

tcanta Essential An essential oil is obtained from the leaves, used in perfumery[178]. A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 60cm apart each way[208].

dwatta Cancer The flowers are said to have anticancer activity[218].

nrakta E. Asia - China, Japan. ksacta Forests, grassy slopes and rocky places from near sea level to 2200 metres[266].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. This species tolerates quite a lot of sun[187]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. The plant forms open clumps[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A very ornamental plant[1], there are some named varieties[187]. The flowers open in the evening[188] and have a delicious lily-like fragrance[233]. The plant only flowers well when grown in a warm position[233], and is not really satisfactory when grown in most areas north of London[251]. Hybridizes freely with other members of this genus[200].

## 4.2.179 *Iris sibirica*

Siberian Iris  
4 tlin 9 cyuc 1 kcaok 0 tcan 1 dwat 0.6 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flat-  
prikwls hpa7tmwatli fyifxre7t hjonli

drutta *Iris sibirica* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay

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

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: Root - an edible starch is said to be extracted from it[2, 105, 177]. The root is not eaten in China[178]. Some caution is advised since there are reports that the plant might be poisonous. Perhaps the extracted starch is edible.

tcanta InsecticideAn insecticide is obtained from the plant[178]. (from the root?)

dwatta ExpectorantExpectorant[178].

nrakta C. Europe to Russia. ksacta Damp woodland[50], pastures and heaths[100].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in August/September after flowering but can also be done in April. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Prefers a humus-rich soil[79], succeeding in a moist border or by water[42, 79]. Grows well in heavy clay soils. The plants are very cold tolerant, but they can be damaged when dormant if the soil is too moist[79]. A very ornamental plant, there are many named varieties[187]. Plant the roots out very shallowly[79]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Suitable for cut flowers.

#### 4.2.180 *Hosta rectifolia*

4 tlin 8 cyuc 1 kcak 0 tcant 0 dwat 0.6 m hkuc  
pcimhmimhtut cyutli tcuphwi hrasljutnyikfriphpa7tli flat-  
prikwlis hpa7tmwatli xre7t hjonli

drutta *Hosta rectifolia* is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105]. Not very tasty[116].

tcanta A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 45cm apart each way[208].

nrakta E. Asia - N. Japan. ksacta Damp lakeside moorlands[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208].

Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A robust plant, forming medium-size to large clumps, the rhizome is slightly stoloniferous[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus[200].

#### 4.2.181 *Leucojum aestivum*

Summer Snowflake

4 tlin 9 cyuc 1 kcak 0 tcant 0 dwat 0.5 m hkuc  
hmimhtut cyutli tcuphja7n hwieli hrasljutnyikfriphpa7tli  
prikwlis hpa7tmwatli xre7t hjonli

drutta *Leucojum aestivum* is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[105]. I have some reservations about this report, though no records of the plant being poisonous have been found so far.

nrakta Europe, including Britain, from France south and east to Spain, Greece, the Crimea and Iran. ksacta Marshes, wet meadows and willow thickets, avoiding acid soils[17].

propta The seed is best sown as soon as it is ripe in a well-drained soil in a cold frame. Stored seed requires 2 - 3 months cold stratification, it should then germinate in 2 - 4 weeks at 10°C[134]. Sow the seed thinly so that the seedlings can be allowed to grow on undisturbed in the pots for their first year of growth. Give them an occasional weak liquid feed to ensure that they do not become nutrient deficient. Pot up the small bulbs when dormant, planting 2 - 3 bulbs in each pot. Grow them on for another 2 - 3 years before planting them out. Division of offsets in September/October. It is best done as soon as the foliage ripens[1]. Scooping the bulbs.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Specimen, Woodland garden. Easily grown in ordinary garden soil[1]. It does well in a moist heavy soil in full sun or partial shade[1, 17, 31, 90] and is happy in water-logged conditions[90]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°C[214]. Plants can be naturalized in damp rough grass[200]. Flowers are produced within 4 - 5 years from seed. The seedpods are swollen and filled with air so that they can be dispersed by floating in water[90]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers.

#### 4.2.182 *Anthemis cotula*

Mayweed, Stinking chamomile

4 tlin 8 cyuc 1 kcak 1 tcant 2 dwat 0.6 m hkuc  
htut cyutli kyuctuc hwieli jlyutnyikfriphpa7tli flatprikwlis  
hpa7tmwatli fyifxre7t hjonli

drutta *Anthemis cotula* is an ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles.

The plant is self-fertile. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

**pcista** The whole plant is penetrated by an acrid juice, touching or ingesting the plant can cause allergies in some people[4, 222].

**kcakta** Edible Parts: Leaves Edible Uses: Tea The herb is used as a flavouring in Peru[183]. It is aromatic. Caution is advised, there are some reports of toxicity. A herb tea is made from the flowers in a similar way to camomile tea[183] and it has a similar though weaker effect medicinally[4]. The odour is not very pleasant and so it is not commonly used[4].

**tcanta** Dye Repellent The growing and the dried plant is said to repel mice and fleas[4, 20], it can also be used as an insecticide[21, 61, 100]. A gold dye is obtained from the whole plant[168, 169].

**dwatta** Antispasmodic Astringent Diaphoretic Diuretic Emetic Emmenagogue Epilepsy Stings Tonic Mayweed is closely related to camomile, but is far less effective as a medicine[254]. It has been used as an antispasmodic and to induce menstruation and was traditionally used to treat supposedly hysterical conditions related to the uterus[254]. It is rarely used in contemporary herbal medicine[254]. The whole plant is antispasmodic, astringent, diaphoretic, diuretic, emetic, emmenagogue and tonic[4, 61]. It is used internally as a tea, which can be made either from the flowers or the whole plant, though the flowers are less unpleasant and so are more commonly used[4]. An infusion is used in the treatment of a variety of complaints such as rheumatism, epilepsy, asthma, colds and fevers[257]. Applied externally, it is used as a poultice on piles or to draw splinters out of the body, and can also be applied to the bath water[4, 257]. The leaves are rubbed onto insect stings[222]. Some people are allergic to the plant and this remedy could give them painful blisters[240]. This herb is contraindicated for pregnant women or nursing mothers[254].

**nrakta** Most of Europe, including Britain, east to N. and W. Asia. **ksacta** Waste places usually on heavy soil[4, 17].

**propta** Seed - best sown outdoors as soon as it is ripe. Most of the seed germinates in the autumn.

**nwatta** Prefers a sunny position and a well-drained soil that is neutral to slightly acid[1, 200]. Succeeds in heavy clay soils. Bees dislike this plant[4]. The leaves contain glands which release a most disagreeable odour when the plant is handled and can cause allergic reactions in people.

## 4.2.183 *Betula schmidtii*

Schmidt's Birch

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 30 m hkc  
hmimhtut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprikliw  
hpa7tmwatli nyanhjen hjonli

**drutta** *Betula schmidtii* is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

**tcanta** Wood Wood - hard, heavy (it does not float). Used for rollers, mallets etc[151].

**dwatta** Antiseborrheic Urinary The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

**nrakta** E. Asia - Japan, Korea, Manchuria. **ksacta** Temperate broad-leaved forests at elevations of 700 - 800 metres[266].

**propta** Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134].

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

**nwatta** Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Hybridizes freely with other members of this genus[50]. Trees are succeeding very well at Kew[11]. Trees are notably susceptible to honey fungus[200].

## 4.2.184 *Populus 'Balsam Spire'*

Tacatricho 32

4 tlin 8 cyuc 0 kcak 2 tcan 3 dwat 30 m hkc  
htut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprikliw  
hpa7tmwatli nyanhjen hjonli

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

**tcanta** Pot-pourri Rooting hormone Shelterbelt Wood An extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The dried buds are used in pot-pourri[238]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Of low quality, it is mainly used as a source of pulp[11, 46].

**dwatta** Anodyne Anti-inflammatory Antiscorbutic Antiseptic Balsamic Diuretic Expectorant Febrifuge Stimulant Tonic The leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They also contain salicin. The buds are antiscorbutic, antiseptic, balsamic, diuretic, expectorant, stimulant and tonic[4, 21, 57, 165, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

**nrakta** A hybrid, P. balsamifera x P. trichocarpa. **ksacta** Not known in the wild.

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

hybrid and will not come true from seed. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy, the cuttings grow away strongly and can be 2 metres tall by the end of their first year[K]. Suckers in early spring[78].

nwatta An easily grown plant, it grows well in a heavy cold damp soil[1]. It prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. Reasonably wind tolerant, though it does not do well in exposed upland sites or in maritime exposure[11, K]. It dislikes shady positions, and is intolerant of root or branch competition[200]. A very fast growing hybrid, this plant is a female clone that is sometimes planted for forestry[11]. It comes into leaf early in the year[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required.

#### 4.2.185 *Populus x canescens*

Grey Poplar

4 tlin 9 cyuc 0 kcaak 2 tcan 1 dwat 30 m hkuc  
htut cyutli tcup hwicli hrasljutnykfrip hpa7tli flatprikwlis  
hpa7tmwatli nyanhjen hjonli

drutta *Populus x canescens* is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from February to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

tcanta Shelterbelt WoodA fast growing tree, tolerant of salt winds, it can be grown in a shelterbelt[200]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11].

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

nrakta Europe, from Britain and France east to S. Russia, south to Italy and Macedonia. ksacta Probably native in damp woods in S. C. and E. England[17].

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

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. Plants are reasonably wind tolerant, though they do not grow well in exposed upland sites[11].

They also tolerate salt-laden winds but not saline soils[200]. They dislike shade and are intolerant of root or branch competition[200]. This species is a spontaneous natural hybrid, *P. alba* x *P. tremula*[200]. There are several named forms selected for their ornamental value[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 4.2.186 *Chamaecyparis nootkatensis*

Nootka Cypress, Nootka Cypress, Yellow Cypress, Alaska Cedar

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 15 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasljutnykfrip hpa7tli flat-  
prikwlisslip hpa7tmwatli hjonli

drutta *Chamaecyparis nootkatensis* is an evergreen Tree growing to 15 m (49ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from March to April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Fibre Hedge Miscellany Tinder Wood-Plants can be grown as a tall hedge[200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. The fibre of the inner bark is fine and soft, it is pounded and spun then used for making blankets, clothing, capes, mats etc[99, 226, 257]. Torn into pieces, it can be used as bandages or for washing babies[226]. The finely shredded inner bark can be used as a tinder[257]. Wood - hard, very durable, fragrant with an agreeable resinous odour, close grained, has low shrinkage, is somewhat brittle, but does not splinter. Easily worked, it is used for carving, cabinet work, making boats, implements etc[1, 46, 61, 82, 99, 171, 226].

dwatta Antirheumatic Miscellany Poultice SkinThe plant has been used in sweat baths for treating rheumatism and arthritis[257]. An infusion of the branch tips has been used as a wash for sores and swellings[257]. A poultice of the crushed leaves has been applied to sores[257]. The soft bark has been used as a cover for poultices[257].

nrakta Western N. America - Alaska to Oregon. ksacta Woodlands from sea-level to 1,000 metres[60, 82]. The best specimens are found in the deep soil of cool wet coastal forests[226].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Screen. Succeeds in most soils and situations, but prefers a moist deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Does not grow well on peat or shallow chalky soils[11]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. Plants are hardy to about -35c,

also tolerate low summer temperatures[200]. A very polymorphic species, there are many named varieties[200]. This species establishes well and grows fairly quickly when young[11]. Trees can reach 20 metres tall in 35 years but growth slows as the trees get older[185]. It is cultivated as a timber tree in Europe[50]. Trees in the wild can live for 1,000 years or longer[226], one specimen is believed to be 3,500 years old[229]. This longevity is probably due to the presence of toxic chemical compounds from microscopic fungi concentrated in the heartwood[226]. The wood and foliage have an acrid odour[226]. The bruised foliage releases a smell of turpentine[245]. Favoured by many birds for roosting, high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms.

## 4.2.187 Chamaecyparis thyoides

White Cypress, Atlantic white cedar, Coast White Cedar, Southern White Cedar, White Cypress

4 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 10 m hkuc  
hmimhtut cyutli kyuctcpupha7n hwicli hrasjlatnyikfrip  
hpa7tli frusfatprikwslip hpa7tmwlati hjonli

drutta Chamaecyparis thyoides is an evergreen Tree growing to 10 m (32ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Hedge Hedge WoodPlants can be grown as a tall hedge[200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. Wood - soft, not strong, close grained, very durable, easily worked, light, slightly fragrant. It weighs 21lb per cubic foot. It is commonly used for woodenware, cooperage, fence posts, interior finish of houses etc[43, 46, 61, 82, 171, 235]. Wood found buried in swamps for hundreds of years is perfectly sound and not water-logged[11].

dwatta A decoction of the leaves has been used as a herbal steam for treating headaches and backaches[257]. A poultice made from the crushed leaves and bark has been applied to the head to treat headaches[257].

nrakta Eastern N. America - Maine, south to Florida and west to Mississippi. ksacta Cold, swampy often inundated ground, frequently forming dense pure forests[11, 43, 81, 82]. The best specimens are found in acid peat beds[229].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Succeeds in most soils and situations, but prefers abundant moisture and a deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. This species is especially well adapted for planting in cold wet places[1]. Plants are hardy to about -35°C[200]. A long-lived tree in the wild with specimens more

than 1,000 years old[229]. It is slow growing in cultivation[200], trees rarely grow more than 20cm in a year[185]. The branches become brittle with age[1]. A very polymorphic species, there are many named varieties[200]. The crushed foliage has a rather gingery hot aroma[185]. Favoured by many birds for roosting, high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features:Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms.

## 4.2.188 Philadelphus lewisii

Mock Orange, Lewis' mock orange

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 3.6 m hkuc  
hmimhtut cyutli tcup hwicli hyishrasjlatnyikfrip hpa7tli flat-  
prikwslip hpa7tmwlati xre7t hjonli

drutta Philadelphus lewisii is a deciduous Shrub growing to 3.6 m (11ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Soap WoodThe leaves and flowers are rich in saponins, when crushed and mixed with water they produce a lather that is an effective cleaner, used on the body, clothes etc[99, 169, 257]. You can wash your hands by merely picking a couple of leaves or a bunch of blossom, wetting your hands and then rubbing the plant material vigorously as if it was a bar of soap[K]. This soap is a very gentle cleaner that does not remove the body's natural oils, but does remove dirt. It is not very effective against oil[K]. An infusion of the bark can also be used[99, 169]. The stems can be used in making fine coiled baskets[257]. Wood - strong, very hard. Used for tool handles[99].

dwatta Antihæmorrhoidal Antirheumatic Eczema Poultice SkinThe dried powdered leaves, or the powdered wood, has been mixed with pitch or oil and used as a rub on sores and swollen joints[257]. A poultice of the bruised leaves has been used to treat infected breasts[257]. A strained decoction of the branches, sometimes with the flowers, has been used as a soaking solution in the treatment of sore chests, eczema and bleeding hæmorrhoids[257].

nrakta Western N. America - British Columbia to Oregon. ksacta Gullies, water courses, rocky cliffs, talus slopes and rocky hillsides of sagebrush deserts[60].

propta Seed - best if given 1 months cold stratification[113]. Sow February in a light position in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long side-shoots, July/August in a shaded frame. Plant out in spring. High percentage[78]. Cuttings of mature wood of the current year's growth, 15 - 25cm with a heel, December in a sheltered bed outdoors. Fair to good percentage[78]. Layering in summer. Very easy.

nwatta An easily grown plant, succeeding in any moderately fertile soil, and also in thin soils over chalk[200]. Tolerates poor soils[200]. Grows well in heavy clay soils. Succeeds in semi-shade but prefers a position in full sun where it will flower more freely[182, 200]. Plants are hardy to about -15°C. Some named forms have been developed for their ornamental value[182]. Plants are very tolerant of pruning, one third of the stems can be cut down to the ground each year in order to promote fresh growth and heavier flowering[202]. A very ornamental plant with aromatic flowers[182, 200]. This plant is the State flower of Idaho[212].

## 4.2.189 Cornus rugosa

Round-Leaved Dogwood

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasjlatnyikfrip hpa7tli flat-  
prikwslip hpa7tmwlati xre7t hjonli

drutta Cornus rugosa is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Cathartic Febrifuge Kidney TB TonicThe bark is cathartic, febrifuge and tonic[61, 257]. A decoction of the roots has been used in the treatment of kidney complaints and TB[257].

nrakta Eastern N. America - Quebec to Manitoba and south to Virginia and Illinois. ksacta Dry woods and rocky slopes[43].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in poorly drained soils[200]. Succeeds in full sun or light shade[[188]. A very ornamental[1] and free-flowering plant[182]. Plants in this genus are notably resistant to honey fungus[200].

## 4.2.190 Ligustrum vulgare

Privet, European privet, Common Privet

4 tlin 7 cyuc 0 kcak 3 tcan 1 dwat 3 m hkuc hmimhtut cyutli hgatkyucup hwicli hrasjlutnykfrip hpa7tli flatprkiwslip hpa7mwatli xre7t hjonli

drutta Ligustrum vulgare is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous[10], though the toxicity is of a very low order and normally the consumption of the fruit leads to vomiting or no symptoms at all[65].

tcanta Basketry Charcoal Dye Ink WoodA yellow dye is obtained from the leaves[6], from the bark, according to other reports[46, 61]. A bluish-green dye is obtained from the berries[6, 46, 61]; it is more permanent than most greens[115]. A black dye can also be obtained from the fruit[61] and an ink[46, 61]. Wood - hard, close-grained. It is valuable for turning if it reaches sufficient size[115] and can also make small tools[46, 61]. The wood is a source of charcoal[46, 61]. The young twigs are used in basketry and hurdle making[46, 61, 100]. Landscape Uses Border, Hedge, Screen, Superior hedge. Naturalizing, Attractive flowers or blooms.

dwatta Astringent Bitter Detergent VulneraryThe leaves are astringent, bitter, detergent, vulnerary[7, 21]. Internal use of this plant should be avoided since it can produce allergic symptoms[7]. Externally it is a safe and effective treatment[7]. The bark has been used as a stomachic[7], though this is not really recommended.

nrakta Central and southern Europe, including Britain, to N. Africa. ksacta Open woodland, hedges and scrub, often by the sea and usually on calcareous soils[10, 17, 50].

propta Sow the seed in spring in a cold frame. Stored seed germinates better if it is stratified,[113]. Remove any fruit flesh from around the seed before it is sown since this can inhibit germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown in outdoor seed beds in the autumn. You can leave the plants to grow on in the seedbed for up to 4 years before planting them out into their permanent positions in the winter. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December[78]. The cuttings can also be placed in situ if required. High percentage[78].

nwatta A very tolerant and easily grown plant, it succeeds in any soil that is not very impoverished[11]. Grows well in heavy clay soils. Prefers a calcareous soil and succeeds in thin dry soils[186]. Grows well in light woodland or the full shade of a wall but flowers and fruits best in a sunny position[186]. Tolerant of atmospheric pollution, once established they also tolerate drought but are intolerant of waterlogging[186]. A suckering shrub, forming dense thickets and making good bird cover[186]. An important food plant for many caterpillars, including the larvae of the privet hawkmoth[186]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

## 4.2.191 Cotoneaster simonsii

Simons' cotoneaster

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

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnykfrip hpa7tli flatprkiwslip hpa7mwatli xre7t hjonli

drutta Cotoneaster simonsii is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. Can be grown as a medium to tall informal hedge[1, 11, 29, 200]. When close trimmed it makes an excellent dense hedge[182].

nrakta E. Asia - Himalayas, in Assam. Naturalized in many places in Britain[17]. ksacta Scrub, hedgerows and rocky places on calcareous soils[200].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -20°C[184]. A fairly fast-growing species[202]. Hybridizes

flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista This plant is an important cause of hayfever[274].

tcanta Fodder Miscellany Soil stabilization Environmental: Erosion control or dune stabilization, Land reclamation, Revegetation, Soil conservation. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200]. Having a deep root system the plant is also useful for checking soil erosion[269]. The plant can be grown for biomass, annual productivity ranges from 2 to 37 tonnes per hectare[269]. If soil fertility is low, a large portion of the total production occurs in the spring, but if the soil is highly fertile, production is well distributed throughout the growing season[269]. Animal feed, fodder, forage.

dwatta Miscellany Reported to be oestrogenic. the plant is a folk remedy for treating tumours, kidney and bladder ailments

nrakta Europe, including Britain, from Norway south and east to N. Africa and temperate Asia. ksacta Meadows, waste places, by roads and on downs[17].

propta Seed - surface sow in a cold frame in the spring and do not allow the compost to dry out[162]. Germination should take place within three weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. There is between 725,000 and 1,450,000 seeds per kilo[269]. If you have sufficient seed it can be sown outdoors in situ in the spring. Division in spring[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most good soils and also under the shade of trees[1, 115, 162]. Prefers a light well-drained soil, it does not thrive on heavy or poorly drained soils[200]. Plants tolerate an annual precipitation in the range of 31 to 176cm, an annual temperature range of 4.3 to 23.8°C and a pH in the range of 4.5 to 8.2[269]. The plant is adapted to humid temperate climates. It grows on almost any type of soil, but thrives best on heavier types, such as clays and clay loams. A drought-resistant plant, it will withstand high temperatures. Prefers areas with 480-750 mm annual rainfall, but will produce on rather poor dry soils[269]. Plants are hardy in all parts of Britain, though they are less winter-hardy than *Pheum pratense* or *Bromus inermis* and do not extend as far north in Europe[269]. A very variable plant[1]. There are both diploid and triploid forms[274]. Numerous strains have been developed, some coarse and stemmy, others good for hay and early grazing. Local ecotypes in the Mediterranean region are adapted to long hot dry summers. In Europe two types have been developed, one for pasture and one for hay. Pasture types produce more basal leaves and generally are more spreading than the hay types. Selections made in Canada, Sweden and Finland are improved for winter hardiness. Improved strains are more leafy, persistent and later flowering than unimproved commercial types[269]. An important food plant for the caterpillars of several lepidoptera species[30]. The plant is occasionally grown for lawns and is particularly well adapted for growing under shade[269]. However, this species does not make a good lawn grass because it is too coarse[1].

## 4.2.194 *Aconitum hemsleyanum*

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta *Aconitum hemsleyanum* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and

## 4.2.192 *Cotoneaster divaricatus*

Spreading Cotoneaster

4 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 2 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnykfrrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Cotoneaster divaricatus* is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. Plants are often used in informal hedging[200].

nrakta E. Asia - China. Naturalized in southern England. ksacta Rocky slopes, gullies, forests, shrubwoods and thickets at elevations of 1600 - 3400 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy species, tolerating temperatures down to at least -15°C[202]. Fairly fast-growing[202]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 4.2.193 *Dactylis glomerata*

Cock's Foot, Orchardgrass, Ascherson's orchardgrass

4 tlin 8 cyuc 0 kcaak 2 tcan 1 dwat 1 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnykfrrip hpa7tli frusflatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Dactylis glomerata* is an evergreen Perennial growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in



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

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta A widely used herbal remedy in China, where it is cultivated for its root[4]. This is harvested in the autumn as the plant dies down and is then dried before being used. The root is anaesthetic, analgesic, anti-inflammatory, anti-rheumatic, cardiotoxic, stimulant and vasodilator[4]. Use with caution, the plant is very poisonous and should not be used internally[218].

nrakta E. Asia - C. and W. China. ksacta Forests, forest margins, scrub, mountains and grassy slopes at elevations of 1700 - 3500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. fischeri* and considered to be part of that species by some botanists[1].

## 4.2.195 *Aconitum japonicum*

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli hjonli

drutta *Aconitum japonicum* is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 174].

dwatta Analgesic Antirheumatic This is a widely used herbal remedy in China, where it is cultivated for its root[218]. The root is analgesic, antirheumatic, cardiotoxic and stimulant[174, 218]. Used in the treatment of neuralgia[174]. Use with caution, and only under the supervision of a qualified practitioner. The plant is very poisonous and should not be used internally[218].

nrakta E. Asia - China, Japan. ksacta Forests, forest margins, by streams at elevations of 500 - 1500 metres in Liaoning province[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. A very ornamental plant[233], it grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. chinensis*[1].

## 4.2.196 *Dipsacus fullonum*

Teasel, Fuller's teasel

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.8 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis  
hpa7tmwatli fyifxre7t hjonli

drutta *Dipsacus fullonum* is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Dye A blue dye obtained from the dried plant is an indigo substitute[74]. It is water soluble[74]. A yellow is obtained when the plant is mixed with alum[148]. Teasels are also occasionally grown as ornamental plants, and the dried heads are used in floristry. The seeds are an important winter food resource for some birds, notably the European goldfinch. Teasels are often grown in gardens and encouraged on some nature reserves to attract them. A rich source of pollen and nectar for bees and other insects. Formerly widely used in textile processing, providing a natural comb for cleaning, aligning and raising the nap on fabrics, particularly wool.

dwatta Cancer Diaphoretic Diuretic Homeopathy Skin Stomachic Warts Teasel is little used in modern herbalism, and its therapeutic effects are disputed[254]. Traditionally it has been used to treat conditions such as warts, fistulae (abnormal passages opening through the skin) and cancerous sores[254]. The root is diaphoretic, diuretic and stomachic[7]. An infusion is said to strengthen the stomach, create an appetite, remove obstructions of the liver and treat jaundice[4, 254]. The root is harvested in early autumn and dried for later use[7]. An infusion of the leaves has been used as a wash to treat acne[257]. The plant has a folk history of use in the treatment of cancer, an ointment made from the roots is used to treat warts, wens and whitlows[4, 218]. A homeopathic remedy is made from the flowering plant[7]. It is used in the treatment of skin diseases[7].

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Copses, stream banks, roadsides, rough pasture etc, especially on clay soils[17].

propta Seed - best sown in early spring in situ[115]. The seed can also be sown from February to May or from August to October. All but the earlier sowings can be made outdoors.

nwatta Succeeds in most soils[1] but prefers clay[17]. Prefers a deep rich soil[169]. Requires a sunny position[169]. A good butterfly plant[24]. This is the true wild species of teasel, its bracts are too flexible to be used for combing cloth[17]. The flowering heads are much prized by flower arrangers because they keep their colour almost indefinitely when dried[7].

## 4.2.197 *Dipsacus sativus*

Fuller's Teasel, Indian teasel

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.8 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis  
hpa7tmwatli fyifxre7t hjonli

drutta *Dipsacus sativus* is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Brush Dye The dried flower heads are used for carding wool and as a clothes brush for raising the nap on woollen cloth[7, 46, 74, 169]. They are harvested with about 20cm of stem as soon as the flowers wither and are dried for later use[4]. A blue dye is obtained from the dried plant, an

Indigo substitute[74]. It is water soluble[74]. The colour is yellow when mixed with alum[148].

dwatta Cancer Diaphoretic Diuretic Homeopathy Stomatocytic WartsThe root is diaphoretic, diuretic and stomachic[7]. An infusion is said to strengthen the stomach, create an appetite, remove obstructions of the liver and treat jaundice[4]. The root is harvested in early autumn and dried for later use[7]. The plant has a folk history of use in the treatment of cancer, an ointment made from the roots is used to treat warts, wens and whitlows[4, 218]. A homeopathic remedy is made from the flowering plant[7]. It is used in the treatment of skin diseases[7].

nrakta Of uncertain origin. An occasional escape from cultivation in Britain[17]. ksacta Not known in a truly wild condition.

propta Seed - best sown in early spring in situ[115]. The seed can also be sown from February to May or from August to October. All but the earlier sowings can be made outdoors.

nwatta Succeeds in most soils[1] but prefers clay[17]. Prefers a deep rich soil[169]. Requires a sunny position[169]. A good butterfly plant[24]. Fuller's teasel is occasionally cultivated for its seed head, which is used for carding cloth[1, 2, 46]. The flowering heads are also much prized by flower arrangers because they keep their colour almost indefinitely when dried[7].

## 4.2.198 *Senecio jacobaea*

Ragwort, Stinking willie

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkcuc  
hmimhtut cyutli tcup hwicli hyshrasjlutnyikfrip hpa7tli flat-  
prikhwis hpa7tmwatli fyifxre7t hjonli

drutta *Senecio jacobaea* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous[4, 19]. The plant contains pyrrolizidine alkaloids, in isolation these substances are highly toxic to the liver and have a cumulative affect even when the whole plant is consumed[65, 254].

tcanta DyeA good green dye is obtained from the leaves, though it is not very permanent[4, 115]. A yellow dye is obtained from the flowers when alum is used as a mordant[4, 115, 168]. Brown and orange can also be obtained[168].

dwatta Antirheumatic Astringent Diaphoretic Diuretic Emmenagogue Expectorant HomeopathyThe plant is astringent, diaphoretic, diuretic, emmenagogue and expectorant[9, 21]. The plant is harvested as it comes into flower and is dried for later use[9]. Used with caution[21], when applied internally it can cause severe damage to the liver[9]. See also the notes above on toxicity. An emollient poultice is made from the leaves[4]. The juice of the plant is cooling and astringent, it is used as a wash in burns, sores, cancerous ulcers and eye inflammations[4]. It makes a good gargle for ulcerated mouths and throats and is also said to take away the pain of a bee sting[4]. Caution is advised here since the plant is poisonous and some people develop a rash from merely touching this plant[K]. A decoction of the root is said to be good for treating internal bruises and wounds[4]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of dysmenorrhoea and other female complaints, internal haemorrhages and other internal disorders[9].

nrakta Europe, including Britain, south and east from Scandinavia to N. Africa, Caucasus and W. Asia. ksacta Waste ground and pastures on all but the poorest soils[4, 17]. It is often only an annual[17].

propta A noxious weed, it doesn't need any help in spreading itself about.

nwatta Succeeding on all but the poorest soils, this plant is a declared noxious weed in Britain spreading freely by seed. It should not be cultivated other than in controlled conditions for scientific research. Ragwort can be eradicated by

pulling it up just before it comes into flower, or by cutting it down as the flowers begin to open (this latter may need to be repeated about six weeks later)[4]. Ragwort is a good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars.

## 4.2.199 *Paonia caucasica*

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkcuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli fyifxre7t hjonli

drutta *Paonia caucasica* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Beads Dye OilA red dye is obtained from the flowers[74]. It has been used to dye cloth and paper[250]. A fatty oil is obtained from the seed[74, 250]. No uses of the oil are given[K]. The seeds are used as beads in necklaces etc[74, 250].

dwatta AntitussiveA tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta W. Europe to W. Asia. ksacta Forests, forest margins, short grass meadows and shrub thickets in the forest zone[74].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. This species is not recognized by many botanists, who view it as no more than a synonym of *P. mascula*[250]. A long-lived plant, specimens can survive in the garden for at least 50 years[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

## 4.2.200 *Narcissus poeticus*

Poet's Narcissus

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkcuc

nut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikrlwis hpa7tmwatli xre7t hjonli

drutta Narcissus poeticus is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant, and especially the bulb, are poisonous[4]. The aroma of the flowers can cause some people to get a headache when they are in a closed room[4].

tcanta EssentialAn essential oil is obtained from the flowers. 500kg of the flowers yields 1kg concrete, 300gr absolute of the essential oil[46, 61].

dwatta Emetic Homeopathy IrritantThe bulb is powerfully emetic and irritant[4]. A homeopathic remedy is made from the bulb[4].

nrakta Europe - France to Greece. ksacta Damp meadows[90] in mountains[50].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils and situations[1]. Grows well in heavy clay soils. Easily grown in a moist soil, doing well in grass[90] but it is slow to establish[188]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°C[214]. A very ornamental plant[1], but it is sometimes shy to flower[90]. The flowers are powerfully scented[245].

## 4.2.201 Asplenium scolopendrium

Hart's Tongue Fern

4 tlin 8 cyuc 0 kcak 0 tcant 2 dwat 0.6 m hkuc  
pcimhmim cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikrlwisslip hpa7tmwatli hjonli

drutta Asplenium scolopendrium is an evergreen Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, and the seeds ripen from July to August. Suitable for: light (sandy) and medium (loamy) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta CosmeticA good ground cover plant for shady positions[28, 200], so long as it is planted no more than 30cm apart each way[208]. Plants form a slowly spreading clump[208]. A decoction of the fronds is used cosmetically as a hair wash to counteract greasy skin and also as a face pack for delicate skin[7].

dwatta Astringent Cholagogue Diaphoretic Diuretic Dysentery Expectorant VulneraryThe fronds are astringent, cholagogue, diaphoretic, diuretic, expectorant, vulnerary[4,

7, 9, 165]. Externally it is used as an ointment in the treatment of piles, burns and scalds[4]. An infusion is taken internally for the treatment of diarrhoea, dysentery, gravelly deposits of the bladder and for removing obstructions of the liver and spleen[4]. The fronds are harvested during the summer and can be dried for later use[7].

nrakta Central and southern Europe, including Britain, to N. Africa and eastwards to Japan. ksacta Moist banks and walls[4], rocks in damp shady places in woodlands[7, 9, 31], often on lime-rich soils[187].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. The spores usually germinate in the spring[1]. Spring sown spores germinate in 1 - 3 months at 15°C[134]. Pot on small clumps of plantlets as soon as they are large enough to handle and grow them on in light shade in a greenhouse. Keep the plants humid until they are well established. Once the plants are 15cm or more tall, plant them out into their permanent positions in the spring. Division in spring. Leaf bases - dig up the plant and wash off the soil until the old caudex covered with 'dead' leaf bases can be clearly seen. Strip off these bases individually by peeling them down the caudex. At the point of attachment they will be green. Young plants can be raised by planting these leaf bases, green tip up, in a pot of loam-based compost and enclosing the pot in a plastic bag. Within one month green swellings will appear around the original point of attachment to the caudex, each of these will develop quite quickly into a young fern. It takes 3 months in summer but longer in winter[200].

nwatta Easily grown in a shady position in a soil that is rich in leaf-mould[187]. Prefers a light sandy soil[1]. Succeeds on chalk[28]. Plants can be grown on drystone walls[219]. Grows well in heavy clay soils. Prefers a shady position with no more than 3 hours sunlight a day, greater exposure will cause yellowing and burning of the leaves[187]. One report says that it succeeds in dry shade[188]. Requires a pH of 6 or more in order to flourish. Plants are hardy to about -30°C[187], they grow very well in SW. England[31]. A very adaptable plant[28]. There are many named forms, selected for their ornamental value[187, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 4.2.202 Primula involucreta

4 tlin 8 cyuc 0 kcak 0 tcant 2 dwat 0.3 m hkuc  
hmim cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikrlwis hpa7tmwatli xre7t hjonli

drutta Primula involucreta is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

dwatta DysenteryThe entire plant is used in Tibetan medicine, it is said to have a sweet and bitter taste and a cooling potency[200]. Antidysenteric, anti-inflammatory and febrifuge, it is used in the treatment of contagious diseases and dysentery[241].

nrakta E. Asia - Himalayas from Pakistan to S. W. China. ksacta Grows in abundance in moist meadows flushed with melt water from snow and glaciers, 4,000 - 5,000 metres[200].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta Prefers a moist position in partial shade, such as along the edge of a stream or in a woodland garden[200]. In such a position the plant is usually long-lived[200]. If conditions are too dry the plant may become dormant by late

summer[200]. Grows well in heavy clay soils. The flowers have a delicious sweet honey perfume[245].

## 4.2.203 Hyacinthoides nonscripta

Bluebell

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc  
hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Hyacinthoides nonscripta is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The bulb (and the whole plant?) is poisonous[4].  
tcanta Adhesive StarchA glue is obtained from the sap in the bulb and stem[4, 6, 66]. Simply cut open a bulb and apply the sap to whatever needs to be joined[K]. It makes an excellent paper glue, the join is stronger than the surrounding paper[6]. It would not work on non-absorbent materials such as plastics and glass[K]. A starch from the bulb has been used in laundring[4], it is very harsh on the skin[6].

dwatta Diuretic StypticThe bulb has diuretic and styptic properties[4]. It is used as a remedy for leucorrhoea[4].

nrakta Western Europe from the Netherlands and Britain o Belgium and France. ksacta Deciduous woodland[28], usually on slightly acid soils[17].

propta Seed - sow early spring or as soon as ripe in a cold frame. It usually requires stratification. If you have plenty of seed it can be sown in situ, but it is usually more economical to sow it in a frame. If sown thinly, the seedlings can be left in their pots for the first year, though give them regular liquid feeds to make sure that they get sufficient nutrient. Prick out the seedlings about 3 to a pot and grow on for 1 - 2 more years before planting out into their permanent positions when they are dormant[K]. Division of the bulbs in summer after the leaves die down. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up smaller bulbs and grow them on for a year in a cold frame before planting them out when dormant in late summer.

nwatta Easily grown in a soil rich in leafmold[90], preferring semi-shade[28, 31] but tolerating full sun. Succeeds in most soils but prefers a heavy one[200]. Succeeds in the dry shade of trees[188, 233]. Bulbs like to be quite deep in the soil[200]. The flowers diffuse a balsam-like scent in the sunshine[245].

## 4.2.204 Vinca minor

Lesser Periwinkle, Flower of Death, English Holly, Creeping Myrtle, Creeping Vinca, Common Periwink

4 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc  
pcimhmimhtut cyutli hgatkuyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Vinca minor is an evergreen Shrub growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the plant are poisonous[19, 65].

tcanta BasketryThe stems are used in basket making[7]. A very good ground cover for covering steep banks and shady places, spreading rapidly once established and forming a dense cover within 2 years[11, 28, 31, 190, 200]. It is less dense on dry or exposed sites[197]. Plants are best spaced about 60cm apart each way[208].

dwatta Antispasmodic Astringent Bitter Detergent Homeopathy Hypotensive Sedative Stomachic TonicThe

plant is sedative and tonic[21, 53, 165]. It contains the alkaloid 'vincamine', which is used by the pharmaceutical industry as a cerebral stimulant and vasodilator[238]. Since the discovery of vincamine in the leaves, the plant has been used herbally to treat arteriosclerosis and for dementia due to insufficient blood supply to the brain[254]. The leaves are bitter, detergent and stomachic[7]. Taken internally, they are used in the treatment of internal bleeding, heavy menstrual bleeding and nosebleeds[254]. When crushed and applied to wounds they have astringent and healing properties[7]. A mouthwash is used to treat gingivitis, sore throats and mouth ulcers[254]. The leaves are gathered in the spring and dried for later use[7]. The root is antispasmodic and hypotensive[7, 19]. It is used to lower the blood pressure[19]. The root is gathered in the autumn and dried for later use[7]. The fresh flowers are gently purgative, but lose their effect on drying[4]. A homeopathic remedy is made from the fresh leaves[4]. It is used in the treatment of haemorrhages[4].

nrakta Europe, possibly also including Britain, from Denmark south and east to Spain and W. Asia. ksacta Fields, woodland edges, copses and hedgerows[7, 13, 17]. Ash and oak-hornbeam woods on better soils in central Europe[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if possible. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring just before active growth commences[78], or in autumn[1]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of mature wood of the current seasons growth, 5 - 10 cm long, October in a cold frame. Roots quickly. High percentage[78].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Specimen. A very easily grown plant, it succeeds in almost any soil[200] but prefers those that are on the richer side[17]. It grows well in heavy clay soils. Plants are very shade tolerant but they do not flower so well in deep shade[11, 28, 31]. It grows well under deciduous trees[187], and in such a position it can succeed in dry soils[190]. Established plants are drought tolerant[190]. A very ornamental[1] and polymorphic plant[200], there are some named forms selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This species rarely if ever sets seed in Britain[4]. It spreads rapidly by long trailing and rooting stems once it is established and will swamp out smaller plants[4]. Special Features:Attractive foliage, Not North American native, Naturalizing, Attractive flowers or blooms.

## 4.2.205 Daphne mezereum

Mezereon, Paradise plant, February Daphne

4 tlin 7 cyuc 0 kcak 0 tcan 2 dwat m hkuc  
hmim cyutli tcup hwicli jlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli fyifxre7t hjonli

drutta Daphne mezereum is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from February to March, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are highly toxic[7, 10, 19, 65]. Skin contact with the sap can cause dermatitis in some people[65, 200].

tcanta Dye OilA yellow to greenish-brown dye is obtained from the leaves, fruit and bark[13]. The seed contains up to 31% of a fatty oil[74]. No further details are given.

dwatta Antirheumatic Antiseborrheic Cancer Cathartic Diuretic Emetic Homeopathy Rubefacient Stimulant Vesi-

antMezereum has been used in the past for treating rheumatism and indolent ulcers, but because of its toxic nature it is no longer considered to be safe[238]. The plant contains various toxic compounds, including daphnetoxin and mezerein, and these are currently being investigated (1995) for their anti-leukaemia effects[238, 254]. The bark is cathartic, diuretic, emetic, rubefacient, stimulant and vesicant[4, 7, 9, 21, 46]. The root bark is the most active medically, but the stem bark is also used[4]. It has been used in an ointment to induce discharge in indolent ulcers[4] and also has a beneficial effect upon rheumatic joints[254]. The bark is not usually taken internally and even when used externally this should be done with extreme caution and not applied if the skin is broken[4, 21, 254]. The bark is harvested in the autumn and dried for later use[7]. The fruits have sometimes been used as a purgative[4]. A homeopathic remedy is made from the plant[7]. It is used in the treatment of various skin complaints and inflammations[7, 9].

nrakta Europe, including Britain, from Scandinavia to Spain, east to Macedonia and temperate Asia. ksacta Damp deciduous mixed woodlands and on rich calcareous soils[7, 17, 268].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°C followed by 12 - 14 weeks at 3°C. Germination may still take another 12 months or more at 15°C[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Layering.

nwatta Landscape Uses:Border, Foundation, Specimen. A good sandy loam suits most members of this genus[11]. Prefers a good heavy soil and some shade[31, 49]. Prefers a calcareous soil[13, 17, 19] and cool moist conditions[11, 49]. There is no evidence to suggest it requires a calcareous soil, but all members of this genus do well on acid soils[11]. A very ornamental plant[1], it is hardy to about -30°C[184]. Plants tend to be short-lived in cultivation, probably due to excessive seed bearing[11, 200]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188]. They also resent being cut and so should not be pruned unless it is essential[245]. A good bee plant, providing a source of nectar very early in the year[108]. The flowers have a delicious sweet perfume[245]. Special Features:Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

#### 4.2.206 *Narcissus pseudonarcissus*

Wild Daffodil, Daffodil

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Narcissus pseudonarcissus* is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[4, 10, 76], the toxins being found mainly in the bulb[65], but even the flowers are mildly toxic[4]. An extract of the bulb, when applied to open wounds, has caused staggering, numbness of the whole nervous system and paralysis of the heart[4].

tcanta DyeA yellow to gold dye is obtained from the flowers[168].

dwatta Astringent Dysentery Emetic EpilepsyThe bulbs, leaves and flowers are astringent and powerfully emetic[4]. The bulb, especially, is narcotic and depresses the nervous

system[4]. It has been used in the treatment of hysterical affections and even epilepsy with some effect[4]. The bulb is harvested in the winter and dried for later use[4]. The flowers are harvested in dry weather when they are fully open and should be dried quickly[4]. They are less powerful than the bulbs but are also considered to be antispasmodic and are useful in relieving the congestive bronchial catarrh of children and also useful in cases of epidemic dysentery[4].

nrakta Western Europe, including Britain. ksacta Moist woodlands and grassland[17].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils[1]. Grows well in heavy clay soils. Succeeds in sun or shade[31]. Grows well on woodland edges[24]. The flowers have the sweet woodland perfume of the primrose[245]. This is not very discernible when only a few plants are grown, but is quite noticeable in a group of plants[245].

#### 4.2.207 *Bergenia purpurascens*

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Bergenia purpurascens* is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A useful ground cover plant, though rather slow to spread[197]. Plants form clumps[208].

dwatta Antiseptic Astringent Styptic TonicThe root is astringent, styptic, tonic[61, 91, 218]. A safe and effective treatment for chronic bronchitis[218]. It is also used in the treatment of giddiness and general physical feebleness[61, 91]. Extracts of the plant are antiseptic[218]. The plant is a source of the drug bergenin[266].

nrakta E. Asia - Himalayas to China. ksacta On rocks and open slopes, 3600 - 4700 metres. in the Himalayas[51]. Forests, scrub, alpine meadows and alpine rock crevices at elevations of 2700 - 4800 metres in western China[266].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1 - 6 months at 15°C[134]. Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering[188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[134, 200] but prefers a deep fertile soil that does not dry out fully[134]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Requires a position sheltered from cold drying winds and from the early morning sun. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. Plants are hardy to

about -20°C[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants seem to be immune to the predations of rabbits[233]. The different species of this genus will hybridise freely when grown near each other[233].

## 5 5 tlin

### 5.1 bwon

#### 5.1.1 *Alnus tenuifolia*

Mountain Alder, Thinleaf alder  
tfo2n 5 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 9 m hkuc  
hmimhtut cyutli tucphja7n hwicli hyisjlutnyikfrip hpa7tli flat-  
prikklwis hpa7tmwatli hjonli

*drutta* *Alnus tenuifolia* is a deciduous Tree growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in March, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

*kcakta* Edible Parts: Flowers Edible Uses: Catkins - raw or cooked. A bitter taste[172].

*tcanta* Pioneer Soil stabilization Tannin Wood This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. The tree has an extensive root system and can be planted to control banks from erosion[226]. The bark and the strobils are a source of tannin[82]. A dark dye is obtained from the bark[226]. The colour can range from orange through red to brown[257]. Wood - soft, straight-grained, very durable in water[82]. It is of no commercial value, though it is used locally as a fuel[229].

*dwatta* Anodyne Astringent Emetic Febrifuge Haemostatic Stomachic Tonic The bark is astringent, emetic, haemostatic, stomachic and tonic[172]. The bark also contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. The outer bark is astringent and is applied as a poultice to bleeding wounds, it also reduces swellings[226].

*nrakta* Western N. America - Alaska to California and New Mexico. *ksacta* Moist soils by swamps, streams, ponds and lakes in foothills to well up in the mountains[60, 229].

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

*nwnatta* Landscape Uses: Erosion control. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A fast-growing but short-lived tree[229]. There is some confusion over the correct name of this tree with one authority citing the European species *A. incana* as the correct name[60]. Another report says that this species is closely related to *A. incana*, but distinct[229]. Some modern works treat it as a subspecies (*Alnus incana tenuifolia*). This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Wetlands plant, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.1.2 *Alnus cordata*

Italian Alder  
tfo2n 5 tlin 9 cyuc 0 kcaak 4 tcan 0 dwat 25 m hkuc  
hmimhtut cyutli kyuctcuphja7n hwicli hyisjlutnyikfrip hpa7tli  
flatprikklwis hpa7tmwatli hjonli

*drutta* *Alnus cordata* is a deciduous Tree growing to 25 m (82ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from April to December, in flower in March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate maritime exposure.

*tcanta* Hedge Pioneer Shelterbelt An excellent wind-break for maritime areas[75], it grows quite quickly and establishes well even in very windy sites[K]. Trees 5 years old from seed have reached 4 metres in height and are showing no signs of wind-shaping in a very exposed site in Cornwall[K]. This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K].

*nrakta* Europe - S. Italy, Corsica. *ksacta* Very rarely self-sown in Britain, but not naturalised.

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

*nwnatta* Thrives on poor and dryish soils, even on chalk, but prefers to be near water[11, 200]. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils. Tolerates very infertile sites[11, 200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric

Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. A very ornamental tree[1], it is very fast growing, reaching 12 metres tall in 20 years in an exposed maritime position at Rosewarne in N. Cornwall[75]. Very tolerant of salt winds, it establishes rapidly in exposed positions[75]. According to World Economic Plants, the correct author of this species is (Loisel.)Loisel. and not Desf. as we have given here. However, since all our other sources have quoted Desf., we have decided not to alter it at this time (1999)[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2 mran

### 5.2.1 *Cornus kousa chinensis*

Japanese Dogwood  
5 tlin 8 cyuc 5 kcaak 2 tcan 0 dwat 10 m hkuc  
hmimhtu cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprik-  
lwis hpa7tmwatli xre7t hjonli

drutta *Cornus kousa chinensis* is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves Edible Uses: Fruit - raw or cooked[61, 177]. Sweet and juicy[11, 183], it is very nice in small quantities[K]. Very seedy[105]. The skin is rather tough and unpleasant, but the pulp is delicious with a custard-like texture[K]. This fruit gained very high marks from a group of 7 people in a fruit-tasting visit to various gardens[K]. The fruit is about 2cm in diameter[200]. Young leaves - cooked[105, 177, 183].

tcanta WoodWood - very hard and heavy. Used for mal-  
lets etc[151].

nrakta E. Asia - China. ksacta Thickets, 1200 - 2200 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Does not like chalky soils according to other reports[184, 188]. Grows well in heavy clay soils. Prefers a rich well-drained loamy soil and a position that is at least partially sunny[11]. A very ornamental plant[1], it is hardy to about -20°C[184]. A number of named forms have been developed for their ornamental value[182]. Plants are slow-growing when young, they speed up somewhat after a few years but then soon slow down again[202]. This sub-species of *C. kousa* grows more freely, flowering and fruiting better in Britain though it barely differs in appearance from

the species[11]. Plants in this genus are notably resistant to honey fungus[200].

### 5.2.2 *Cornus kousa*

Japanese Dogwood, *Kousa dogwood*, Chinese Dogwood,  
5 tlin 8 cyuc 5 kcaak 2 tcan 0 dwat 10 m hkuc  
hmimhtu cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprik-  
lwis hpa7tmwatli xre7t hjonli

drutta *Cornus kousa* is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves Edible Uses: Fruit - raw or cooked[61, 177]. Sweet and juicy[11, 183], it is very nice in small quantities[K]. Very seedy[105]. The skin is rather tough and unpleasant, but the pulp is delicious with a custard-like texture, it is one of our favourite late summer fruits[K]. The fruit is about 2cm in diameter[200]. Young leaves - cooked[105, 177, 183].

tcanta WoodWood - very hard and heavy. Used for mal-  
lets etc[151].

nrakta E. Asia - China, Korea. ksacta Woods and scrub in the mountains of Sichuan[109]. Valleys, shaded slopes, by streams and roadsides, in mixed, sparse, and dense woods at elevations of 400 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses: Pest tolerant, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility, from acid to slightly alkaline but dislikes shallow chalky soils[184, 188]. Grows well in heavy clay soils. Prefers a rich well-drained loamy soil and a position that is at least partially sunny[11]. A very ornamental plant[1], it is hardy to about -20°C[184]. A number of named forms have been developed for their ornamental value[182]. Plants are slow-growing when young, they speed up somewhat after a few years but then soon slow down again[202]. The sub-species of *C. kousa chinensis* grows more freely, flowering and fruiting better in Britain though it barely differs in appearance from the species[11]. This species has been known to hybridize with *C. capitata*[182]. The cultivar 'Norman Hadden' could be such a hybrid[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Not North American native, Blooms are very showy. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 5.2.3 Crataegus pennsylvanica

5 tlin 9 cyuc 5 kcaok 0 tcan 2 dwat 9 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprikwvslip hpa7tmwatli xre7t hjonli

drutta Crataegus pennsylvanica is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked. A very good size fruit, up to 25mm in diameter, with a lovely semi-sweet flavour even when semi-ripe, it makes a delicious dessert[K]. It is also sometimes made into jellies[82] and can be dried for later use. The fruit is borne in clusters of 4- 12 and is very easily harvested[82, K]. There are up to five fairly large seeds in the centre of each fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Delaware to Pennsylvania and W. Virginia. ksacta Open woods and thickets in moist fertile soils[43]. Meadows in low, moist soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80].

If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has a good potential as a fruit crop in Britain. It regularly produces heavy crops of high quality, the tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A tree about 5 metres tall and wide at Kew fruits regularly and very heavily[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before

they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.4 Crataegus arnoldiana

Arnold Hawthorn

5 tlin 9 cyuc 5 kcaok 0 tcan 2 dwat 7 m hkuc  
hmmihtut cyutli hgatkuyctcuphja7n hwicli hrasjlutnyikfrp  
hpa7tli flatprikwvslip hpa7tmwatli xre7t hjonli

drutta Crataegus arnoldiana is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177]. Sub-acid[82]. A delicious flavour, it is sweet with a soft juicy flesh and makes an excellent dessert fruit[K]. It can also be cooked and used in pies, preserves etc and can be dried for later use. The fruit ripens in early September in southern Britain[K]. The fruit is about 2cm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Massachusetts and Connecticut. ksacta Wooded banks[43]. Thickets on a dry bank[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80].

If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit,



they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This is a tree with an excellent potential as a fruit crop in Britain. The fruit is of very good quality and is freely borne, whilst the tree is of very easy cultivation and rarely troubled by pests or diseases[K]. A tree at the Hillier Arboretum in September 1993 was about 3 metres tall and 1.5 metres wide. The growth looked somewhat weak and the tree was leaning due to wind rock but it was carrying a heavy crop of fruit[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. A very ornamental plant[1], it is very closely related to *C. mollis*, and considered to be part of that species by many botanists[229]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.5 *Crataegus schraderana*

Blue hawthorn

5 tlin 9 cyuc 5 kcaak 0 tcan 2 dwat 6 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprkwiwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus schraderana* is a deciduous Tree growing to 6 m (19ft 8in). It is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked[74]. A reasonable size, about 15 - 20mm in diameter[K]. This is one of the nicest tasting fruits of the genus I have tried to date. When fully ripe it is juicy with an extremely pleasant flavour and almost literally melts in the mouth[K]. I would far rather eat this fruit than a strawberry[K]. It ripens in late September and hangs on the tree in good condition for at least 4 weeks[K]. The ripe fruit is so soft that it is best eaten fresh from the tree[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S. Europe - Greece. ksacta Mountainous areas[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has an excellent potential as a fruit crop in Britain. The fruit is about the size of a cherry, it is very freely borne and the best forms are of excellent dessert quality[K]. The tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. Grafted specimens can produce fruit in their third year[K]. A very ornamental plant[74], it grows well in Britain flowering and fruiting well at Kew and Wisley[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.6 *Crataegus ellwangeriana*

Scarlet Hawthorn

5 tlin 7 cyuc 5 kcaak 2 tcan 2 dwat 6 m hkuc  
hmmihtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprkwiwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus ellwangeriana* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit. Edible Uses: Fruit - raw or cooked. Juicy and acid[82]. An excellent dessert fruit, it has an acid yet sweet flavour, is juicy but with a mealy texture, it makes very pleasant eating[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. A reasonable size, it is about 15mm in diameter[200]. A specimen at Kew has fruits up to 25mm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive. Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America. ksacta Not known in the wild, it is possibly of hybrid origin.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. This species is possibly of hybrid origin, involving *C. pedicellata*, though some botanists view it as no more than part of *C. pedicellata*[82]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11].

## 5.2.7 *Prunus insititia*

Damson

5 tlin 9 cyuc 5 kcaek 3 tcan 1 dwat 6 m hkuc  
hmimhtut cyutli tcup hwicli hrasjutnykfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Prunus insititia* is a deciduous Tree growing to 6 m (19ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

ckakta Edible Parts: Fruit Seed Edible Uses: Fruit - raw or cooked[1, 2, 46]. More acid than a plum but it is very acceptable raw when fully ripe, especially after being touched by frost[12, 34, K]. The fruit is about 3cm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge Shelterbelt A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Trees are fairly wind resistant and can be grown as a shelterbelt hedge[200].

dwatta Febrifuge Purgative Styptic The bark of the root and branches is febrifuge and considerably styptic[4]. An infusion of the flowers has been used as a mild purgative for children[4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S. W. Asia. Naturalized and often considered a native of Britain. ksacta Thickets, hedges and open woods[17].

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

nwatta Requires a well-drained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Occasionally cultivated for its edible fruit, there are some named varieties[200]. It has been derived in cultivation from the bullace, differing in having a sweeter fruit[200]. Damsons can be grown successfully against a north facing wall[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. *Prunus insititia* L. is a synonym of *Prunus domestica* subsp. *insititia* (L.) Bonnier and Layens For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

## 5.2.8 *Prunus domestica italica*

Gages, Greengage

5 tlin 8 cyuc 5 kcaek 2 tcan 2 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjutnykfrip hpa7tli flatprikli-  
wisslip hpa7tmwatli hjonli

drutta *Prunus domestica italica* is a deciduous Tree growing to 5 m (16ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees, insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ckakta Edible Parts: Flowers Fruit Oil Seed Edible Uses: Oil Fruit - raw or cooked. Often considered to be the finest of the dessert plums, they have a delicious flavour[K ]. The greengages. The usually green, globose fruit is usually 30 - 400mm in diameter. Seed - raw or cooked. Do not eat the

Use if it is too bitter - see the notes above on toxicity. An edible gum is obtained from points of damage on the trunk[64]. The seed contains about 20% of an edible semi-drying oil[4, 57]. It has an agreeable almond smell and flavour[4]. The flowers are eaten. They are used as a garnish for salads and ice cream or brewed into a tea[183].

**tcanta Adhesive Cosmetic Dye Oil Wood**A green dye can be obtained from the leaves [168]. A dark grey to green dye can be obtained from the fruit [168]. A yellow dye is obtained from the bark [115]. A gum obtained from points of damage along the stem can be used as an adhesive [64]. The ground up seeds are used cosmetically in the production of face-masks for dry skin [7]. A semi-drying oil is obtained from the seed [64]. No details of its uses. The reddish-brown wood is very close-grained, hard, compact. Liable to warp and split. It is used for musical instruments [115, 146].

**dwatta Digestive Febrifuge Laxative Purgative Stomachic Styptic**The dried fruit, known as prunes, is a safe and effective laxative and is also stomachic [4, 7, 21, 238]. The bark is sometimes used as a febrifuge and is styptic [4, 7]. An infusion of the flowers has been used as a mild purgative for children [4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being [238].

**nrakta A cultivated plant, not known in the wild. ksacta Not known in a truly wild situation**

**propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe [200]. Sow stored seed in a cold frame as early in the year as possible [200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate [113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. The various cultivars of plum are unlikely to breed true (though the green forms of the gage generally do) - they will usually produce a range of plants from seed with differing characteristics from their parent. Cuttings of half-ripe wood with a heel, mid summer in a frame [11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame [200]. Layering in spring.**

**nwatta The greengages are a group of cultivars of the common European plum. Gages are often cultivated as a fruit crop, especially in western Europe. Of excellent quality, though their delicate skins makes it difficult to get them to market in good condition and so they are more likely to be grown on a garden scale or be used for canning etc. Prunus domestica subsp. italica requires a well-drained moisture retentive soil [1, 11]. Succeeds in light shade but fruits better in a sunny position [11, 200]. Thrives in a loamy soil, doing well on limestone [11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present [1]. The various gages are often cultivated for their edible fruits, especially on a garden scale. There are some named varieties [200]. The gage was first developed from the plum in the Middle East, later spreading via France into much of western Europe. Its cultivation has spread into most temperate regions, though it is often only grown on a small scale because of the difficulty of getting it to market in good condition. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged [238]. Plants in this genus are notably susceptible to honey fungus [200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1]. Prunus domestica italica is a deciduous shrub or a tree usually growing 2 - 6 metres tall, occasionally to 15 metres. We can infer from its cultivation that the species grows optimally in areas with cold winters and long warm summers as vernalisation is required for flowering. The species can tolerate frost, however, when this occurs after flowering the fruit quality is poor (Lim 2002). Widely grown cultivars include: Boddarts Reneclode (Germany), Bryanston (UK), Cambridge Gage (UK), Canerik (Turkey), Denniston's Superb (USA), Gojeh Sabz (Iran), Yasil Alça or Góy Alça (Azerbaijan), Golden Transparent (UK), Graf**

Althanns Reneclode (Germany), Green Vanilla (Mount Pelion, Greece), Große Grüne Reneclode (Germany) / Reine Claude Verte (France), Laxton's Gage (UK), Laxton's Supreme (UK), Meroldts Reneclode (Germany), Rainha Cláudia (Portugal), Regina Claudia (Italy), Reine Claude de Bavay (France), Reine Claude d'Oullins (France), Uhinks Reneclode (Germany), Washington (USA).

## 5.2.9 Allium ampeloprasum

Wild Leek, Broadleaf wild leek

5 tin 9 cyuc 5 kcak 2 tcan 3 dwat 1.8 m hkuc htut cyutli kyuctcup hwelit hrasljutnykfrip hpa7tli flatprkl-wisslip hpa7tmwatli hrc7t hjonli

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

**pcista** Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

**kcakta Edible Parts: Flowers Leaves Root**Edible Uses: Bulb - raw or cooked[2, 27, 61, 105]. The small bulbs can vary considerably in size from 2 - 6cm[200], they have a fairly strong leek to garlic flavour and are nice as a flavouring in cooked foods[K]. The bulbs of selected cultivars are very large with a mild garlic flavour[183]. Leaves - raw or cooked[2]. A pleasant mild to strong garlic flavour, they are available from late autumn to the spring though they can become rather tough and fibrous as they get older[K]. Flowers - raw. A similar flavour to the leaves but they have a somewhat dry texture and are best used as a flavouring in cooked foods[K]. The bulbils have a mild garlic flavour and make a nice flavouring in salads and cooked foods. Although produced abundantly, they are quite fiddly to use because they are small[K]. They can also be pickled[142].

**tcanta Repellent**The juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

**dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cholagogue Diaphoretic Diuretic Expectorant Febrifuge Stimulant Stings Stomachic Tonic Vasodilator**This species has the same medicinal virtues as garlic, but in a much milder and less effective form[238]. These virtues are as follows:- Garlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasitocidal properties have proved of benefit[218]. It is also said to have anticancer activity[218]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The crushed bulb may be applied as a poultice to ease the pain of bites, stings etc[4, 9, 14, 21].

**nrakta S. Europe to W. Asia. Possibly native in Britain in S.W. England and Wales[17]. ksacta Rocky places near the coast in S.W. England and Wales[17].**

**propta Seed - best sown as soon as it is ripe in a cold frame, though it can also be sown in a cold frame in the spring[200]. Prick out the seedlings into individual pots when they are large enough to handle. Well-grown plants can be planted out into their final positions in late summer or the autumn, otherwise grow them on for a further year in pots and plant them out the following summer. Division in late summer or early autumn. Dig up the bulbs when the**

are dormant and divide the small bulblets at the base of the larger bulb. Replant immediately, either in the open ground or in pots in a cold frame. Bulbils - plant out as soon as they are ripe in late summer. The bulbils can be planted direct into their permanent positions, though you get better results if you pot them up and plant them out the following spring.

nwatta Prefers a sunny position in a light well-drained soil[1]. Prefers a dry position[45]. Succeeds in clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. The bulbs should be planted fairly deeply[1]. The wild leek is a rare native of Britain, found only in the south-west and Wales, though it should be hardy in most parts of the country. It comes into growth in the autumn, dying down in the summer, and makes a very pleasant winter leaf, either raw or cooked. It is a rather variable plant, especially in the amount of flowers and bulbils produced. The species produces mainly flowers with almost no bulbils, whilst the sub-species *A. ampeloprasum babbingtonii* (*Babbington's Leek*) produces lots of bulbils and almost no flowers[17]. The cultivated leek (*A. ampeloprasum porrum*) is believed to have been developed from this plant whilst, in Germany and Italy, other forms have been selected for their edible bulbils[142]. *Allium ampeloprasum* comprises several vegetables, of which the most important ones are: leek, elephant garlic or great-headed garlic, pearl onion, kurrat, Egyptian leek or salad leek, and Persian leek (*Allium ampeloprasum ssp. persicum*). The cultivar 'Perizweibel' is often used, the bulbils are solid rather than made up of layers and are popularly used for making pickles[183]. This cultivar does not set seed[183]. Another cultivated form of this plant produces very large, mild-garlic flavoured bulbs that are up to 500g in weight[183]. They are known as elephant garlic[183]. The wild leek grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

## 5.2.10 *Allium schoenoprasum*

Chives, Wild chives, Flowering Onion  
5 tlin 11 cyuc 5 kcak 3 tcan 2 dwat 0.3 m hkuc  
hmmihtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli fyfjxre7t hjonli

drutta *Allium schoenoprasum* is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from February to December, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Root Edible Uses: Leaves - raw, cooked or dried for later use. The leaves have a mild onion flavour and are an excellent addition to mixed salads, they can also be used as a flavouring in soups etc[2, 4, 5, 9, 27, 33]. The leaves are often available from late winter and can continue to produce leaves until early the following winter, especially if they are in a warm, sheltered position[K]. A good source of sulphur and iron[201]. A nutritional analysis is available[218]. The bulbs are rather small, and rarely exceed 10mm in diameter[200]. They can be harvested with the leaves still attached and be used as spring onions[K]. They have a pleasant mild onion flavour. The flowers can be used

as a garnish in salads etc[183]. The flowers of this species are rather dry and less desirable than the flowers of many other species[K].

tcanta Fungicide Repellent Landscape Uses: Border, Container, Massing, Rock garden, Forest Garden. The juice of the plant is used as an insect repellent, it also has fungicidal properties and is effective against scab, mildew etc[14, 18, 20, 201]. The growing plant is said to repel insects and moles[14, 20, 200]. Dynamic accumulator. Ground cover.nectary, Ground Cover. Aromatic.

dwatta Appetizer Digestive Hypotensive Tonic The whole plant has a beneficial effect on the digestive system and the blood circulation. It improves the appetite, is digestive, hypotensive and tonic[201]. It has similar properties to garlic (*A. sativum*), but in a much milder form, and it is rarely used medicinally[238].

nrakta Most of Europe, including Britain, east to the Himalayas and Japan. ksacta Rocky pastures and damp meadows, preferring calcareous soils[17, 90].

propta Seed - sow spring in a cold frame. Germination is usually free and easy, pot up the seedlings as soon as they are large enough to handle easily and plant out in the following spring. Division can be carried out at almost any time of the year but is probably best done in spring. The clumps should be divided at least every 3 or 4 years in order to maintain vigour[200], the divisions can be planted out direct into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[14, 37], though it succeeds in most soils[1, 37, 200] and also in light shade[203]. Grows well in heavy clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. Chives are commonly cultivated in the garden for their edible leaves which are available from late winter to the beginning of the following winter[K]. The bulbs divide rapidly and large clumps are quickly formed. There are some named varieties[183, 200, 203]. Chives are very tolerant of heavy harvesting, regular cutting of the leaves ensures a continuous supply of young leaves and prevents the plants flowering[33]. Plants can be moved into a frame or other protected environment in the autumn and will then produce leaves throughout the winter[33]. Do not do this every year or it weakens the plants. The bulbils should be planted fairly deeply[1]. A good bee plant[24]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. Helps to reduce the incidence of scab when it is grown under apple trees[201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: North American native, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

## 5.2.11 *Sorbus torminalis*

Wild Service Tree, Checkertree  
5 tlin 9 cyuc 4 kcak 2 tcan 0 dwat 20 m hkuc  
hmmihtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Sorbus torminalis* is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light

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

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

**kcakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked[2, 5, 11, 74, 115, 183]. The taste is best after a frost because it turns sweeter. The fruit can also be blotted if it is going to be eaten raw[3, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. Rich in vitamin C. The fruit is up to 1.5cm across[200] and is borne in bunches which makes it easier to harvest[K].

**tcanta Wood** Wood - heavy, fine grained, polishes well. Used for turning, wood carving[74, 115].

**nrakta Europe**, from Britain and Denmark south and east to N. Africa, the Caucasus and W. Asia. **ksacta Woods**, usually on clay[186], sometimes on limestone[17].

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

**nwatta Succeeds** in most reasonably good soils so long as they are not too poor or acid, in an open sunny position[1, 11]. Prefers clay soils[3, 11]. Tolerates moderate shade[188], but does not fruit so well in such a position[K]. Grows best in the eastern half of Britain[121]. Plants are susceptible to fireblight[188]. Plants respond well to coppicing[186]. When found in a truly wild situation this species is considered to be an indication of primary woodland[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.12 *Acer saccharum grandidentatum*

Big-Tooth Maple, Canyon Maple, Rocky Mountain Sugar Maple

5 tlin 8 cyuc 4 kcaok 0 tcan 0 dwat 12 m hkc  
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikli-wis hpa7tmwatali hjonli

**drutta** *Acer saccharum grandidentatum* is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen in September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**kcakta Edible Parts:** Inner bark **Sap Seed** **Edible Uses:** Sweetener The sap is relatively rich in sugar and can be made into a drink or concentrated into a syrup by boiling off the water[1, 2, 11, 34, 57]. The syrup is used as a sweetener on many foods. It can be harvested in late winter or early spring[142], the flow is best on a warm sunny day after a frost. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100

litres per tree can be obtained[142]. The best sap production comes from cold-winter areas with continental climates. Seed - boiled then roasted[62, 105, 159]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161].

**tcanta Fuel Preservative Wood** The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy. Used for furniture, ship building, etc[46, 61, 82, 171]. It is a good fuel.

**nrakta Western N. America - Rocky Mountains.** **ksacta** Found in moist sites such as wet canyons, valleys and the banks of mountain streams at elevations of 1200 - 2100 metres[229].

**propta Seed** - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate, sometimes taking two years[125]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

**nwatta Landscape Uses:** Firewood, Pest tolerant, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98]. Chlorosis can often develop as a result of iron deficiency when the plants are grown in alkaline soils. Grows well in heavy clay soils. Trees need full light and a lot of space if they are to grow well[98]. Plants are hardy to about -45°C when fully dormant[160]. This species is not a great success in Britain[1], though it does better than once thought[11]. It grows well in Cornwall[59]. Slow growing when young[11]. Plants produce prodigious root growth but very little top growth in first year from seed[133]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with *A. saccharum* and the sub-species *A. s. nigrum* it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. **Special Features:** North American native, Inconspicuous flowers or blooms.

## 5.2.13 *Crataegus azarolus*

Azarole

5 tlin 9 cyuc 4 kcaok 0 tcan 2 dwat 10 m hkc  
hmimhtut cyutli hgattcupha7n hwicli hrasljutnyikfrip hpa7tli flatprikliwssip hpa7tmwatali xre7t hjonli

**drutta** *Crataegus azarolus* is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked in pies, preserves etc[1, 2, 3, 11, 34, 183]. The fruit can be used fresh or dried for later use. A pleasant acid

kast[89]. In warm temperate areas the fruit develops more fruit sugars and has a fragrant sugary pulp with a slightly alkaline flavour[183]. It can be eaten out of hand. In cooler zones, however, the fruit does not develop so well and is best cooked or used in preserves[183]. The fruit is very variable in size and colour, it is up to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S. Europe to W. Asia. ksacta Dry hillsides and mountains in woods and hedges[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. The azarole has long been cultivated for its edible fruit in S. Europe, though it is now going out of favour[3, 11]. There are some named varieties[46]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.14 *Pyrus pyrifolia*

Sand Pear, Chinese pear

5 tlin 9 cyuc 4 kcaok 0 tcan 1 dwat 10 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-  
prikrlwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pyrifolia* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. Hard and gritty[11]. Firm crisp and juicy when fully ripe, they are eaten out of hand or used in fruit salads, pies or baked etc[183]. The fruit is up to 3cm long[200]. Up to 5cm in another report[194]. The average yield from wild trees in the Himalayas is 83kg per year, though some trees yield up to 200kg[194]. The fruit contains about 4.9% sugars, 3.2% protein, 0.9% pectin[194].

dwatta Antiseptic Astringent Febrifuge Nervine Pectoral Antiseptic, astringent, febrifuge, nervine, pectoral[178].

nrakta E. Asia - China. ksacta Warm rainy regions at elevations of 100 - 1400 metres in China[266]. Naturalized in low mountains and around villages in C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A parent of the cultivated Asian pears[11]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.15 *Cornus officinalis*

Shan Zhu Yu, Asiatic dogwood, Japanese Cornel Dogwood  
5 tlin 8 cyuc 4 kcaok 0 tcan 3 dwat 10 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-prikrl-  
wisslip hpa7tmwatli xre7t hjonli

drutta *Cornus officinalis* is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177]. The fully ripe fruit is quite pleasant but slightly astringent[K]. It is about 1.5cm long[200]. The fruit contains about 8.6% sugars, 2.9% malic acid, 0.74% ash[179].

dwatta Antibacterial Antifungal Antiperiodic Antiseptic Antitumor Astringent Diuretic Hepatic Hypotensive Malaria Tonic Urinary Shan Zhu Yu has been used for at least 2,000 years in Chinese herbal medicine. It is a herb that "stabilizes and binds" and is used principally to reduce heavy menstrual bleeding and unusually active secretions including copious sweating, excessive urine, spermatorrhoea and premature ejaculation[147, 238, 254]. Like all herbs that suppress bodily fluids (even excessive ones), it will simply prolong or lead to a worsening of symptoms if it is used without tonic or detoxifying herbs[254]. It is, therefore, normally used in combination with herbs such as *Rehmannia glutinosa* and is an ingredient of the "Pill of eight ingredients" which is used in China to "warm up and invigorate the yang of the loins"[254]. The fruit is antibacterial, antifungal, hypotensive, antitumor, astringent, diuretic, hepatic and tonic[116, 147, 176, 178, 238]. The fruit, without the seed, is decocted

for the treatment of arthritis, fever, and a wide range of other ailments[218, 279]. It is used in the treatment of senile lumbago, diabetes, cystitis, tinnitus etc[174, 254, 279]. The fruit has an antibacterial action, inhibiting the growth of *Bacillus dysenteriae* and *Staphylococcus*[176]. The fruit is harvested when fully ripe and is dried for later use[238]. The stem bark is astringent, antimalarial and tonic[218]. The plant is antibacterial, diuretic, hypotensive and a urinary antiseptic[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woodland, 1200 - 1800 metres in W. China[109]. Mountains, slopes, forest margins and forests a elevations of 400 - 1500, occasionally to 2100 metres[266].

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

nwatta Landscape Uses:Border, Massing, Standard, Specimen, Street tree. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. A very ornamental plant[1], it is very closely related to *C. mas*[1, 11] but is more tree-like in its habit[K]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive flowers or blooms.

## 5.2.16 *Pyrus pyrifolia culta*

Asian Pear

5 tlin 9 cyuc 4 kcaak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrp hpa7tli flat-prikrlwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pyrifolia culta* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcacta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. Crisp, juicy with a fine flavour[178]. The fruit contains about 6 - 9.5% sugar and up to 0.56% fruit acids[179].

dwatta Antiseptic Astringent Febrifuge Nerveine PectoralAntiseptic, astringent, febrifuge, nerveine, pectoral[178].

nrakta A cultivated form of *P. pyrifolia*. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they

are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. Cultivated for its edible fruit in China and Japan, there are many named varieties[183]. A hybrid between this plant and *P. communis culta* is more suitable for warmer climates[11].

## 5.2.17 *Prunus cerasifera*

Cherry Plum, Myrobalan Plum, Newport Cherry Plum, Pissard Plum

5 tlin 8 cyuc 4 kcaak 3 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flat-prikrlwis hpa7tmwatli xre7t hjonli

drutta *Prunus cerasifera* is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in March, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kcacta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked in pies, tarts, jams etc[2, 5, 12, 34, 183]. The size of a small plum with a thin skin and a nice sweet flavour[183]. The flesh is somewhat mealy but is also juicy[K]. The fruit can hang on the tree until October[K]. The fruit is about 30mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge Rootstock ShelterbeltA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Makes quite a good windbreak hedge though it cannot stand too much exposure[1, 11, 29]. Often used as a rootstock for the cultivated plums, giving them a semi-dwarfing habit[61].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Desperation', 'Fear of losing control of the mind' and 'Dread of doing some frightful thing'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta W. Asia? Original habitat is obscure. Often planted in hedgerows in Britain but rarely naturalized. ksacta Not known in a truly wild situation.

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

nwatta Landscape Uses:Specimen. Requires a well-drained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives

in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A very ornamental plant[1], it is sometimes cultivated for its edible fruit, unfortunately this is not often borne in large quantities in Britain[3, 17], but large crops are produced every 4 years or so[K]. There are some named varieties[183]. Included as a part of *P. divaricata* by some botanists[11] though others include *P. divaricata* as a sub-species under this species[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, All or parts of this plant are poisonous. Blooms are very showy. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

## 5.2.18 *Crataegus laciniata*

5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 6 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus laciniata* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[2, 105]. A pleasant acid taste[74]. The fruit is about 1.5cm in diameter[200]. A nice taste with a very good flesh to seed ratio, it can be eaten in quantity for dessert[K]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta WoodWood - heavy, close-grained, hard and tough. Used for tool handles etc[82, 74].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia. Occasionally self-sows in Britain[17]. ksacta Mountain thickets and rocky slopes[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed

before before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy species, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.19 *Crataegus champlainensis*

Quebec hawthorn  
5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 6 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus champlainensis* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked. A nice sweet flavour, the fruit is about 1.5cm in diameter[K]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Northern N. America - Quebec to New York and Ontario. ksacta Thickets, streambanks and hillsides[204]. Limestone ridges[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up



the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**wnatta** A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Closely related to *C. submollis*[200], and included in that species by some botanists[82]. This species is possibly no more than a part of *C. rotundifolia*[204].

## 5.2.20 Sambucus nigra

Elderberry - European Elder, Black elderberry, American black elderberry, Blue elderberry, Europea  
5 tlin 7 cyuc 4 kcaak 5 tcan 3 dwat 6 m hkuc  
hmmihtut cyutli tcup hwicli hraşljutnykfrif hpa7tli flatprik-  
wisslip hpa7tmwatli xre7t hjonli

**drutta** *Sambucus nigra* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to November, in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

**pcista** The leaves and stems are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

**kcakta** Edible Parts: Flowers Fruit Edible Uses: Colouring Tea Fruit - raw or cooked[2, 3, 5, 46, 61]. The flavour of the raw fruit is not acceptable to many tastes, though when cooked it makes delicious jams, preserves, pies and so forth[K]. It can be used fresh or dried, the dried fruit being less bitter[12, 183, 238]. The fruit is used to add flavour and colour to preserves, jams, pies, sauces, chutneys etc, it is also often used to make wine[13, 183]. The fruit is about 8mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked[2, 5, 12, 53]. They can also be dried for later use[21]. The flowers are crisp and somewhat juicy, they have an aromatic smell and flavour and are delicious raw as a refreshing snack on a summers day, though look out for the insects[K]. The flowers are used to add a muscatel flavour to stewed fruits, jellies and jams (especially gooseberry jam)[238]. They are often used to make a sparkling wine[183]. A sweet tea is made from the dried flowers[21,

183]. The leaves are used to impart a green colouring to oils and fats[183].

**tcanta** Compost Cosmetic Dye Fungicide Hedge Hedge Insecticide Litmus Microscope Musical Pioneer Pipes Repellent Wood The plant is a valuable addition to the compost heap[14, 18], its flowers are an alternative ingredient of 'QR' herbal compost activator[32] and the roots of the plant improve fermentation of the compost heap when growing nearby[18]. The leaves are used as an insect repellent[4, 6, 14, 66], very effective when rubbed on the skin though they do impart their own unique fragrance[K]. They can be powdered and placed amongst plants to act as a deterrent[14], or made into a spray when they act as an insecticide[7]. This is prepared by boiling 3 - 4 handfuls of leaves in a litre of water, then straining and allowing to cool before applying[201]. Effective against many insects, it also treats various fungal infections such as leaf rot and powdery mildew[201]. The dried flowering shoots are used to repel insects, rodents etc[101]. The flowers are used in skin lotions, oils and ointments[238]. Tolerant of salt-laden gales, this species can be grown as a shelter hedge in exposed maritime areas[29, 75], it is rather bare in the winter though[K]. This is an excellent pioneer species to use when re-establishing woodlands. It is very tough and wind-resistant, grows quickly and provides shelter for longer-lived and taller woodland species to establish. It will generally maintain itself in the developing woodland, though usually in the sunnier positions[K]. A dye is obtained from the fruit and the bark[13, 15]. The bark of older branches and the root have been used as an ingredient in dyeing black[4]. A green dye is obtained from the leaves when alum is used as a mordant[4]. The berries yield various shades of blue and purple dyes[4]. They have also been used as a hair dye, turning the hair black[4]. The blue colouring matter from the fruit can be used as a litmus to test if something is acid or alkaline. It turns green in an alkaline solution and red in an acid solution[4]. The pith in the stems of young branches pushes out easily and the hollow stems thus made have been used as pipes for blowing air into a fire[4]. They can also be made into musical instruments[4]. The pith of the wood is used for making microscope slides and also for treating burns and scalds[46, 61, 100]. The mature wood is white and fine-grained. It is easily cut and polishes well[4]. Valued highly by carpenters, it has many uses, for making skewers, mathematical instruments, toys etc[4, 13, 100, 244]. A good forage for animals: mule deer, elk, sheep and small birds. It is classified as nesting habitat for many birds, including hummingbirds, warblers, and vireos. Elderberries are a favorite food for migrating band-tailed pigeons in northern California.

**dwatta** Antiinflammatory Aperient Diaphoretic Diuretic Emetic Emollient Expectorant Galactagogue Haemostatic Laxative Ophthalmic Purgative Salve Stimulant Elder has a very long history of household use as a medicinal herb and is also much used by herbalists[4]. The plant has been called 'the medicine chest of country people'[4]. The flowers are the main part used in modern herbalism, though all parts of the plant have been used at times[238]. Stimulant[9, 53, 165]. The inner bark is collected from young trees in the autumn and is best sun-dried[4]. It is diuretic, a strong purgative and in large doses emetic[4, 7]. It is used in the treatment of constipation and arthritic conditions[238]. An emollient ointment is made from the green inner bark[4]. The leaves can be used both fresh or dry. For drying, they are harvested in periods of fine weather during June and July. The leaves are purgative, but are more nauseous than the bark[4]. They are also diaphoretic, diuretic, expectorant and haemostatic[4, 7]. The juice is said to be a good treatment for inflamed eyes[4]. An ointment made from the leaves is emollient and is used in the treatment of bruises, sprains, chilblains, wounds etc[4]. The fresh flowers are used in the distillation of 'Elder Flower Water'. The flowers can be preserved with salt to make them available for distillation later in the season[4]. The water is mildly astringent and a gentle stimulant. It is mainly used as a vehicle for eye and skin lotions[4]. The dried flowers are diaphoretic, diuretic, expectorant, galactagogue and pectoral[4, 7]. An infusion is very effective in the treatment of chest complaints and is also used to bathe inflamed eyes[4]. The infusion is also a very good spring tonic and blood cleanser[4]. Externally, the flowers are used in poultices to ease pain and abate inflammation[4]. Used as an ointment, it treats chilblains, burns, wounds, scalds etc[4]. The fruit is depurative, weakly diaphoretic and gently laxative.

ve[4, 7]. A tea made from the dried berries is said to be a good remedy for colic and diarrhoea[4]. The fruit is widely used for making wines, preserves etc., and these are said to retain the medicinal properties of the fruit[4]. The pith of young stems is used in treating burns and scalds[46, 61, 100]. The root is no longer used in herbal medicine but it formerly had a high reputation as an emetic and purgative that was very effective against dropsy[4]. A homeopathic remedy is made from the fresh inner bark of young branches[4]. It relieves asthmatic symptoms and spurious croup in children[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Sambucus nigra* for cough and bronchitis, fevers and colds (see [302] for critics of commission E).

**nrakta Europe**, including Britain, from Scandinavia south and east to N. Africa and W. Asia. **ksacta Hedgerows, scrub, woods, roadsides, waste places etc**, especially on disturbed base-rich and nitrogen rich soils[9, 17].

**propta Seed** - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

**nwatta Industrial Crop: Dye Industrial Crop: Medicinal Management: Standard Minor Global Crop Landscape Uses: Border, Container, Massing, Pollard, Standard, Seashore, Specimen.** A very easily grown plant, it tolerates most soils and situations[11, 28, 98], growing well on chalk[28, 98, 186], but prefers a moist loamy soil[200]. Grows well in heavy clay soils. Tolerates some shade but fruits better in a sunny position[37, 200]. Tolerates atmospheric pollution and coastal situations[200]. Another report says that it is intolerant of very smoky atmospheres[186]. The elder is very occasionally cultivated for its edible fruit, there are some named varieties though most of these have been developed for their ornamental value[182]. The subspecies *S. nigra alba* has white/green fruits that are nicer than the type species and are quite nice raw[K]. The elder also has a very long history of folk use, both medicinally and for a wide range of other uses. All in all it is a very valuable plant to have in the garden. The leaves often begin to open as early as January and are fully open in April[186]. The leaves fall in October/November in exposed sites, later in sheltered positions[186]. Young stems can be killed by late frosts but they are soon replaced from the ground level[186]. Very tolerant of pruning, plants can be cut back to ground level and will regrow from the base[186]. The flowers have a sweet, almost overpowering smell, not exactly pleasant when inhaled near to for it has fishy undertones, but from a distance its musky scent is appealing[245]. Very resistant to the predations of rabbits[17, 186]. The flowers are very attractive to insects[186]. The fruit is very attractive to birds[186] and this can draw them away from other cultivated fruits[14, 186]. The elder is an early colonizer of derelict land, the seed arriving in the defecations of birds and mammals[186]. It is a very good pioneer species for re-establishing woodlands. Plants in this genus are notably resistant to honey fungus[200]. **Special Features: Attractive foliage, Not North American native, Attractive flowers or blooms.** In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

## 5.2.21 *Berberis aristata*

Chitra, Indian Barberry or Tree Turmeric  
5 tin 9 cyuc 4 kcaak 3 tcan 3 dwat 3.5 m hkuc

hminhtut cyutli kyuctup hwicli hyishrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

**drutta Berberis aristata** is an evergreen Shrub growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**kcakta Edible Parts: Flowers Fruit Edible Uses: Fruit raw or cooked[145].** A well-flavoured fruit, it has a sweet taste with a blend of acid, though there is a slight bitterness caused by the seeds[194, K]. The fruit is much liked by children[194, K]. It is dried and used like raisins in India[2, 3, 177, 183]. The fruit contains about 2.3% protein, 12% sugars, 2% ash, 0.6% tannin, 0.4% pectin[194]. There is 4.6mg vitamin C per 100ml of juice[194]. The fruit is about 7mm x 4mm[194] - it can be up to 10mm long[200]. Plants in the wild yield about 650g of fruit in 4 pickings[194]. Flower buds - added to sauces[177, 183].

**tcanta Dye Fuel Tannin** A yellow dye is obtained from the root and the stem[46, 61, 272]. An important source of dyestuff and tannin, it is perhaps one of the best tannin dyes available in India[194]. The wood is used as a fuel[146]. The spiny branches are used for making fencing around fields[272].

**dwatta Alterative Antibacterial Antiperiodic Bitter Cancer Deobstruent Diaphoretic Dysentery Laxative Malaria Ophthalmic Tonic Vitamin C** The dried stem, root bark and wood are alterative, antiperiodic, deobstruent, diaphoretic, laxative, ophthalmic and tonic (bitter)[46, 61, 158, 194, 240]. An infusion is used in the treatment of malaria, eye complaints, skin diseases, menorrhagia, diarrhoea and jaundice[240, 243]. Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

**nrakta E. Asia - Himalayas in Nepal.** **ksacta Shrubberies** to 3500 metres[51]. Open hillsides at elevations of 1800 - 3000 metres[272].

**propta Seed** - best sown as soon as it is ripe in a cold frame, it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78]. Stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for at least their first winter. Once they are at least 20cm tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are subject to damping off, so be careful not to overwater them and keep them well ventilated[113]. Cuttings of half-ripe wood, July/August in a frame. Very difficult, if not impossible. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Very difficult, if not impossible.

**nwatta** Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are very hardy, they survived the severe winters of 1986-1987 without problems in most areas of Britain[K]. Plants can be pruned back quite severely and resprout well from the base[200]. The fruits are sometimes sold in local markets in India[194]. Hybridizes freely with other members of this genus[1]. Most plants cultivated under this name are *B. chitria*, *B. coriaria*, *B. glaucocarpa*. and, more commonly, *B. floribunda*[67, 200].

## 5.2.22 *Fagopyrum* spp.

Perennial Buckwheat  
5 tin 10 cyuc 4 kcaak 2 tcan 3 dwat 1 m hkuc

hmmhtut cyutli tcup hwicli hysihrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli hjonli

drutta *Fagopyrum* spp. is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Seed Edible Uses: Leaves - raw or cooked[105, 160, 272]. Boiled or steamed and used like spinach[183]. Of excellent quality according to one report[2], but we have been less than impressed by the flavour, which has a distinct bitterness especially when eaten raw[K]. The leaves are rich in rutin (see below for details of its uses) and so they do make a healthy addition to the diet[K]. Seed - it can be sprouted and eaten raw, or cooked and used as a cereal[4]. Dried and ground into a powder, it can serve as a thickening agent in soups etc. The seed is rich in vitamin B6. Unfortunately, it is not freely produced in Britain[2]. Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Animal feed, An ornamental plant.

dwatta The whole plant is anodyne, anthelmintic, antiphlogistic, carminative, depurative and febrifuge. It stimulates blood circulation[147]. A decoction is used in the treatment of traumatic injuries, lumbago, menstrual irregularities, purulent infections, snake and insect bites[147]. A decoction of the roots is used in the treatment of insect bites, dysmenorrhoea, inflammation, lumbago, snakebite and traumatic injuries[218]. The leaves are rich in rutin which is a capillary tonic, antioedemic, anti-inflammatory, antispasmodic and hypotensive[218]. Rutin also inhibits carcinogenesis and protects against radiation[218].

nrakta Eurasia. ksacta Forests and cultivated areas from Pakistan to S.W. China, 1500 - 3400 metres[51]. Found alongside ditches on shady damp and fertile soils in China[147].

propta Seed - sow spring in a greenhouse. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in the summer. Division is very easy at almost any time in the growing season, though it is best avoided in early spring because the young growth can be damaged by late frosts. The divisions can be planted out direct into their permanent positions.

nwatta Hypothetical Crop Management: Standard Staple Crop: Balanced carb Climate: boreal to cold temperate. Humidity: arid to semi-arid. Carbon Farming Solutions - Cultivation: hypothetical - *F. esculentum* could be crossed with *F. cymosum*. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

## 5.2.23 *Allium porrum*

Leek, Garden leek

5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.9 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Allium porrum* is a BULB growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Root Edible Uses: The leaves and long white blanched stem are eaten cooked[2, 16, 37, 183]. They can also be cut into thin slices and be added to salads[183]. A mild onion flavour with a delightful

sweetness[183, K]. Bulb - raw or cooked. The bulb is produced in the plants second year of growth (that is, after it is normally harvested). The bulb is somewhat larger if the plant is prevented from flowering[K]. Flowers - raw. Used as a garnish on salads, though they are rather on the dry side and less pleasant than many other members of the genus[K].

tcanta Repellent The juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cholagogue Diaphoretic Diuretic Expectorant Febrifuge Stimulant Stings Stomachic Tonic Vasodilator This species has the same medicinal virtues as garlic, but in a much milder and less effective form[238]. These virtues are as follows:- Garlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasitocidal properties have proved of benefit[218]. It is also said to have anticancer activity[218]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The crushed bulb may be applied as a poultice to ease the pain of bites, stings etc[4, 9, 14, 21].

nrakta Original habitat is obscure. ksacta Not known in wild.

propta Seed - for an early crop, or for larger plants, sow the seed in early spring in a greenhouse and plant out in May. For smaller or later plants, sow April in an outdoor seedbed and plant out as space permits in July or even August.

nwatta Prefers a sunny position in a light well-drained soil[1] but succeeds in most soils[16]. Grows well in heavy clay soils. Prefers an open situation[1, 37]. Does best in a soil that was well fed for a previous crop[1]. Tolerates a pH in the range 5.2 to 8.3. The leek is a widely cultivated vegetable, there are many named varieties[183]. Young plants are often planted quite deeply in the soil (8 - 10cm deep) in order to blanch the lower stem, it is also a common practice to earth up the growing plants in order to blanch right the way up the stems. Whilst this does make the stems more tender, it also results in a loss of minerals and vitamins. Although commonly treated as a biennial, this plant is a true perennial, perennating by means of small lateral growths and often developing a roundish bulb at the base of the main growth[1]. A relatively slow-growing plant, it can be interplanted with faster maturing species such as lettuces[201]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, celery, celariac, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.24 *Hemerocallis aurantiaca*

5 tlin 9 cyuc 4 kcak 2 tcan 1 dwat 0.8 m hkuc  
hmmhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli dyatxre7t hjonli

drutta *Hemerocallis aurantiaca* is an evergreen Perennial growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Root Edible Uses: Leaves and young shoots - cooked[105, 177]. They must be

consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. The tubular flowers are about 7.5cm long and 13cm in diameter[205]. Each stem carries 6 - 8 flowers[205]. The flowers contain carotene and starch[105, 177]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked. A radish-like flavour but not so sharp[205].

**tcanta Weaving**The tough dried foliage is plaited into cord and used for making footwear[205].

**dwatta Antidote Diuretic Vitamin C**The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

**nrakta E. Asia - China, Japan, Korea.** ksacta Thickets, grasslands and streambeds at elevations of 300 - 1000 metres in Guangdong, Guangxi, and Taiwan[266].

**propta Seed - sow** in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Seed is only set if the plant is fertilized by another species, thus seedlings will not be true to the species type[233]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

**nwatta Succeeds** in most soils[1], including dry ones, preferring a rich moist soil[205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. The roots have spindle-shaped swellings[205]. The cultivar 'Major' is smaller than the type species, but has larger flowers, it is sometimes cultivated for these edible flowers in Japan[205]. There is some doubt as to whether this cultivar really is a form of *H. aurantiaca*[205]. Individual flowers are very short-lived, opening in the morning and withering in the evening[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. There is some doubt as to the origins of this plant, it might have arisen in cultivation at Kew[205]. It is cultivated in Japan, where it is believed to have come from China[58]. It is quite possibly a hybrid since it is sterile unless fertilized by another species[233].

## 5.2.25 *Crataegus pinnatifida major*

Chinese Haw

5 tlin 9 cyuc 4 kcaak 2 tcant 3 dwat m hku  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

**drutta Crataegus pinnatifida major** is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Fruit<sup>Edible Uses:</sup> Fruit - raw or cooked[3, 105, 177]. A pleasant flavour, it is sold in local markets in China[178]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. A good size, it is up to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

**tcanta Wood - heavy, hard, tough, close-grained.** Useful for making tool handles, mallets and other small items[82].

**dwatta Anticholesterolemic** **Cardiotoxic** **Hypotensive** **Stomachic** **Vasodilator**The fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The fruits are anticholesterolemic, cardiotoxic, stomachic and vasodilator. Their use improves the blood circulation and lowers blood pressure[176]. The fruits are used in the treatment of dyspepsia, stagnation of fatty foods, abdominal fullness, retention of lochia, amenorrhoea, postpartum abdominal pain, hypertension and coronary heart disease[176].

**nrakta E. Asia - China.** ksacta Riverbanks, on sandy soils or stony slopes[74].

**propta Seed - this is best sown** as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**nwatta A** very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant, this sub-species is widely cultivated for its edible fruit in China[266], it is larger than the type species[46, 178, 200].

## 5.2.26 *Quercus cerris*

Turkey Oak, European turkey oak

5 tlin 9 cyuc 3 kcaak 0 tcant 2 dwat 35 m hku  
hmimhtut cyutli tcup hwicli jlutnykfrp hpa7tli flatprikliwslip hpa7tmwatli hjonli

**drutta Quercus cerris** is a deciduous Tree growing to 35 m (114ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

**ksakta Edible Parts:** SeedEdible Uses: CoffeeSeed - cooked. Up to 2.5cm long. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. A sweet fluid exudes from insect damage on the stems and solidifies[2, 61, 105, 177]. This is edible and is sold as a manna in local markets in Iran[46]. It can be boiled down into a syrup and used for sweetening food[183].

**tcanta Buttons Repellent Tannin Wood**The seed cups are used as buttons[95]. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit the growth of young plants[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The leaves, bark and wood are used commercially as a source of tannins[223]. Wood. It is valued by wheelwrights, turners and cabinet makers[4]. Of little value[1, 11]. It does not weather well[100].

**dwatta Astringent Dysentery**Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

**nrakta Europe to S.W. Asia.** Naturalized in Britain[17]. ksakta Hedges, thickets and woods in acid soils[17, 100].

**propta Seed** - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

**nwatta Prefers a good deep fertile loam** which can be on the stiff side[1, 11]. Grows well on chalk[98], even when the soil is shallow[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Grows well near the coast[98]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. A very ornamental tree[1], it grows very well in Britain and is the fastest growing of the oaks in cultivation in this country[1]. The seed ripens in its second year[200]. Trees transplant badly unless they are moved regularly[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

## 5.2.27 *Quercus lyrata*

Overcup Oak

5 1tn 9 cyuc 3 kcaak 0 tcan 2 dwat 30 m hku  
hmmihtut cyutli tcup hwicli jutnyikfrip hpa7tli flatprik  
lwis hpa7tmwatli hjonli

**drutta** *Quercus lyrata* is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

**ksakta Edible Parts:** SeedEdible Uses: CoffeeSeed - cooked. The seed is about 25mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc

or mixed with cereals for making bread. The seed is fairly sweet and does not contain many bitter tannins[159]. It does not require much leaching but any bitterness can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

**tcanta Repellent Tannin Wood**A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - close-grained, hard, tough, strong, heavy, very durable in contact with the ground[82]. It weighs 51lb per cubic foot. Used for construction, tools, furniture etc[46, 82, 227].

**dwatta Astringent Dysentery**The leaves and bark are astringent[46, 61]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

**nrakta** Diarrhoea and South-eastern N. America - New Jersey to Florida, west to Mississippi and Texas. ksakta Bottomlands and wet woods[43], usually on rich soils[82]. Wet, poorly-drained heavy clay soils[227, 229].

**propta Seed** - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

**nwatta Landscape Uses:**Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees are not well suited to the British climate and usually grow poorly here. They fail to properly ripen their wood which results in frost damage overwinter[200]. A slow-growing but long-lived tree[227], it takes 25 - 30 years before it starts to produce seeds[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Large crops are produced every 3 - 4 years with low production in the intervening years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

## 5.2.28 *Ulmus glabra*

Wych Elm, Table-top Scotch Elm, Scotch Elm

5 1tn 7 cyuc 3 kcaak 0 tcan 2 dwat 30 m hku  
hmmihtut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprik  
lwis hpa7tmwatli xre7t hjonli

**drutta** *Ulmus glabra* is a deciduous Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade

(light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

**ckakta Edible Parts:** Fruit Inner bark Leaves**Edible Uses:** Leaves - raw or cooked[179, K]. They can be a little bit bitter, especially if not very young, and have a mucilaginous texture[K]. They make a nice addition to a mixed salad[K]. Immature fruits, used just after they are formed, can be eaten raw[132]. An aromatic, unusual flavour, leaving the mouth feeling fresh and the breath smelling pleasant[132]. They contain about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[179]. The fruit is about 2.5cm long[200]. Inner bark - mucilaginous[179]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[K].

**tcanta Fibre Wood**A fibre from the inner bark is used for mats and making ropes[100]. Wood - very durable under water, fairly hard, elastic, withstands abrasion and salt water. Used for water pipes, wheels, mallet heads, ships keels etc[46, 61, 67, 100].

**dwatta Astringent Bach Demulcent Diuretic Eczema Homeopathy**The inner bark is astringent, demulcent and mildly diuretic[9]. It is used both internally and externally in the treatment of diarrhoea, rheumatism, wounds, piles etc and is also used as a mouthwash in the treatment of ulcers[4, 9, 66]. The inner bark is harvested from branches 3 - 4 years old and is dried for later use[9]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Occasional feelings of inadequacy', 'Despondency' and 'Exhaustion from over-striving for perfection'[209]. A homeopathic remedy is made from the inner bark[9]. It is used in the treatment of eczema[9].

**nrakta Europe, including Britain, from Scandinavia south and east to Spain, north and west Asia.** ksacta Woods, hedges and by streams, commoner in the west and north[17].

**propta Seed** - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

**nwatta Landscape Uses:**Specimen. Easily grown in any soil of at least moderate quality so long as it is well drained[1]. Prefers a deep or heavy soil that is moist but not waterlogged and does not thrive if the soil is markedly acid[186]. Moderately shade tolerant[186]. Very wind resistant and tolerant of maritime exposure[186]. Trees cast a dense shade[186]. Rarely produces suckers but responds well to coppicing[186]. The wych elm is subject to 'Dutch elm disease' (though less so than *U. procera*), a disease that has destroyed the greater part of all the elm trees growing in Britain. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant to the disease so the potential exists to develop new resistant hybrids with the native species. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times. A very ornamental tree[1], it is a food plant for the caterpillars of many lepidoptera species[30]. A good tree for growing grapes into[18]. **Special Features:** Not North American native, Inconspicuous flowers or blooms.

## 5.2.29 *Pyrus balsanae*

5 tlin 9 cyuc 3 kcak 0 tcen 0 dwat 15 m hkuc hmimhtut cyuti hgattcup hwicli hrasljutnyikfrrip hpa7tli flat-prikliw hpa7tmwatli wre7t hjonli

**drutta** *Pyrus balsanae* is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK

zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Fruit**Edible Uses:** Fruit - raw or cooked. A reasonable size, to 2.5cm[200]. The flesh is rather hard and harsh, though it becomes soft and sweet when blotted and then makes a very good dessert fruit[K].

**nrakta W. Asia - Caucasus.** ksacta Forests and shrub thickets[74].

**propta Seed** - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

**nwatta Prefers a good well-drained loam in full sun**[1]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Hardy to about -15°C[200]. Plants are growing and fruiting well at Kew Botanical Gardens[K].

## 5.2.30 *Taxus baccata*

**Yew, English yew, Common Yew**

5 tlin 7 cyuc 3 kcak 4 tcen 4 dwat 15 m hkuc pcmhmimhtut cyuti hgatkyuctup hwicli hrasljutnyikfrrip hpa7tli frusflatprikliwslip hpa7tmwatli nyanhjen hjonli

**drutta** *Taxus baccata* is an evergreen Tree growing to 15 m (49ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to April, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**pcista** All parts of the plant, except the flesh of the fruit, are highly poisonous, having a paralyzing effect on the heart[1, 4, 7, 10, 19, 65]. Poisoning symptoms are dry mouth, vomiting, vertigo, abdominal pain, dyspnoea, arrhythmias, hypotension and unconsciousness.

**kcakta Edible Parts:** Fruit**Edible Uses:** TeaFruit - raw[1, 2, 65, 81, 158]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. A number of people who like the flavour do not like the texture which is often described as being 'snotty'[K]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm (UPDATE: this is probably not true: unfortunately, the digestive system of most mammals, including humans, is robust enough to break down the seeds. This will release the toxic taxanes. Birds are able to eat the whole "berry" because they cannot digest the seeds). If it is bitten into, however, you will notice a very bitter flavour and the seed should immediately be spat out or it could cause some problems. The fruit is a fleshy berry about 10mm in diameter and containing a single seed[200]. Some reports suggest using the bark as a tea substitute[158, 183], this would probably be very unwise.

taanta Fuel Hedge Insecticide Wood Very tolerant of trimming, this plant makes an excellent hedge[1, 11, 29]. The plants are often used in topiary and even when fairly old, the trees can be cut back into old wood and will re-sprout[200]. One report says that trees up to 1000 years old respond well to trimming[200]. A decoction of the leaves is used as an insecticide[46, 61]. Some cultivars can be grown as a ground cover when planted about 1 metre or more apart each way[208]. 'Repandens' has been recommended[208]. Wood - heavy, hard, durable, elastic, takes a good polish but requires long seasoning. Highly esteemed by cabinet makers, it is also used for bows, tool handles etc[4, 7, 11, 46, 61, 66, 146]. It makes a good firewood[6]. The wood is burnt as an incense[146].

dwatta Anticonvulsant Antispasmodic Cancer Cardiotonic Diaphoretic Emmenagogue Epilepsy Expectorant Homeopathy Narcotic Purgative The yew tree is a highly toxic plant that has occasionally been used medicinally, mainly in the treatment of chest complaints. Modern research has shown that the plants contain the substance 'taxol' in their shoots. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[238]. Unfortunately, the concentrations of taxol in this species are too low to be of much value commercially, though it is being used for research purposes[238]. This remedy should be used with great caution and only under the supervision of a qualified practitioner[21]. See also the notes above on toxicity. All parts of the plant, except the fleshy fruit, are antispasmodic, cardiotonic, diaphoretic, emmenagogue, expectorant, narcotic and purgative[7, 21]. The leaves have been used internally in the treatment of asthma, bronchitis, hiccup, indigestion, rheumatism and epilepsy[240, 257]. Externally, the leaves have been used in a steam bath as a treatment for rheumatism[257]. A homeopathic remedy is made from the young shoots and the berries[4]. It is used in the treatment of many diseases including cystitis, eruptions, headaches, heart and kidney problems, rheumatism etc[4]. Ingestion of 50-100g of needles can cause death.

nrakta Europe, incl Britain, from Scandinavia south and east to N. Africa, the Caucasus, Iran, Himalayas. ksacta Woods and scrub, usually on limestone. It sometimes forms pure stands in sheltered sites on chalk in the south-east and on limestone in the north-west[17].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Industrial Crop: Medicinal Management: Copice Regional Crop Landscape Uses: Espalier, Firewood, Hedge, Screen, Standard, Superior hedge, Specimen. A very easy plant to grow, it is extremely tolerant of cold and heat, sunny and shady positions, wet and dry soils, exposure and any pH[200]. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 11, 200]. Grows well in heavy clay soils. Sensitive to soil compaction by roads etc[186, 200]. Very shade tolerant[17, 81]. Tolerates urban pollution[200]. In general they are very tolerant of exposure, though plants are damaged by severe maritime exposure[K]. A very cold hardy plant when dormant, tolerating temperatures down to about -25°C[200]. The fresh young shoots in spring, however, can be damaged by frosts[186, K]. Plants are dioecious, though they sometimes change sex and monoecious trees are sometimes found[81, 186]. Male and female trees must be grown if fruit and seed is required[K]. The fruit is produced mainly on the undersides of one-year old branches[200]. A

very long lived tree[1, 7, 11, 185], one report suggests that a tree in Perthshire is 1500 years old, making it the oldest plant in Britain. Another report says that trees can be up to 4000 years old[11]. It is, however, slow growing and usually takes about 20 years to reach a height of 4.5 metres[186]. Young plants occasionally grow 30cm in a year but this soon tails off and virtually no height increase is made after 100 years[185]. A very ornamental tree, there are many named varieties[200]. Very resistant to honey fungus[8, 88, 200], but susceptible to phytophthora root rot[81, 88]. The bark is very soft and branches or even the whole tree can be killed if the bark is removed by constant friction such as by children climbing the tree[186]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. The fruit is greatly relished by thrushes[186]. Special Features: Not North American native. All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

## 5.2.31 *Crataegus cuneata*

Sanzashi, Chinese hawthorn

5 tin 9 cyuc 3 kcak 3 tcan 3 dwat 15 m hkuc hmimhtuk cyutli hgattcupha7n hwicli hrasjlutnyikfrip hpa7tli flatprkwlwisslp hpa7tmwatli xre7t hjonli

druuta *Crataegus cuneata* is a deciduous Shrub growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked and used in pies, preserves etc[147, 183]. It can also be dried for later use[177, 183]. A pleasant flavour, it is sold in local markets in China and Japan[178]. The fruit contains about 0.44% protein, 1% fat, 22.1% carbohydrate, 0.8% ash, it is rich in vitamin C, fruit acids and pectin[179]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

taanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Anodyne Anticholesterolemic Astringent Blood tonic Cardiotonic Dysentery Haemostatic Hypotensive Stomachic Vitamin C The fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The fruit is anodyne, anticholesterolemic, antidiarrhetic, antidyenteric, astringent, blood tonic, cardiotonic, haemostatic and stomachic[61, 147, 176, 218]. It is used in the treatment of dyspepsia, stagnation of fatty food, abdominal fullness, retention of lochia, amenorrhoea, postpartum abdominal pain, hypertension and coronary heart disease[176].

nrakta E. Asia - China, Japan. ksacta Sunny places in upland wilds[147]. Valleys, thickets and hills at elevations of 200 - 2000 metres[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

put up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Although perfectly cold-hardy in most of Britain when dormant, the young growth of this species might be susceptible to spring frosts[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.32 *Malus fusca*

Oregon Crab, Oregon crab apple

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 12 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Malus fusca* is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kakta Edible Parts: FruitEdible Uses: Pectin Pectin-Fruit - raw or cooked[11, 101]. Up to 2cm in diameter[229]. An agreeable sub-acid taste, it can be eaten out of hand or made into jellies, preserves etc[183]. The fruit can be left on the tree until there have been some autumn frosts, this will soften the fruit and make it somewhat less acid[K]. The fruit is rich in pectin so it can be added to pectin-low fruits when making jams or jellies[183, 257]. Pectin is also said to protect the body against radiation[201].

tcanta Pectin Pectin WoodThe fruit is a source of pectin[183]. Wood - hard, close grained, durable. Used for mallets, tool handles and bearings[11, 82, 99, 101, 226].

dwatta Antirheumatic Astringent Diuretic Dysentery Eczema Laxative Ophthalmic Pectoral Skin Stomachic TB TonicOregon crab was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. In particular, it gained a reputation with some tribes as a heal-all, especially useful for treating any of the internal organs[257]. It is little, if at all, used in modern herbalism. The trunk, bark and inner bark are antirheumatic, astringent, blood purifier, cardiac, diuretic, laxative and tonic[257]. A decoction has been used

in the treatment of coughs, stomach ulcers, dysentery, diarrhoea, rheumatism and consumption[257]. The shredded bark has been used to treat blood spitting[257]. A poultice of the chewed bark has been applied to wounds[257]. An infusion of the bark is used as an eyewash[257]. A decoction of the bark is used as a wash on cuts, eczema and other skin problems[257]. An infusion of the bark, combined with wild cherry bark (*Prunus* sp.) has been used as a cure-all tonic[257]. The juice scraped from the peeled trunk has been used as an eye medicine[257]. The soaked leaves have been chewed in the treatment of lung problems[257].

nrakta Western N. America - Alaska to California. ksacta Moist woods, stream banks, swamps and bogs in deep rich soils[60, 82], usually occurring in dense pure thickets[229].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental plant[1], it is slow-growing in the wild[229]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.33 *Amelanchier interior*

Pacific serviceberry

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 9 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli fyfxfre7t hjonli

drutta *Amelanchier interior* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet taste[177, K] and a juicy texture[229, K], even before the fruit is fully ripe[K]. The fruit is produced in small clusters and is up to 8mm in diameter[229]. The fruit is rich in iron and copper[226]. This species has been seen fruiting well at Kew where the fruit ripened about 3 weeks later than most of the other species[K].

nrakta Central N. America - Wisconsin to S. Minnesota and south to S. Dakota ksacta Hillslides and banks of streams[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.



nawatta *We have very little information on this species. We do not know if it will be hardy in Britain, though it is growing and fruiting well at Kew Gardens in London[K] and judging by its native range it should succeed outdoors in most parts of the country. This species is not stoloniferous[43]. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].*

### 5.2.34 *Crataegus flava*

Summer Haw, Yellowleaf hawthorn  
5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 8 m hkuc  
hmmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip  
hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus flava* is a deciduous Shrub growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta *Edible Parts:* Fruit<sup>Edible Uses:</sup> Fruit - raw or cooked[46, 61, 95, 161]. well-flavoured[2]. Dry and mealy[82], it is highly esteemed in N. America as a wild fruit gathered for making jellies[183]. The yellow fruit is pear-shaped[245], it is up to 16mm in diameter and is borne in small clusters[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta *Cardiotonic Hypotensive* Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Florida, west to Mississippi. ksacta Open woods and low hills in dry sandy or gravelly soils[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but

undercut the roots if they are to be left undisturbed for more than two years.

nawatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. The fruit is sparsely produced in Britain[11]. A tree at Kew in September 1993 was fruiting heavily[K].

### 5.2.35 *Crataegus pinnatifida*

Chinese Haw

5 tlin 9 cyuc 3 kcaak 2 tcan 3 dwat 7 m hkuc  
hmmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pinnatifida* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta *Edible Parts:* Fruit<sup>Edible Uses:</sup> Fruit - raw or cooked[105, 177]. A pleasant flavour[178]. The orange fruit has a mealy texture with an acid taste and a slight bitterness but is fairly nice raw[K]. It ripens fairly late, specimens seen at the end of October 1998 were not quite fully ripe[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 15mm in diameter[200], though in some forms it can be 25mm in diameter[266]. A nutritional analysis is available[218]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta *Alterative Antibacterial Anticholesterolemic Antidote Antiscorbutic Cardiotonic Deobstruent Hypotensive Laxative Stimulant Stomachic Vasodilator* The fruit is antibacterial, anticholesterolemic, cardiotonic, hypotensive, stomachic, vasodilator. It contains several medically active constituents including flavonoids and organic acids[279]. It has been shown to lower blood cholesterol levels and to improve blood circulation[176, 238, 279]. It is used in Korea in the treatment of abdominal distension, pain, diarrhoea and to induce menstruation[279]. The dried fruit is alterative, antiscorbutic, deobstruent, laxative, stimulant and stomachic[218]. The fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The seed is recommended in the treatment of difficult labour, hernia and swollen genitals[218]. The leaves and twigs are used as an antidote to varnish poisoning (from certain *Rhus* spp)[218]. The root is used in the treatment of nausea and vomiting[218].

nrakta E. Asia - N. China, Korea. ksacta Riverbanks, on sandy soils or stony slopes[74]. Among shrubs, on slopes at elevations of 100 - 2000 metres[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Industrial Crop: Medicinal Management: Standard Minor Global CropA very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Most trees have very few thorns, some forms are thorn-free[202]. A very ornamental plant[1, 11]. The sub-species *C. pinnatifida* major has larger fruit than the type species, it is cultivated for this fruit in China[46, 178, 200] Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.2.36 *Pyrus pyraeaster*

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 7 m hkuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pyraeaster* is a deciduous Tree growing to 7 m (23ft) by 5.5 m (18ft). See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is often borne in abundance and is up to 35mm in diameter. It ripens in late summer to early autumn. It is rather hard and astringent at first, but blets as soon as it falls from the tree and then has quite a good flavour, becoming soft and quite juicy[K].

nrakta C. and S.W. Europe. ksacta Thickets and open woods[50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to

late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°C[200].

## 5.2.37 *Amelanchier huroensis*

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Amelanchier huroensis* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is rich in iron and copper[226].

nrakta North-western N. America - Ontario, Michigan, Wisconsin and Minnesota. ksacta Open woods, cliffs and shores, chiefly on trap or other basic rocks[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of the country. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main drawback to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

## 5.2.38 *Crataegus aprica*

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc  
hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus aprica* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the

edible ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked. A good dessert fruit, it is sweet and rather juicy[82]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 12mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

**tcanta Wood** - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

**dwatta Cardiotoxic Hypotensive** Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

**nrakta South-eastern N. America** - Virginia to Tennessee and Georgia. **ksacta Dry woods** in the foothills of the Appalachians, 450 - 1000 metres[82].

**propta Seed** - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**nwatta** A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.39 *Crataegus pentagyna*

5 tlin 9 cyuc 3 kcak 0 tcant 2 dwat 6 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

**drutta** *Crataegus pentagyna* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in

June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kcakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked[2, 46, 105]. It can also be made into preserves[61] and can be dried for later use. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

**tcanta Wood** - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

**dwatta Cardiotoxic Hypotensive** Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

**nrakta S.E. Europe** to the Caucasus. **ksacta Woodland margins**[45, 50].

**propta Seed** - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**nwatta** A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Cultivated in China for its edible fruit, it is sold in the local markets[46, 61]. This report might be a mistake, probably applying instead to *C. pinnatifida*[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.40 *Amelanchier weigandii*

5 tlin 9 cyuc 3 kcak 0 tcant 0 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikli-  
wis hpa7tmwatli fyifxre7t hjonli

**drutta** *Amelanchier weigandii* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness.

It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit, raw or cooked. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Canada. ksakta Not known propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species, though it is growing well at Kew Botanical Gardens, where 8 year old plants are about 3 metres tall with multiple stems and lots of side branches[K]. They were flowering well at the end of April 1995[K]. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

## 5.2.41 *Crataegus hupehensis*

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 5 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli  
flatprilkwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus hupehensis* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105, 177, 200]. Esteemed in China, the fruit is large but insipid[61]. The fruit is up to 2.5cm in diameter[200, 266]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as

acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - W. China. ksakta Thickets on slopes at elevations of 500 - 2000 metres in Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan and Zhejiang Provinces[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Cultivated for its edible fruit in China[46, 61, 109].

## 5.2.42 *Berberis lycium*

5 tlin 9 cyuc 3 kcaak 1 tcan 3 dwat 3 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfriphpa7tli  
flatprilkwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis lycium* is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked and made into preserves[2, 11, 105, 177, 183]. Fairly juicy with a nice slightly acid flavour[K]. The fruits are about 8mm long[200]. Leaves and young shoots - cooked[2, 177, 183]. Leaves are a tea substitute[177, 183].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Aperient Cancer Carminative Dysentery Febrifuge OphthalmicThe roots are aperient, carminative, febrifuge and ophthalmic[11, 46, 61, 158, 240]. They are used in the treatment of eye complaints, menorrhagia, chronic diarrhoea and piles[240]. The leaves have been

in the treatment of jaundice[240]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas ksacta Shrubberies and open hillsides[51, 67], usually on hot dry slopes[146], to 3000 metres. in Kashmir[57].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A fairly hardy plant but it suffers some damage in severe winters[1]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they re-sprout well from the base[200].

### 5.2.43 Sambucus racemosa var. racemosa

Red Coast Elder

5 1ln 9 cyuc 3 ckac 2 tcan 2 dwat 3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis  
hpa7tmwatli xre7t hjonli

drutta Sambucus racemosa var. racemosa is a deciduous shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripe from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Fruit - raw or cooked[61, 105, 257]. The fruit can be made into jams and preserves[257]. It can also be dried for winter use[118]. The fruit is about 5mm in diameter and is borne in large clusters[200]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked.

dwatta The leaves are abortifacient, analgesic, oxytocic and poultice[257]. A decoction of the leaves has been used to terminate a pregnancy and can also be taken during labour to ease the birth[257]. An infusion of the leaves has been used as an antiseptic wash on areas affected by blood poisoning[257]. A poultice of the pounded leaves has been applied to abscess and boils and also to sore joints to help reduce the swelling[257]. A poultice of the cooked shoots has been used to alleviate pain[257]. The bark is cathartic[257]. An infusion of the bark has been used in the treatment of coughs and colds[257]. A poultice of the bark has been applied to sore joints to help reduce the swelling[257]. The fruit has been cooked and eaten as a treatment for stomach problems[257].

nrakta Western N. America - Alaska to California. ksacta River banks in low moist soils from sea-level to 2400 metres[82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

### 5.2.44 Rheum australe

Himalayan Rhubarb

5 1tn 9 cyuc 3 ckac 2 tcan 3 dwat 3 m hkuc  
hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatprikwis  
hpa7tmwatli xre7t hjonli

drutta Rheum australe is a PERENNIAL growing to 3 m (9ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Stem Edible Uses: Rutin Leaf stem - raw or cooked[22, 105, 183]. An excellent flavour that is something like apples[2, 183] (this is likely to be a cooking apple). The crop is sometimes blanched by excluding light from the growing stems, this produces an almost white stem that is free of fibre, crisp and less acid[2]. This species makes an excellent late crop[2]. The stems can also be made into a preserve or be dried and stored for later use[183]. One report says that the plant contains 0.32% rutin[240]. It does not specify which part of the plant, though it is likely to be the leaves[K].

tcanta Dye Lining The leaves can be up to 1 metre in diameter, they are used as a lining material and also to cover and protect fruit in baskets[2, 37]. A bright yellow dye is obtained from the root[272].

dwatta Digestive Purgative Tonic Rhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is *R. palmatum*. Though the chemistry varies slightly, this species is used interchangeably[238]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 37, 57, 61, 171, 238, 240]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This

is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - Himalayas. ksacta Open slopes on rocky ground at elevations of 3200 - 4200 metres[51, 272]. Grassy slopes at elevations of 3400 - 4300 metres in Tibet[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Hardy to about -20°C[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200]. The root is sold for medicinal purposes in local markets in the Himalayas[46, 61]. Overgathering of this plant from the wild, both for food and for medicine, is becoming a cause of conservation concern[272]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

## 5.2.45 Mahonia napaulensis

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 2.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta Mahonia napaulensis is an evergreen Shrub growing to 2.5 m (8ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[272]. An acid flavour, but it is rather nice raw especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit can also be dried and used as raisins[2, 51, 158, 177]. The ovoid fruit is about 12mm long[200].

tcanta Dye A yellow dye is obtained from the stem and leaves[61].

dwatta Antibacterial Antitumor Dysentery Ophthalmic Tonic The fruits are said to be diuretic and demulcent[240, 272]. They are used in the treatment of dysentery[240]. A decoction of the bark is used as eye drops to treat inflammations of the eyes[272]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218].

It should not be used with Glycyrrhiza species (Licquice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta E. Asia - Bhutan, Nepal, Sikkim and Uttar Pradesh. ksacta Dense wet oak and rhododendron forests to 2900 metres[51, 184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Cuttings of half ripe wood 15cm long, July in individual pots in a frame[78]. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown plant, it thrives in any good garden soil[11]. Grows well in heavy clay soils. Prefers a semi-shaded woodland position in a damp slightly acid to neutral humus rich soil[200]. Requires a position sheltered from cold or strong winds[1]. The plant is slightly tender in Britain[1] though it does well in Cornwall[59]. It under performs in areas where temperatures regularly fall below -10°C[200]. The young growth in spring can be damaged by late frosts[K]. Hybridizes freely with other members of this genus. The flowers have a delicate sweet fragrance[245]. At least one named variety has been developed for its ornamental value. 'Maharajah' appears to be harder than the type species[182]. Closely allied to *M. acanthifolia*[11] (which is quoted as a synonym of this species in some books). The differences stated between the two species do not hold true in the wild but in cultivation *M. acanthifolia* has leaflets with a dull surface, flowers in the autumn and is harder than many of the spring flowering introductions of *M. nepaulensis*. Resistant to honey fungus[88].

## 5.2.46 Cynara cardunculus

Cardoon

5 tlin 9 cyuc 3 kcaak 1 tcan 5 dwat 2 m hkuc  
htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli  
flatprikkwishsom hpa7tmwatli xre7t hjonli

drutta Cynara cardunculus is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves Root Stem Edible Uses: Curdling agent Flower buds - raw or cooked[33, 105]. A globe artichoke substitute[183]. The flower buds are a bit smaller than the globe artichoke and so are even more fit to use[K]. The buds are harvested just before the flowers open, they are then usually boiled before being eaten. Only the base of each bract is eaten, plus the 'heart' or base that the petals grow from [K]. The flavour is mild and pleasant and is felt by some people to be more delicate than the globe artichoke[K]. Stems - cooked and used as a celery substitute[2, 27, 33, 46, 61]. It is best to earth up the stems as they grow in order to blanch them and reduce their bitterness[4], these blanched stems can then be eaten cooked or in salads[105, 132, 183]. In Italy raw strips of the stems are dipped into olive oil[183]. We find these stems to be too bitter when eaten raw[K]. Young leaves - raw or cooked. Eaten as a salad by the ancient Romans[183]. Rather bitter[K]. Root-cooked like parsnips[27, 105, 183]. Tender, thick and fleshy,

Use an agreeable flavour[183]. The dried flowers are a rennet substitute, used for curdling plant milks[105, 183].

**tcanta Dye**The plant is said to yield a good yellow dye[4], though the report does not say which part of the plant is used.

**dwatta Anticholesterolemic Chologogue Digestive Diuretic**The cardoon has become important as a medicinal herb in recent years following the discovery of cynarin. This bitter-tasting compound, which is found in the leaves, improves liver and gall bladder function, stimulates the secretion of digestive juices, especially bile, and lowers blood cholesterol levels[238, 254]. The leaves are anticholesterolemic, antirheumatic, chologogue, digestive, diuretic, hypoglycaemic and lithontripic[7, 21, 165]. They are used internally in the treatment of chronic liver and gall bladder diseases, jaundice, hepatitis, arteriosclerosis and the early stages of late-onset diabetes[238, 254]. The leaves are best harvested just before the plant flowers, and can be used fresh or dried[238].

**nrakta S. Europe. ksacta Stony or waste places and in dry grassland, usually on clay**[50].

**propta Seed** - sow early spring in a greenhouse. Germination is usually quick and good, prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions during the summer. It would be prudent to give the plants some winter protection in their first year. The seed can also be sown in situ in April. Sow the seed 2cm deep, putting 2 or 3 seeds at each point that you want a plant[1]. Protect the seed from mice[1]. Division of suckers. This is best done in November and the suckers overwintered in a cold frame then planted out in April. Division can also be carried out in March/April with the divisions being planted out straight into their permanent positions, though the plants will be smaller in their first year.

**nwatta Industrial Crop: Biomass Management: Hay Management: Standard Staple Crop: Oil**Prefers a light warm soil and an open position in full sun[37, 200]. For best results, this plant requires plenty of moisture in the growing season and a good rich soil[16, 27, 33, 37], though another report says that it is drought tolerant once established[190]. Plants grew very well with us in the hot and very dry summer of 1995, though they were looking very tatty by September[K]. Tolerates most soils including heavy clays of both acid and alkaline nature, especially when grown in heavier or more spartan soils[200]. Plants are reasonably wind resistant[200, K]. This species is hardy to about -10°C[187]. Plants are more likely to require protection from winter cold when they are grown in a heavy soil[190]. Wet winters can do more harm than cold ones[K]. At one time the cardoon was often grown for its edible stems but it has now fallen into virtual disuse[132]. There are some named varieties[183]. It is a very ornamental foliage plant and makes a very attractive feature in the garden. The leaves are long lasting in water and are often used in flower arrangements[233]. Recent taxonomic revisions (1999) have seen the globe artichoke being merged into this species. However, since from the gardener's point of view it is quite a distinctive plant, we have decided to leave it with its own entry in the database under *Cynara scolymus*[K]. Plants seem to be immune to the predations of rabbits[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 5.2.47 *Mahonia japonica*

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc  
pcmhmtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

**drudda** *Mahonia japonica* is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in

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

**kcakta Edible Parts: Fruit**Edible Uses: Fruit - raw or cooked. An acid flavour, but it is rather nice raw especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The ovoid fruit is about 9mm long[200], it ripens in spring and crops can be quite good if the plant is in a sheltered position[K]. The fruit is produced in large clusters and so is easy to harvest[K].

**dwatta Antibacterial Antirheumatic Antitumor Antitussive Cancer Depurative Dysentery Expectorant Febrifuge Tonic**The leaf is febrifuge and is used as a tonic in cases of cancer[218]. The seed is febrifuge and tonic[218]. The roots and stems are antirheumatic, antitussive, depurative, expectorant and febrifuge[147, 218]. A decoction is used in the treatment of bone-breaking fevers, dizziness and tinnitus, backache, weak knees, dysentery and enteritis[147]. The root and root bark are best harvested in the autumn[213]. Berberine, universally present in rhizomes of *Mahonia* species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

**nrakta E. Asia - China, Taiwan. ksacta Damp woodlands in upland areas**[147, 200]. Not found in a truly wild situation, this species is possibly only a cultigen.

**propta Seed** - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

**nwatta** An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. Survives under very heavy tree shade[184]. Succeeds in poor soils when the leaves will often become bright red, especially if the plant is in full sun. The fully dormant plant is hardy to about -20°C[184], though the young growth in spring can be damaged by late frosts. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. This species is closely related to *M. bealei*[11, 200]. It hybridizes freely with other members of the genus. The flowers have a delicious perfume[245]. The form '*Hiemalis*' bears larger flower spikes which are almost as strongly scented as *Lily of the Valley* (*Convallaria majalis*)[245].

## 5.2.48 *Berberis x lologensis*

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 2.5 m hkuc  
hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli fyifxre7t hjonli

**drudda** *Berberis x lologensis* is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

**kcakta Edible Parts: Fruit**Edible Uses: Fruit - raw or cooked. A pleasant sub-acid flavour, though there are a lot

Use seeds to relatively little flesh[K]. Children generally love this fruit, along with some adults, though most adults seem to prefer it cooked in pies, preserves etc[K]. The fruits are about 7mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A garden hybrid. B. darwinii. x B. linearifolia ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Most of the seedlings seedlings revert back to one of the parents, usually B. darwinii[11]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Grows well on chalky soils[11]. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are several named varieties[182]. The cultivar 'Mystery Fire' bears very large crops of fruit, even on small plants[K]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

## 5.2.49 Berberis x carminea

5 tlin 9 cyuc 3 kcaak 1 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli ywishrasjtnyikfrip hpa7tli flat-prikwisslip hpa7tmwatli fyfxre7t hjonli

drutta Berberis x carminea is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant though strongly acid flavour, it goes well in a muesli[K]. Most children, and a few adults, really like the fruit raw, but in general most people will prefer to cook it[K]. The fruits are about 10mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Antitumor DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A range of garden hybrids involving B. aggregata as one parent with other closely related species. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Grows well on chalky soils[11]. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are several named varieties[182]. The cultivar 'Buccaneer' bears very large crops of large fruits, even on small plants[K]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

## 5.2.50 Rheum palmatum tanguticum

Da Huang

5 tlin 9 cyuc 3 kcaak 0 tcan 5 dwat 2 m hkuc hmimhtut cyutli tcup hwicli jtnyikfrip hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Rheum palmatum tanguticum is a PERENNIAL growing to 2 m (6ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. See Rheum palmatum for possible related information.

kcaakta Leaf stem - raw or cooked[2, 7, 105, 183]. The stem is superior in flavour to the common rhubarb and quite tender[2]. An acid flavour, it is sometimes used as a cooked fruit substitute[K].

dwatta Anticholesterolemic Antiseptic Antispasmodic Antitumor Astringent Cholagogue Diuretic Haemostatic PurgativeRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 7, 9, 21, 91, 171, 176, 238]. The roots contain anthraquinones, which have a purgative effect, and also tannins and bitters, which have an opposite astringent effect[244]. When taken in small doses, it acts as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232, 244]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants



are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - N.W. China. ksacta Valleys at elevations of 1600 - 3000 metres in Gansu, Qinghai and Xizang Provinces[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. This is a more robust form of the species[200], it is hardy to at least -15°C[238]. This sub-species is favoured for its medicinal properties over the species[244] and is cultivated as a medicinal plant in China[187]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

## 5.2.51 Mahonia bealei

Beale's barberry, Leatherleaf Mahonia

5 tlin 8 cyuc 3 kcaok 2 tcan 2 dwat 2 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfril hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Mahonia bealei is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from January to March, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant acid flavour, it is nice when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit is about 10mm long and 6mm wide[200], it ripens in April/May and if the plant is in a sheltered position the crops can be fairly heavy[K].

dwatta Antibacterial Antiphlogistic Antirheumatic Cancer Depurative Dysentery Febrifuge TonicThe leaf is febrifuge and tonic[218]. A decoction of the root and stems is antiphlogistic, antirheumatic, depurative and febrifuge[147, 218]. A decoction is used in the treatment of pulmonary tuberculosis, recurring fever and cough in rundown body systems, rheumatoid arthritis, backache, weak knees, dysentery and enteritis[147]. The root and root bark are best harvested in the autumn[213]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China in Hupeh, Hubei, Sichuan and Taiwan. ksacta Damp woodlands in uplands around 2000 metres[184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which

should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Rock garden, Specimen, Woodland garden. Thrives in any good garden soil[11]. Grows well in heavy clay soils. Survives under quite heavy tree cover[11], thriving in dense shade[182]. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. The fully dormant plant is hardy to about -20°C[184], though the young growth in spring can be damaged by late frosts. Scarcely distinct from *M. japonica*[11, 200], differing mainly in its broader leaflets which are placed closer together on the stem and its erect flower racemes[245]. It is often treated as a subspecies of *M. japonica*, despite the fact that this species is found in the wild whilst *M. japonica* is a cultigen and not a wild plant[11, 200]. Plants of the two species are often confused in cultivation. The flowers are sweetly scented[245]. Hybridizes freely with other members of this genus. Special Features:Attractive foliage, Not North American native, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

## 5.2.52 Chaenomeles x superba

Dwarf Quince, Flowering Quince

5 tlin 8 cyuc 3 kcaok 3 tcan 0 dwat 1 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfril hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Chaenomeles x superba is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - very harsh and acid raw but fragrant when cooked. Used for jams, jellies etc and as a flavouring with cooked apples[K]. The fruit can be apple or pear-shaped and up to 6cm long x 6cm wide[200].

tcanta Hedge HedgePlants can be grown to make a medium sized hedge[200]. Some cultivars, such as 'Crimson and Gold' produce suckers prolifically and are suitable for ground cover[182].

nrakta A hybrid of garden origin, *C. japonica* x *C. speciosa*. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. This species is a hybrid and so will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1, 11]. Prefers a deep moist well-drained loam[11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. Plants are hardy to about -25°C[200]. A very ornamental plant, there are many named varieties[200, 202]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey

fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.53 *Rumex patientia*

Herb Patience

5 tlin 10 cyuc 3 kcaok 0 tcan 1 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Rumex patientia* is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[1, 2, 5, 37, 177]. Eaten like spinach or made into a delicious puree, they are often mixed with a quarter part of sorrel in order to add flavour to them[183]. A fairly mild flavour[183], they make an excellent vegetable[K]. The leaves are produced very early in the year[27]. Carbon Farming - The hybrid *Rumex patientia* x *tianschanicus* is a good staple crop: balanced carb.

tcanta Although no specific mention has been made for this species, dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus. They do not need a mordant[168].

dwatta The juice, and an infusion of the root, has been used as a poultice and salve in the treatment of various skin problems[257]. An infusion of the root has been used in the treatment of constipation[257]. The leaves have been rubbed in the mouth to treat sore throats[257].

nraکتa Europe. Naturalized in a few places in Britain[17]. ksacta Waste land in Britain[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Experimental Crop Industrial Crop:  
Biomass Management: Coppice Management: Standard Staple Crop: Balanced carbA very easily grown plant, it succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. Formerly cultivated for its edible leaves[1, 2, 37, 50], these can be available in early February if the winter is mild[K]. An important food plant for the caterpillars of many species of butterfly[30]. The hybrid *Rumex patientia* x *tianschanicus* (Hybrid sorrel) is a good Carbon Farming plant. *Rumex patientia* x *tianschanicus* cultivation: new crop. Management: standard, coppice. Staple Crop: balanced carb. Industrial Crop: biomass.

## 5.2.54 *Chaenomeles japonica*

Dwarf Quince, Maule's quince, Japanese Flowering Quince

5 tlin 8 cyuc 3 kcaok 3 tcan 0 dwat 1 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Chaenomeles japonica* is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a medium rate. See

above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from November to January. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 4, 11, 177, 183]. Very harsh and acid raw but fragrant when cooked, imparting a strong pleasant flavour to jams and jellies[1, 200], it is especially good cooked with apples in apple pies[K]. The fruit is apple-shaped and about 4cm in diameter[200]. The rich aromatic juice, as tart as a lemon, is squeezed and used for culinary purposes[183].

tcanta Plants sucker freely and can be used as a ground cover. The form *C. japonica alpina* grows to about half the size of the species, it is especially suitable and can be planted about 1 metre apart each way[208].

nraکتa E. Asia - Japan ksacta Woods in low mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200]. Division of suckers in late winter[113]. They can be planted out straight into their permanent positions.

nwatta Landscape Uses:Border, Hedge, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25°C[200] and fruits freely in Britain[11]. Plants are occasionally cultivated for their edible fruit[183]. This species is closely allied to *C. speciosa*[11]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.55 *Mentha x smithiana*

Red Raripila Mint

5 tlin 9 cyuc 3 kcaok 0 tcan 2 dwat 1 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta *Mentha x smithiana* is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: Leaves Edible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods. The sweetly scented leaves can be used in the same ways as spearmint[238]. A good culinary mint, the leaves have an attractive red tinge[244]. A herb tea is made from the fresh or dried leaves[238]. It has a very pleasant and refreshing taste of spearmint, leaving the mouth and digestive system feeling clean[K]. An essential oil from the leaves and flowers is used as a flavouring in sweets, ice cream, drinks etc[238].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Febrifuge StomachicRed raripila mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Northern and Central Europe. ksakta Not known propta Seed - this hybrid is usually sterile, and even if seed is produced it will not breed true[200]. If you do obtain seed, then it can be sown in spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade[4]. Prefers partial shade and a slightly acid soil[4, 16]. This species is a hybrid involving *M. aquatica* x *M. arvensis* x *M. spicata*[200]. It has sweetly mint-scented leaves with similar culinary uses to *M. spicata*. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.56 *Impatiens noli*

Touch-Me-Not

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtud cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Impatiens noli-tangere* is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral content[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in *I. capensis* and

so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

ksakta Edible Parts: Leaves Seed Edible Uses: Young shoots - cooked[105, 172]. See the notes above on toxicity. Seed - raw. A delicious nutty flavour but rather difficult to harvest[172], mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K].

dwatta Antiseptic Diuretic Emetic LaxativeThe plant is antiseptic, diuretic, strongly emetic, laxative and vulnerary[4, 9, 61]. It has been used in the treatment of strangury and haemorrhoids[4]. The plant is occasionally used internally in the treatment of haemorrhoids and as a laxative and diuretic, but the dose must be carefully adhered to since large quantities are strongly emetic[9]. The plant is harvested at any time in the summer[9].

nrakta Europe, including Britain, from Scandinavia to France, east to Macedonia and temperate Asia. ksakta By streams, wet ground in woods in N. Wales, the Lake District, Yorkshire and Lancashire[17].

propta Seed - sow spring in a greenhouse. A period of cold stratification may help to improve germination rates. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying an outdoor sowing in situ in the spring or the autumn[4].

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. Self sows in areas where the minimum temperature is no lower than -15°C[200]. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

## 5.2.57 *Mentha aquatica*

Water Mint

5 tlin 9 cyuc 3 kcaak 3 tcan 3 dwat 1 m hkuc hmimhtud cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Mentha aquatica* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

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

ksakta Edible Parts: Leaves Edible Uses: Condiment TeaLeaves - raw or cooked. A strong distinctive peppermint-like fragrance[183]. Used as a flavouring in salads or cooked foods[5]. The leaves are too pungent for most people to use as a flavouring[244]. A herb tea is made from the leaves[21, 183].

tcanta Repellent StrewingThe plant repels flies, mice and rats[14, 20, 244]. It has a pleasant, fresh scent and was formerly used as a strewing herb and has been strewn in granaries to keep mice and rats off the grain[14, 244]. The plant, harvested before flowering, yields about 0.8% essential oil[240]. The fresh or dried plant is very good when used in herbal baths and can also be used in herb pillows[244]. Water garden.

dwatta Anodyne Antidiarrhoeal Antiseptic Antispasmodic Astringent Carminative Cholagogue Diaphoretic Emetic Refrigerant Stimulant Stomachic Tonic VasodilatorThe leaves are anodyne, antiseptic, antispasmodic, astringent, carminative, cholagogue, diaphoretic, emetic, refrigerant, stimulant, stomachic, tonic and vasodilator[4, 9, 21]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. It is also used as a mouth-wash and

g[9]. gale for treating sore throats, ulcers, bad breath etc[9]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe, including Britain, south and east to N. Africa and southwest Asia Also in S. Africa, Madeira ksacta Swamps, fen, marshes, near rivers, streams and ponds, in wet woods[9].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants can grow in water up to 15cm deep[24]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant, especially when bruised, has a pungent aroma of bergamot, etc[245]. The flowers are especially attractive to bees and butterflies[24]. A good companion for brassicas[14]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.58 Berberis aggregata

Salmon Barberry

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis aggregata is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A fairly acid lemony flavour, it can be eaten in quantity by those who like acid fruits - children seem particularly keen on it[K]. A very reliable cropper, the fruit is borne in abundance along the stems[1, K]. The fruit is about 7mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Thickets and stream-sides up to 2500 metres in Kansu and W. Szechwan[67, 109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so

should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus, especially the closely related B. wilsonae[1]. The true species is seldom seen in gardens, having been replaced with its hybrid progeny[182]. The seedling 'Sibbertoft Coral' is very closely related to B. aggregata and fruits well in Britain[11]. Plants can be pruned back quite severely and will resprout well from the base[200].

## 5.2.59 Amelanchier obovalis

Southern Juneberry, Coastal serviceberry  
5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier obovalis is a deciduous Tree growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit, raw or cooked[177]. Sweet and of very good quality, the fruit is eaten out of hand or used in pies, preserves, drinks etc[183]. The fruit is rich in iron and copper[226].

nrakta South-eastern N. America - Georgia and Alabama north to southern New Jersey[43]. ksacta Pinelands and low woods[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are stoloniferous[43]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. There is at least one named variety with improved fruits. 'Jennybelle' is a small bush, to 3.5 metres and produces few suckers so is easier to manage[183]. The fruit is up to 12mm in diameter and is sweet even before it is fully ripe. Plants fruit heavily and start to yield when young. They are resistant to drought, frost and high temperatures[183]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the

problema problem of hybridizing[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

## 5.2.60 *Impatiens glandulifera*

Jewelweed, Ornamental jewelweed

5 tlin 9 cyuc 3 kcaok 0 tcan 1 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Impatiens glandulifera* is an ANNUAL growing to 1.5 m (5ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral content[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in *I. capensis* and so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Oil OilYoung leaves and shoots - cooked[172, 183]. They should not be used on a regular basis, see warning at top of record[172]. Seed - raw[105, 177]. A delicious nutty flavour[183], but difficult to harvest in quantity mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K] An edible oil is obtained from the seed[17, 177, 183].

tcanta Oil OilAn oil from the seed is used for lighting[17, 177].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Impatience', 'Irritability' and 'Extreme mental tension'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209].

nrakta E. Asia - W. Himalayas - Pakistan to Uttar Pradesh. Naturalized in Britain. ksacta Shrubberies and bushy places, often on grazing ground, frequently gregarious, 1800 - 4000 metres in the Himalayas[51]. Grows on river banks and waste places in Britain[17].

propta Seed - sow spring in a greenhouse. A period of cold stratification may help to improve germination rates. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying an outdoor sowing in situ in the spring.

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. Self sows in areas where the minimum temperature is no lower than -15°C[200]. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

## 5.2.61 *Berberis angulosa*

5 tlin 9 cyuc 3 kcaok 1 tcan 2 dwat 1 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnykfrip hpa7tli  
flatprikwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis angulosa* is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. The relatively large berries are freely borne and are more palatable than most barberries[1, 3, 11]. The fruit is about 12mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas (Nepal) ksacta Alpine regions, open places in forests and amongst rocks in river beds to 4500 metres[51, 67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to *B. ludlowii*, *B. cappilaris* and *B. pariseipala*[200].

## 5.2.62 *Berberis rubrostilla*

5 tlin 9 cyuc 3 kcaok 1 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnykfrip hpa7tli  
flatprikwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis rubrostilla* is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Fairly large for a barberry, it is pear shaped with an acid flavour[K]. It can be eaten raw in small quantities, though most people would probably prefer to cook it in pies, preserves etc[K]. The fruits are about 15mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A hybrid of garden origin, *B. aggregata* x *B. sisonia*? ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings

are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. A hybrid species, it will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. This is probably not a true species but a hybrid involving *B. wilsonae* and perhaps *B. aggregata*. There are a number of named varieties selected for their ornamental value, many of these have quite large fruits which are freely borne. The cultivar 'Crawleyensis' has fruits up to 1.5cm long[200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

## 5.2.63 *Primula vulgaris*

Primrose, Common Primrose, English Primrose  
5 tlin 10 cyuc 3 kcak 3 tcan 3 dwat 0.3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprkl-  
wis hpa7tmwatli fyfxre7t hjonli

drutta *Primula vulgaris* is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from December to May, and the seeds ripen from April to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves Edible Uses: Tea Young leaves - raw or cooked as a potherb, added to soups etc[2, 177, 183]. A mild flavour, though the texture is a bit tough[K]. The leaves are often available all through the winter[K]. Leaves - raw or cooked. They make an attractive garnish to salads[4, 183, 238, K], and can also be used as a cooked vegetable or in conserves etc[4, 183]. Picked when first opened, the flowers are fermented with water and sugar to make a very pleasant and intoxicating wine[2]. Both the flowers and the leaves can be made into a syrup or a tea[183].

tcanta Makes a good carpet in open woodland and on woodland edges[24, 31]. Plants are best spaced about 35cm apart each way[208]. Attractive flowers.

dwatta Anodyne Antispasmodic Astringent Emetic Sedative Vermifuge Primroses have a very long history of medicinal use and has been particularly employed in treating conditions involving spasms, cramps, paralysis and rheumatic pains[238]. They are, however, considered to be less effective than the related *P. veris*[238]. The plant contains saponins, which have an expectorant effect, and salicylates which are the main ingredient of aspirin and have anodyne, anti-inflammatory and febrifuge effects[238]. This remedy should not be prescribed for pregnant women, patients who are sensitive to aspirin, or those taking anti-coagulant drugs such as warfarin[238]. The roots and the flowering herb are anodyne, antispasmodic, astringent, emetic, sedative and vermifuge[4]. An infusion of the roots is a good remedy against nervous headaches[4]. The roots are harvested in the autumn when two or three years old and dried for later use[4]. An ointment has been made from the plant and used for treating skin wounds[244].

nrakta Western Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Woods and hedgerows on acid and calcareous soils[4, 17]. Also found in the open on north-facing slopes in south-western England[31].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the

summer. Division in autumn. This is best done every other year[200].

nwatta Landscape Uses: Container, Ground cover, Rock garden, Woodland garden. Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200]. Grows well in heavy clay soils. Plants are hardy to about -25°C[187]. A very ornamental plant, there are many named varieties[187]. The blooms have a characteristic fragrance of a mossy bank or a deciduous woodland[245]. This species hybridizes readily with *P. elatior*[17]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for dried flowers, Fragrant flowers.

## 5.2.64 *Mentha requienii*

Corsican Mint, Mint

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 0.1 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprkl-  
wis hpa7tmwatli xre7t hjonli

drutta *Mentha requienii* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked. A very strong peppermint-like aroma, it is used as a flavouring in salads, cooked foods and liqueurs[183]. A herb tea is made from the leaves.

tcanta Essential Repellent Strewing An essential oil with a strong peppermint scent is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An ornamental ground cover plant[183].

dwatta Antiseptic Carminative Febrifuge A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe - Mediterranean in Corsica, Sardinia and Italy. Occasionally naturalized in Britain. ksacta Not known

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Reaching only 1-3 cm in height. Succeeds in most soils and situations so long as the soil is not too dry[200]. This species of mint will grow in drier soils than the other mints[245]. It also grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Prefers a shady position[188]. Fairly tolerant of being walked on, it grows well in the cracks of paving stones and also as a lawn with thyme and camomile[245]. This species is not hardy in all areas of Britain[238]. However, the plant usually self-sows even when

parent plant is killed by frost[238]. The whole plant is strongly aromatic with a peppermint aroma[245]. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 5.2.65 *Mentha x gracilis*

Ginger Mint

5 tlin 9 cyuc 3 kcaok 0 tcan 2 dwat 0.5 m hkuc  
hmhimmtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
lwis hpa7tmwlati xre7t hjonli

drutta *Mentha x gracilis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaoka Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked. They are used as a flavouring in salads or cooked foods[61, 105]. A refreshing odour and taste[183], they are said to go particularly well with melon, tomatoes and fruit salads[238]. The slight ginger scent make them an interesting addition to fresh salads[244]. A herb tea is made from the leaves. An essential oil from the leaves is used as a spearmint flavouring, it is especially used in N. America in chewing gums[183, 238].

tcanta Essential Repellent Strewing The essential oil obtained from the leaves has a spearmint flavour and is used commercially in N. America[238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative Febrifuge Ginger mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta A hybrid, *M. arvensis x M. spicata*. ksacta Not known in a truly wild situation.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by

division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. This species is somewhat less easy in cultivation than most other mints. It can be lost over winter if the weather is very cold or wet so ensure that it is grown in a warm, well-drained sunny position[K]. A sterile hybrid, the result of a cross between *M. arvensis* and *M. spicata*, though it can back-cross with its parents. There are some named varieties[183], most of which have variegated leaves. A polymorphic species[200]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a strong minty aroma with a hint of ginger[245]. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.66 *Mahonia nervosa*

Oregon Grape, Cascade barberry

5 tlin 9 cyuc 3 kcaok 3 tcan 2 dwat 0.6 m hkuc  
pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip  
hpa7tli flatpriklwis hpa7tmwlati xre7t hjonli

drutta *Mahonia nervosa* is an evergreen Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcaoka Edible Parts: Fruit Leaves Edible Uses: Fruit - raw or cooked[2, 3, 101]. An acid flavour but it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. Too acid for most tastes but they are very good in jams, jellies, pies etc[183]. They can also be used to enhance the flavour of bland fruits or made into a refreshing lemon-flavoured drink[183]. The fruit is about 8mm in diameter[200]. Young tender leaves - cooked. Simmered in a small amount of water and eaten as a snack[183].

tcanta Dye A yellow dye is obtained from the inner bark of the stem and roots[98, 101, 257]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. Plants can be grown as a ground cover, spaced about 30cm apart each way[208]. They are very slow to spread[208] and so will need weeding for their first few years after planting[K].

dwatta Antiarthritic Antibacterial Antitumor Blood tonic Dysentery Laxative Tonic The root is alternative and tonic[4]. It improves the digestion and absorption and is recommended in the treatment of psoriasis, syphilis and impure blood conditions[4, 257]. A decoction of the peeled and chopped root bark has been used as a wash in treating arthritis and as an eyewash for red itchy eyes[257]. The fruit is an excellent safe and gentle laxative[257]. Berberine, universally present in rhizomes of *Mahonia* species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumor activity[218]. The root and root bark are best harvested

in the autumn[13].

nrakta North-western N. America. ksacta Light dry woods and rocky ledges[60, 67].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown plant, it thrives in any good garden soil[11, 200] but also succeeds in poor dry ones. Another report says that it is best on a lime-free soil[182]. Grows well in heavy clay soils. Prefers a sunny position[3] but succeeds in heavy woodland shade[K]. Hybridizes freely with other members of this genus. Plants are growing and fruiting well at Wakehurst Place in Sussex, but they do not generally do well in Britain[11]. Resistant to honey fungus[88].

## 5.2.67 *Acer macrophyllum*

Oregon Maple, Bigleaf maple, Oregon Maple  
5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat m hkuc  
hmimhtu cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
lwis hpa7tmwatli hjonli

drutta *Acer macrophyllum* is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Inner bark Leaves Sap  
SeedEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177, 183]. The syrup is used as a sweetener on many foods. The concentration of sugar is somewhat lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Inner bark[177]. Eaten in small quantities with oil[257]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. The leaves, when wrapped round food during baking, impart a nice flavour to the food[99, 118]. Yellow flower clusters - raw. They are sweet with nectar[183]. Seeds - sprouted and then boiled[226]. The sprouted seeds are generally bitter, but the young shoots are quite sweet and juicy[257]. The seeds are about 6mm long and are produced in small clusters[82].

tcanta Basketry Companion Fibre Fuel Hair Preservative Scourer WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A sticky gum obtained from the buds in spring has been mixed with oil and used as a hair tonic[257]. A fibre obtained from the inner bark is used for making scouring pads, rope and crude dresses[99, 118, 257]. It was harvested in the spring and was also used in making baskets[257]. Young stems are used as coarse twine warp and weft in the manufacture of baskets[257]. Wood - light, soft, not strong, close grained. It is highly valued for timber, furniture and indoor use and is also used for carving bowls, veneer etc[46, 61, 82, 99, 118, 229]. It makes an excellent fuel, producing a hot smokeless flame[226].

dwatta TB TonicAn infusion of the bark has been used in the treatment of TB[257]. The raw sap has been used as a tonic[257].

nrahta Western N. America - southern Alaska to California. ksacta Found in a variety of soil types, on the banks of streams, in rich bottom lands and on rocky slopes of mountain valleys[82, 229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] and a position that is at least moderately sunny[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Growth of young plants is rapid in the wild, slowing down after 40 - 50 years with a maximum life span of about 275 years[229]. This species thrives in Britain but it can be cut back in a severe winter if that follows a mild autumn[11]. A very ornamental plant[1]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:North American native, Fragrant flowers, Inconspicuous flowers or blooms.

## 5.2.68 *Quercus petraea*

Sessile Oak, Durmast oak  
5 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 40 m hkuc  
hmimhtu cyutli tucphja7n hwicli jlutnyikfrip hpa7tli frusflat-  
priklwis hpa7tmwatli hjonli

drutta *Quercus petraea* is a deciduous Tree growing to 40 m (131ft) by 25 m (82ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Coffee GumSeed - cooked[2, 5, 8, 13]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[21, 61]. An edible gum is obtained from the bark[177].

tcanta Basketry Charcoal Compost Fuel Gum Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20, 201]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects.



The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is an ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The bark is very rich in calcium[13]. An ink is made from the oak galls, mixed with salts of iron[7, 66]. The wood is a source of tar, quaiacol, acetic acid, creosote and tannin[123]. Tannin is extracted commercially from the bark and is also found in the leaves[223]. Wood - hard, tough, durable even under water. It is highly valued for furniture, construction etc[4, 13, 66]. It is also a good fuel and charcoal[6, 61]. Trees can be coppiced to provide material for basket making, fuel, construction etc[23].

**dwatta Antiphlogistic** Bach Decongestant Dysentery Haemostatic TonicThe oak tree has a long history of medicinal use. It is anti-inflammatory, antiseptic, astringent, decongestant, haemostatic and tonic[4, 7, 9, 13, 21, 165]. The bark is the part of the plant that is most commonly used[4], though other parts such as the galls, seeds and seed cups are also sometimes used[7]. A decoction of the bark is useful in the treatment of chronic diarrhoea, dysentery, intermittent fevers, haemorrhages etc[4]. Externally, it is used to bathe wounds, skin eruptions, sweaty feet, piles etc[9]. It is also used as a vaginal douche for genital inflammations and discharge, and also as a wash for throat and mouth infections[9]. The bark is harvested from branches 5 - 12 years old, and is dried for later use[9]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Despondency', 'Despair, but never ceasing effort'[209]. A homeopathic remedy is made from the bark. It is used in the treatment of disorders of the spleen and gall bladder[9].

**nrakta Europe**, including Britain, from Norway south and east to Spain, S.W. Russia and Greece. **ksacta Woods**, especially on acid soils and in the western part of Britain, where it is often dominant[17].

**propta Seed** - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

**nwatta Landscape Uses:** Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[11]. Dislikes heavy clay[98]. Young plants tolerate reasonable levels of shade[200]. Found mainly on acid soils in the wild. Thrives in well drained soils but is also tolerant of periodic flooding[186]. Tolerates exposure and strong winds if these are not salt-laden[186]. A very important timber tree in Britain, it is also a food plant for the caterpillars of many species of butterfly[30], there are 284 insect species associated with this tree[24]. Trees were often coppiced or pollarded in the past for their wood[186], though this is best done on a long rotation of perhaps 50 years. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Older trees have a thick corky bark and this can protect them from forest fires, young trees will often regenerate from the base if cut down or killed back by a fire[186]. Trees transplant badly unless moved regularly[11]. Hybridizes freely with other members of the genus[200]. Immune to attacks by the Tortix moth[1]. This species is notably resistant to honey fungus[88, 200]. **Special Features:** Not North American native, Inconspicuous flowers or blooms.

## 5.2.69 *Cornus controversa*

**Giant Dogwood, Wedding Cake Tree,**  
5 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 15 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltutnykfrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

**drudda Cornus controversa** is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

**kcakta Edible Parts:** Fruit **Oil** **Edible Uses:** Oil **Fruit**[105, 177]. No more details are given. The fruit is about 6mm in diameter[200].

**tcanta Oil** The fruit provides an oil used in the lubricating and soap industry[266].

**dwatta Antiphlogistic** The leaves are used in folk remedies to relieve pain and reduce swelling[266].

**nrakta E. Asia - China, Japan, Himalayas.** **ksacta Woodland, hedges and thickets,** 600 - 2000 metres in W. China[109]. Broad-leaved or mixed broad-leaved and needle-leaved forests at elevations of 200 - 2600 metres[266].

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

**nwatta Landscape Uses:** Pest tolerant, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. A very ornamental plant[1, 11], it is hardy to about -20°C[184]. This species is unusual in having alternate leaves whilst almost all other members of this genus have opposite leaves[182]. Closely related to *C. alternifolia*[200]. Plants in this genus are notably resistant to honey fungus[200]. **Special Features:** Not North American native, Attractive flowers or blooms.

## 5.2.70 *Malus trilobata*

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 15 m hkuc  
hmimhtut cyutli tcup hwicli hrasjltutnykfrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

**drudda Malus trilobata** is a deciduous Tree growing to 15 m (49ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

**kcakta Edible Parts:** Fruit **Edible Uses:** Fruit - raw or cooked. A pleasant pear-like flavour[2, 105, 177]. The fruit is up to 2cm in diameter[200].

nrakta S. Europe to W. Asia. ksacta Evergreen scrub[50].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.71 *Pyrus calleryana*

Callery Pear

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkcuc  
hmimhtut cyutli hgattcup hwicli hrasjlutnykfrip hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus calleryana* is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from April to November, in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Best used after it has been exposed to frost[177, 183], since this will soften and sweeten the flesh[K]. The fruit is about 25mm in diameter[200].

tcanta Rootstock WoodThis species is widely used as a rootstock[183], especially for cultivars of *Pyrus pyrifolia*[266]. It is said to induce earlier bearing[160]. The wood of this species is hard and close-grained, and is sometimes used for making furniture and stools[266].

nrakta E. Asia - China, central and southern Japan. ksacta Thickets and streambanks to 1500 metres[109]. Slopes, plains, mixed valley forests and thickets at elevations of 100 - 1800 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Landscape Uses:Espalier, Firewood, Screen, Specimen, Street tree. Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Grows well on acid soils[160]. Plants are hardy to about -40°C when they are fully dormant[160]. There are many named forms selected for their ornamental value[200]. The cultivar 'Bradford' is resistant to fireblight[188]. Resists fireblight, collar rot, root aphid, pear psylla and root lesion nematodes[160]. Trees have a short dormancy period and lose their leaves late in the season[160]. Special Features: Not North American native, Naturalizing, Blooms are very showy.

## 5.2.72 *Pyrus nivalis*

Snow Pear

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkcuc  
hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnykfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus nivalis* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A sour flavour, it is usually cooked or brewed into cider or perry[183, 200]. The fruit matures late in the season and is 3 - 5cm long[200].

nrakta S.E. Europe to W. Asia. ksacta Sunny slopes and dry open woods in S. Europe[50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A very ornamental plant[1].

## 5.2.73 *Malus prattii*

Pratt apple

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkcuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus prattii* is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Gritty[1]. The fruit is 10 - 15mm in diameter[200].

nrakta E. Asia - China. ksacta Mixed forests on slopes at elevations of 1400 - 3500 metres in W Sichuan and NW Yunnan[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out

the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Plants fruit regularly at Kew[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 5.2.74 *Pyrus amygdaliformis*

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 10 m hkuc  
hmmimhtut cyutli hgattucc hwicli hrasjlutnyikfrip hpa7tli flat-  
prikwlis hpa7tmwattli xre7t hjonli

**drutta** *Pyrus amygdaliformis* is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

**kcakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is up to 3cm in diameter[200].

**nrakta** S. Europe to W. Asia. ksacta Dry rocky places in Bulgaria and the Mediterranean[50].

**propta** Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

**nwatta** Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200].

### 5.2.75 *Pyrus regellii*

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 9 m hkuc  
hmmimhtut cyutli hgatkuyucc hwicli hrasjlutnyikfrip hpa7tli flat-  
prikwlis hpa7tmwattli xre7t hjonli

**drutta** *Pyrus regellii* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

**kcakta** Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 3cm in diameter[200].

**tcanta** RootstockUsed as a rootstock[74].

**nrakta** W. Asia - Turkestan. ksacta Dry stony slopes, rocks, sometimes in valleys on deeper moist soils, 1000 - 2000 metres[74].

**propta** Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary

dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

**nwatta** Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are very drought resistant[74]. Plants are hardy to at least -15°C[200]. Cultivated for its edible fruit in China and Japan, there are many named varieties. A hybrid between this plant and *P. communis culta* is more suitable for warmer climates. The leaves are remarkably variable in shape[11]. Trees are used in the re-forestation of arid areas[74].

### 5.2.76 *Ilex aquifolium*

Holly, English holl, Christmas Holly, Common Holly, English Holly

5 tlin 9 cyuc 2 kcaok 4 tcan 2 dwat 9 m hkuc  
pcimhmmimhtut cyutli hgatkuyucc hwicli hyishrasjlutnyik-  
frip hpa7tli frusflatprikwlis hpa7tmwattli nyanhjen hjonli

**drutta** *Ilex aquifolium* is an evergreen Shrub growing to 9 m (29ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from November to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

**pcista** The fruit and probably other parts of the plant contain saponins and are toxic, causing diarrhoea, vomiting and stupor[10, 274]. However, toxicity levels are low and it is only in very large doses that problems are likely to arise[65, 76]. Do not exceed recommended doses. Fruits particularly poisonous to children [301].

**kcakta** Edible Parts: Edible Uses: TeaThe leaves have been used as a tea substitute[4]. The roasted fruit has been used as a coffee substitute[7]. Some caution is advised here, since the fruit can be purgative and emetic[K].

**tcanta** Fuel Hedge Hedge WoodAn excellent hedge plant, tolerating hard clipping and maritime exposure and forming a dense stock-proof shelter[4, 11, 29, 75, 186]. Plants are fairly slow growing however[11]. The cultivar 'Pendula' makes a very good carpeting ground cover plant when grown as a cutting on its own roots[208]. It can be planted up to 1.2 metres apart each way, but is fairly slow to cover the ground[208]. Wood - strong, hard and dense, it polishes well, though it must be well dried and seasoned or else it warps badly. It is beautifully white, except at the centre of very old trees, and is highly regarded by cabinet makers though it must be well seasoned[4, 7, 46, 61].

The heartwood of mature trees is used for printing blocks, engravings, turnery etc[11, 115]. The wood makes a good fuel, burning well even when green[6]. Landscape Uses:Border, Screen, Standard, Specimen.

**dwatta** Astringent Bach Diaphoretic Diuretic Emetic Expecto- rant Febrifuge PurgativeHolly is little used in modern herbalism. The leaves are diaphoretic, expecto- rant, febrifuge and tonic[4, 9, 21]. They can be use fresh at almost any time of the year or can be harvested in late spring and dried for later use[4, 9]. They are used in the treatment of intermittent fevers, rheumatism, catarrh, pleurisy etc[4, 238, 254]. The juice of the fresh leaves has been successfully used in the treatment of jaundice[4]. The berries are violently emetic and purgative[4, 7]. They have been used in the treatment of dropsy and as a powder they have been used as an astringent to check bleeding[4]. The berries are toxic, especially to children, and should not be used medicinally except under professional supervision[254]. The root has been

as a diuretic, though there are more effective diuretics available[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Hatred', 'Envy', 'Jealousy' and 'Suspicion'[209].

nrakta Western and central Europe, including Britain, from Norway to Germany south to the Mediterranean. ksacta Found in most well-drained soils in scrub, hedges and woodland where it is often the dominant under-storey shrub[7].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils, including peat, chalk, gravels, sand and shales[186], so long as they are not waterlogged, though wild plants are occasionally found in situations with standing winter water[186]. Grows well in heavy clay soils[186]. Established plants are fairly drought tolerant[186]. Dislikes dry soils according to one report[31] whilst another says that it succeeds in dry shade[188]. Tolerates a pH range from 3.5 to 7.2[186]. Succeeds in full sun or fairly dense shade[17, 28, 31], self-sown seedlings from woods and shady places making the most shade tolerant plants[28]. Tolerant of maritime exposure[75] though in such a situation it may lose some or all its leaves in the winter[186]. Plants require a minimum July temperature of 12°C for good fruit production[186]. They tolerate short periods in winter down to -15°C[184]. Severe frosts can kill whole branches, especially if they are open to the sky[186]. The young growth in spring can be damaged by late frosts. A very ornamental plant, there are many named varieties[182]. Flowers and fruits are formed on wood of the previous year's growth[229]. A good bee plant[108], the minute flowers are sweetly scented[245]. The fruit is a valuable winter food source for birds. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Only move the plants in May or, preferably, in September[1]. Plants are quite slow growing, even when in good soils and situations[11, 75]. Trees are usually dioecious but hermaphrodite forms are available. Male and female plants must usually be grown if seed is required. Plants are capable of regenerating from the main stem both above and below ground level and, although the top may be killed in a fire, the plants will usually regrow from the base[186]. Rabbits are particularly fond of this species and will quickly remove the bark. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.77 *Quercus libani*

Lebanon Oak

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 8 m hkuc

hmimhtut cyutli kyuctup hwicli jlutnykifrip hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Quercus libani* is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the

same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: Seed Edible Uses: Coffee Seed - cooked. The seed is about 2.5cm in diameter[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4].

dwatta Astringent Dysentery Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta W. Asia - Turkey, Iran, Iraq. ksacta Not known

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Prefers warmer summers than are usually experienced in Britain[200]. The seed ripens in its second year[200] and is frequently produced in Britain[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.78 *Malus sikkimensis*

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 7 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykifrip hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Malus sikkimensis* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

source, however, it can cause respiratory failure and even death.

**kaakta Edible Parts:** FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is up to 15mm in diameter[200] and is freely produced in Britain[11].

**nrakta E. Asia - Himalayas** from India to Sikkim and western China. **ksakta** Open forests on slopes, mixed forests in valleys at elevations of 2500 - 3000 metres in western China[266].

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

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. Closely related to *M. baccata*[1]. The fruit, which is freely produced in Britain[11], is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.79 *Malus bracteata*

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 7 m hkuc  
hmmimhut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

**drutta** *Malus bracteata* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

**kaakta Edible Parts:** FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is about 3cm in diameter[200].

**nrakta Southern N. America - Missouri to Florida.** **ksakta** Bottoms, wooded slopes, thickets and clearings[43] in most soil types and moisture levels[159].

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

**nwatta** An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife

food source, especially for birds[200]. There is some confusion over the correct name of this species, [43] lists this name as a synonym of *M. coronaria lancifolia* whilst [200] treats it as a species in its own right. This species is closely related to *M. ioensis*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.80 *Crataegus heterophylla*

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 6 m hkuc  
hmmimhut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli  
flatprikwis hpa7tmwatli xre7t hjonli

**drutta** *Crataegus heterophylla* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**kaakta Edible Parts:** FruitEdible Uses: Fruit - raw or cooked[177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is up to 1.5cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

**tcanta Wood** - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

**dwatta** **Cardiotonic Hypotensive** Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

**nrakta Europe to E. Asia - Spain to China.** Rarely self-sown in Britain. **ksakta** Found in secondary georgian oak forests.

**propta Seed** - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

**nwatta** A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years

before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[1].

## 5.2.81 *Crataegus nigra*

Hungarian Hawthorn

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 6 m hkuc  
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Crataegus nigra* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A soft flesh[200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. and C. Europe - Hungary. ksacta Woods[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often

flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.82 *Amelanchier ovalis*

Snowy Mespilus, Dwarf Garden Serviceberry

5 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 5 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Amelanchier ovalis* is a deciduous Shrub growing to 5 m (16ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked. Not very palatable, but it can be used for preserves etc[183]. The fruit is rich in iron and copper[226].

tcanta WoodWood - fine grained, hard, very heavy, reddish. Used for small articles[74].

nrakta C. and S. Europe ksacta Rocky places and stony woods[45], mainly on limestone[50, 184].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Fairly lime tolerant[200]. Hardy to about -20°C[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very ornamental plant[74]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features: Not North American native, Blooms are very showy.

## 5.2.83 *Malus glabrata*

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus glabrata* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177]. Up to 3cm in diameter[200].

nrakta N. America - Western N. Carolina. ksakta Valleys, 600 - 900 metres[82]

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. This species is closely related to *M. glaucescens*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.84 Fuchsia magellanica

Fuchsia, Hardy fuchsia

5 tlin 7 cyuc 2 kcaok 1 tcant 1 dwat m hkuc  
hmimhtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta Fuchsia magellanica is a deciduous Shrub growing to 3.6 m (11ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

ksakta Edible Parts: Fruit Edible Uses: Fruit - raw. A juicy berry[K], it is not very palatable[105, 177].

tcanta Dye Hedge Hedge A black dye is obtained from the wood[46, 61]. Very resistant of maritime exposure and tolerant of trimming it makes a good informal hedge in mild maritime areas[29, 75, 166]. The variety 'Riccartonii' is commonly used[200]. The cultivar 'Prostrata' forms a carpet of growth and can be used as a ground cover when planted about 60cm apart each way[208].

dwatta Diuretic Febrifuge Diuretic, febrifuge[46].

nrakta S. America. - Peru and south to Tierra Del Fuego. Naturalized in S.W. England. ksakta Forest clearings and margins, especially in mixed evergreen/deciduous woods[69].

propta Seed - best sown as soon as it is ripe[200] though it can also be sown in the spring[1]. Surface sow the seed in pots in a warm greenhouse and do not allow the compost to dry out[200]. Germination should take place in less than 6 weeks. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Inter-nodal cuttings of greenwood, 5 - 8cm long, May/June in a frame. Quick and easy, a high percentage take[78, K]. Overwinter in the greenhouse for the first year and plant out after the

last expected frosts. Inter-nodal cuttings of half-ripe wood, July/August in a frame. Very quick and easy, treat as greenwood cuttings above[K]. Cuttings usually succeed at any time during the growing season[K].

nwatta Landscape Uses: Border, Container, Ground cover, Specimen. Succeeds in any fertile well-drained circum-neutral soil, preferring one that is rich in humus[1, 200]. Grows well in heavy clay soils. Prefers cool moist conditions and some shade[1, 15]. Succeeds in a good loam if leafmold and sand are added[1]. This species is very resistant to maritime exposure, it can be grown right on the coast[75, 166]. The top growth is hardy to about -10°C[184], this can be cut right back to the ground in severe winters but the plants usually recover well, growing away quickly in the late spring and flowering by late summer[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The sub-species *F. magellanica myrtifolia* often bears a very large crop of fruit[K]. The cultivar 'Riccartonii' can be hardy fairly well north in Britain. A lovely specimen 3 metres tall was seen growing in dappled shade of trees in the Monastery Gardens in York[K]. A very ornamental plant, it is a parent of most of the hardy ornamental fuchsia varieties[1]. Plants seem to be immune to the predations of rabbits[233]. Plants are pollinated by humming birds in the wild, they are good bee plants in Britain[108]. Special Features: Extended bloom season in Zones 9A and above, Blooms are very showy.

## 5.2.85 Sambucus melanocarpa

Black Elder, Rocky Mountain elder

5 tlin 9 cyuc 2 kcaok 0 tcant 2 dwat m hkuc  
hmimhtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

drutta Sambucus melanocarpa is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

ksakta Edible Parts: Flowers Fruit Edible Uses: Fruit - raw or cooked[105, 161]. Low in pectin, it is best mixed with crab-apples or other pectin-rich fruits if used in making jams, jellies etc[183]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked.

dwatta Astringent Dysentery Poulitice Salve TB The dried ripe berries have been eaten as a treatment for diarrhoea[257]. A decoction of the roots has been used in the treatment of diarrhoea and dysentery[257]. A poultice of the boiled, mashed roots has been used as a treatment for caked breasts, cuts and wounds[257]. A decoction of the flowers has been used in the treatment of tuberculosis, coughs and colds[257]. It has also been given to children as a spring tonic[257]. A poultice of the crushed leaves has been used to treat bruises and bleeding wounds[257].

nrakta Western N. America. ksakta Moist places in California, 1800 - 3600 metres, and northwards to Canada[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a shel-

nered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.86 *Quercus acutissima*

Sawthorn Oak

5 tlin 9 cyuc 2 kcaak 3 tcan 2 dwat 5 m hkuc  
hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatprik  
lwis hpa7tmwatli hjonli

drutta *Quercus acutissima* is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: Leaves Seed Edible Uses: Seed - cooked[105, 177]. The seed is up to 25mm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Young leaves - cooked. A famine food when all else fails[177]. The roasted seed is a coffee substitute.

tcanta Charcoal Dye Fodder Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black dye is obtained from the seed cups[109]. Wood - used for boat building and construction[109]. The wood is also used for fuel and charcoal[11, 109].

dwatta Astringent DysenteryThe stem bark is used to clean foul sores[218]. The seeds are used in the treatment of diarrhoea, menorrhagia and gastrointestinal hypertrophy[218]. The cupule (seed cup) is astringent[218]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Often forming pure forests or growing with *Pinus* species, to 1000 metres in W. China[109].

propta Seed - quickly loses viability if allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed but must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: Tannin Management: Standard Regional Crop Staple Crop:

Balanced carb Landscape Uses: Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed ripens in its second year[200]. This species is closely related to *Q. variabilis*[1]. Often cultivated in China as a coppiced tree for fuel and charcoal[109]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 5.2.87 *Cornus macrophylla*

Large-Leaf Dogwood

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat m hkuc  
hmimhtut cyutli tcup hwicli hrasljlutnyikfrip hpa7tli flatprik  
lwis hpa7tmwatli xre7t hjonli

drutta *Cornus macrophylla* is a deciduous Tree growing to 15 m (49ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[2, 105, 146, 158, 200, 218]. The fruit is about 6mm in diameter[200].

tcanta Charcoal Good Wood - hard, close grained, warps badly[158]. It makes a good charcoal[146, 158].

dwatta Anodyne Astringent Dysentery Tonic Anodyne, astringent, tonic[178]. The wood is anodyne and a uterosedative[218]. The stem bark is used in the treatment of dysentery[218].

nrakta E. Asia - China, Japan, Himalayas. ksacta Woodlands, 1200 - 1800 metres in W. China[109]. Slopes, by streams, dense forests, mixed woods and margins of woods from sea level to 3600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow



chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. A very ornamental tree[1]. There is some confusion between this species and *C. controversa*[11]. Plants usually fruit heavily in Britain[11]. The flowers have a soft sweet perfume[245]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.88 *Pyrocydonia danielii*

5 tlin 9 cyuc 2 kcak 0 tcac 0 dwat 5 m hkuc  
hmimhtut cyutli hgtaccup hwicli hrasjlutnyikfrp hpa7tli flat-  
prklkwis hpa7tmwatli dyatre7t hjonli

drutta *Pyrocydonia danielii* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. Fully ripe fruits are crisp and juicy and the flavour is rather pear-like, though of inferior quality to most pears[K].

nrakta A graft hybrid of garden origin, *Cydonia oblonga* x *Pyrus communis* 'Williams Bon Cretien' ksacta Not known in the wild.

propta Seed. A bigeneric hybrid, it will not breed true from seed even if fertile seed is produced. If by chance you do obtain seed, then it is best sown in the autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood in early summer, treated with rooting hormone and rooted in a closed case with bottom heat[200]. Grafting onto *Pyrus communis*.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200].

## 5.2.89 *Berberis amurensis*

5 tlin 9 cyuc 2 kcak 0 tcac 2 dwat 3.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli  
flatprklkwis hpa7tmwatli fyfxfre7t hjonli

drukta *Berberis amurensis* is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitLeavesEdible Uses: Fruit-cooked. Used in preserves[177]. The oblong fruit is about 10mm long[200]. Leaves[177]. No more details.

tcanta Hedge HedgePlants are very amenable to trimming and can be grown as an almost impenetrable formal or informal hedge[200].

dwatta Antibacterial Antirheumatic Cancer Dysentery-The root is antirheumatic[218]. Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia. ksacta Thickets, edges of woods and banks of streams in Korea and Manchuria[67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. This species is closely allied to *B. vulgaris*, it hybridizes freely with other members of the genus[1]. There are some named forms selected for their ornamental value[200]. Plants can be pruned back quite severely and will resprout well from the base[200].

## 5.2.90 *Berberis parisepala*

5 tlin 9 cyuc 2 kcak 0 tcac 2 dwat 3 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli  
flatprklkwis hpa7tmwatli fyfxfre7t hjonli

drukta *Berberis parisepala* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related *B. angulosa* - it quite possibly can also be applied to this species[K]. Fruit - raw or cooked. The relatively large berries are freely borne and are more palatable than most barberries. The fruit is about 15mm long and 8mm wide[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in northern Assam, northeastern India, Nepal, Sikkim and eastern Tibet. ksacta In the subalpine to alpine zone, growing on rocky slopes and scree.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. This species comes into leaf very early in the spring[11]. Hy-

bridizes freely with other members of this genus[1]. This species is closely related to *B. angulosa*[200].

## 5.2.91 *Rosa pisocarpa*

Cluster Rose, Ahart's cluster rose  
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 2.5 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

*dru*ta *Rosa pisocarpa* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

*pcista* There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

*kcakta* Edible Parts: Fruit Seed Stem Edible Uses: Tea Fruit - raw or cooked[118, 183]. It is used to make jams and jellies, it is also used to make a pleasant tasting fruity-flavoured tea[177, 183]. The fruit is about 13mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The shoots can be used to make a tea-like beverage[257]. Young tender shoots - peeled and eaten in the spring[257].

*dwatta* Astringent Cancer Foot care VD Women's complaints A decoction of the roots has been used in the treatment of sore throats and syphilis[257]. An infusion of the bark has been taken by a mother just after childbirth[257]. A decoction of the branches, combined with chokecherry (*Prunus virginiana*) and red willow (*Salix bonplandiana*), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The leaves have been placed in the shoes as a protection from athletes foot[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

*nrakta* Western N. America - British Columbia to California. *ksacta* Shaded slopes below 1500 metres in California.

*propta* Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out

direct into their permanent positions. Layering. Takes 12 months[11].

*nwatta* Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.92 *Ribes sanguineum*

Flowering Currant, Blood currant  
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 2.5 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli xre7t hjonli

*dru*ta *Ribes sanguineum* is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

*kcakta* Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[101, 105, 118, 257]. It does not have a wonderful flavour, but is tolerable raw[K]. It can be harvested when still firm in August and when stored carefully will keep until November, by which time the flavour has improved slightly[K]. The fruit is about 10mm in diameter[200].

*tcanta* Hedge Hedge Tolerates maritime exposure and can be grown as an informal hedge[29, 49]. It provides reasonable shelter when in leaf but is rather bare and gives little protection in winter[K]. Fruit loved by birds. A good ground-cover shrub for dry shade when planted with shorter ground-covers.

*nrakta* Western N. America. Occasionally naturalized in Britain. *ksacta* Open to wooded, moist to rather dry valleys and foothills[60].

*propta* Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

*nwatta* Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Grows well in heavy clay soils. Succeeds in full sun, it is also quite tolerant of shade though it does not fruit so well in such a position[11]. Tolerates maritime exposure[49]. Hardy to about -25°C[200]. A very ornamental plant[11], there are a number of named varieties[182]. A plant labelled *R. sanguineum carneum* (which is probably the cultivar '*Carneum Grandiflorum*') was seen at Kew with a very good crop of unripe fruit in July 1994[K]. A disease-resistant plant, the species is being used in blackcurrant breeding programmes[119]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Heat zone: 8-6.

## 5.2.93 *Rosa centifolia*

Provence Rose, Cabbage rose  
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wis hpa7tmwatli fyifxre7t hjonli

drutta Rosa centifolia is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed Edible Uses: Tea Fruit - raw or cooked. A pulpy flesh[11]. It is best after it has been softened and sweetened by frost. There is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The blossoms are used for scenting tea[2, 46, 177, 183]. The petals are preserved in sugar and used as a delicacy[183]. They can also be added to fruit pies as a flavouring[183].

tcanta Essential Pot-pourri An essential oil is obtained from the flowers, it is used in perfumery[57, 61, 171]. The dried petals are used in pot-pourri[4].

dwatta Aromatherapy Astringent Cancer Laxative The root is astringent[240]. The petals are laxative[240]. A syrup made from the petals is used to treat constipation in infants[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavonoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The essential oil is used in aromatherapy. Its keyword is 'Cleansing'[210].

nrakta A garden hybrid of uncertain origin. ksacta Not known in a truly wild situation.

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. A very ornamental plant[1], there are many named forms developed for their ornamental value[245]. The flowers are fragrant[245]. The Provence rose is often cultivated for its essential oil in southern France and Morocco[4, 61]. It is closely related to R. damascena and R. gallica[11]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation

[18, 20]. Grows badly with boxwood[18]. Plants produced a few suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.94 *Solidago canadensis*

Canadian Goldenrod, Shorthair goldenrod, Harger's goldenrod, Rough Canada goldenrod, Common Goldenrod  
5 tin 10 cyuc 2 kcaak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwan2 hrasjlatnutnykfrp hpa7tli flatprik-lwis hpa7tmwatli fyfixre7t hjonli

drutta *Solidago canadensis* is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Weak potential for sensitization. Irrigation therapy is contraindicated in cases of oedema due to renal or heart disease. Care needed with chronic kidney disease[301].

kcakta Edible Parts: Leaves Oil Seed Edible Uses: Oil Tea Young leaves and flowering stems - cooked[172]. Seed[22, 46, 61, 105, 161, 183]. Used as a thickener in soups[172]. The seed is very small[K] and is only used as a survival food when all else fails[222]. A tea can be made from the flowers and/or the leaves[172, 183].

tcanta Dye Oil Mustard, orange and brown dyes can be obtained from the whole plant[168]. The source of 'Canadian goldenrod' oil[46]. We have no further details, but it is likely to be an essential oil.

dwatta Antiseptic Haemostatic Kidney Salve Styptic Urinary Haemostatic, styptic[168, 172]. The root is applied as a poultice to burns[168, 172, 222]. An infusion of the dried powdered herb can be used as an antiseptic[168, 172]. The blossoms are analgesic, astringent and febrifuge[257]. They have been chewed and the juice slowly swallowed to treat sore throats[213, 222]. A tea made from the flowers is used in the treatment of diarrhoea, body pains, fevers and snakebites[222, 257]. The plant contains quercetin, a compound that is reportedly useful in the treatment of haemorrhagic nephritis[222]. This plant is said to have similar medicinal properties to *S. virgaurea*. These are:- Goldenrod is a safe and gentle remedy for a number of disorders. In particular, it is a valuable astringent remedy treating wounds and bleeding, whilst it is particularly useful in the treatment of urinary tract disorders, being used both for serious ailments such as nephritis and for more common problems such as cystitis[254]. The plant contains saponins that are antifungal and act specifically against the *Candida fungus* which is the cause of vaginal and oral thrush[238, 254]. It also contains rutin which is used to treat capillary fragility, and phenolic glycosides which are anti-inflammatory[238]. The leaves and flowering tops are anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, carminative, diaphoretic, mildly diuretic, febrifuge and stimulant[4, 7, 9, 21, 147, 165]. A good vulnerary herb, it has also proved of value when used internally in the treatment of urinary infections, chronic catarrh, skin diseases, influenza, whooping cough, bladder and kidney stones etc[4, 238]. Due to its mild action, goldenrod is used to treat gastro-enteritis in children[254]. It makes an excellent mouthwash in the treatment of thrush[7]. The plant is gathered in the summer and dried for later use[7]. The seed is anticoagulant, astringent and carminative[218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney and bladder disorders, rheumatism and arthritis[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Solidago canadensis* for infections of the urinary tract, and kidney and bladder stones (see [302] for critics of commission E).

nrakta Eastern N. America - Newfoundland to Ontario, south to Virginia. Naturalized in Britain[17]. ksacta Dry to damp thickets, roadsides, slopes and clearings, avoiding acid soils.

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Foundation, Seashore, Specimen, Woodland garden. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The flowers attract butterflies and moths[30]. The plant also attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers.

## 5.2.95 *Mentha suaveolens*

Round-Leaved Mint, Apple mint, Pineapple Mint  
5 tin 10 cyuc 2 kcaak 2 tcan 2 dwat 1 m hkuc  
hmimhtut cyutli tcup hwicli hratslutnykfrif hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Mentha suaveolens* is a PERENNIAL growing to 1 m (3ft 3in) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked as a potherb[50]. Used as a flavouring in salads or cooked foods[183]. The leaves have a similar flavour to spearmint, and are considered to be superior in flavour to that species but are also hairy, which makes them less suitable for garnishing[238]. A herb tea is made from the leaves[183].

tcanta Essential Repellent Strewing An essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative Febrifuge Round leafed mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta S. and W. Europe, north to the Netherlands and east into W. Asia. ksakta Damp ground that often dries out in summer, from sea level to 400 metres in Turkey[93].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring

or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen. A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but plants also succeed in partial shade. Often cultivated as a pot herb[50]. There are some named varieties[200]. The flowers have a sickly sweet smell[50]. A very invasive plant, spreading freely at the roots[200]. Unless you have the space to let it roam, it needs to be restrained by some means such as planting it in a container that is buried in the soil[K]. It is said to be a good companion for cabbages and tomatoes, its aromatic leaves repelling insect pests, though its aggressive root system also needs to be taken into account here. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies. Members of this genus are rarely if ever troubled by browsing deer[233]. Hybridizes freely with other members of this genus. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 5.2.96 *Rheum ribes*

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc  
hmimhtut cyutli kyucutcup hwicli jlutnykfrif hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Rheum ribes* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcaakta Edible Parts: Stem Edible Uses: Leaf stem - cooked[2, 93, 105]. Eaten raw by the local people[187].

nrakta W. Asia - Turkey to Iran. ksakta Dry gorges among rocks, 2300 - 2700 metres[93, 187].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the

spring. Division in early spring or autumn[1, 111]. Divide the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Best grown in a dry position, where it can be very long-lived[187]. Hardy to about -20°C according to one report[200] whilst another says that plants are somewhat tender in Britain[1]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

## 5.2.97 *Berberis fendleri*

Colorado Barberry

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc  
hmmhtut cyutli kyuctcup hwicli hyishrasjlnutyikfrrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis fendleri* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 161, 177, 257]. The fruits are about 5mm long[200].

tcanta Dye A yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta South-western N. America - Colorado, New Mexico and Utah. ksacta Slopes and canyon bottoms at elevations of 1300 - 2700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

## 5.2.98 *Mentha longifolia*

Horsemint

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc  
hmmhtut cyutli tcup hwicli hrasjlnutyikfrrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mentha longifolia* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower

from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kcakta Edible Parts: Leaves Edible Uses: Condiment Tea Leaves - raw or cooked. Peppermint-scented, they are used as a flavouring in salads, chutneys and cooked foods[183, 238]. A herb tea is made from the leaves[183]. An essential oil obtained from the leaves and flowering tops is used as a food flavouring in sweets etc[183]. A peppermint-like taste[183].

tcanta Essential Repellent Strewing The leaves contain about 0.57% essential oil[240]. It is sometimes used as a substitute for peppermint oil in confectionery[238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiasthmatic Antiseptic Antispasmodic Carminative Stimulant Horsemint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The leaves and flowering stems are antiasthmatic, antispasmodic, carminative and stimulant[4, 148, 240]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Central and southern Europe, including Britain, Mediterranean region, Siberia. ksacta Waste places and damp roadsides[17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but the plants also succeed in partial shade. There is some confusion over the name of this plant, it appears in the British flora[17] but according to Flora Europaea it is not found in Britain[50]. Sometimes cultivated for its leaves, there are some named varieties[183]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.99 Berberis sikkimensis

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis sikkimensis is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. A fairly acid flavour, it is acceptable raw in small quantities, and children seem to like it. Generally, though, most people will prefer to cook it[K].

tcanta DyeA yellow dye is obtained from the root.  
dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Sikkim. ksacta Found at elevations of 2,100 - 4,200 metres in the Himalayas.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. This species is closely related to *B. chitria*[11]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

## 5.2.100 Mentha satuireioides

Native Pennyroyal

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.3 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mentha satuireioides is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods. A herb tea is made from the leaves.

tcanta Essential Repellent StrewnAn essential oil is obtained from the whole plant. It has a scent intermediate between pennyroyal and peppermint[238]. The plant is used

as an insect repellent[154]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Abortifacient Alterative Antiseptic Antispasmodic Blood purifier Carminative Digestive Emmenagogue TonicThe leaves and flowering plant are alterative, antispasmodic, blood purifier, digestive, emmenagogue and tonic[152, 154, 238]. A tea made from the leaves has traditionally been used in the treatment of fevers, coughs, colds, headaches, digestive disorders, menstrual complaints and various minor ailments[152, 222, 238]. It can be used as a substitute for both pennyroyal (*Mentha pulegium*) and peppermint (*Mentha x piperita*)[238]. Like those species, it should not be prescribed for pregnant women since it can procure an abortion[238]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222] and can cause abortions[152, 154].

nrakta Australia - New South Wales, Queensland, Victoria. ksacta Banks of rivers and creeks, open forests and pastures, especially on shale[152].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to about -15°C[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.101 Rheum compactum

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc  
hmimhtut cyutli tcup hwicli jlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rheum compactum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

ksakta Edible Parts: StemEdible Uses: Leaf stem - cooked[2, 74]. A tart flavour, it can be used as a rhubarb substitute[105].

nrakta E. Asia - China. ksakta Banks of rivers and brooks, valleys and slopes[74]. Slopes at elevations around 2000 metres in Tibet[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Hardy to about -20°C[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

## 5.2.102 Sinapis arvensis

Charlock, Charlock mustard, Wild mustard  
5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.8 m hkuc  
htut cyuutli tcup hwicli hrasjlutnyikfrrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Sinapis arvensis is a ANNUAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The plant is possibly poisonous once the seedpods have formed[76].

ksakta Edible Parts: Flowers Leaves Oil Oil SeedEdible Uses: Condiment Oil OilLeaves - raw or cooked[2, 4, 5, 12, 74]. Somewhat hot, the young leaves are used as a flavouring in salads, where they add a piquant flavour[9, 183]. Older leaves are used as a potherb[183]. It is best to use just the young shoots and leaves in the spring, older leaves are bitter[9]. Flowering stems - cooked[9, 74]. A pleasant, cabbage/radish flavour, they can be used as a broccoli substitute before the flowers open[183]. The stems should be lightly steamed for no more than 5 minutes[9]. The flowers can also be cooked as a vegetable or used as a garnish[183]. Seed - it can be sprouted and eaten raw[12]. A hot flavour, it can be added to salads and sandwiches[183]. The seed can be ground into a powder and used as a food flavouring. It has a hot mustard flavour[4, 9, 46, 115]. An edible oil is obtained from the seed[1, 57, 74].

tcanta Oil OilAn edible semi-drying oil is obtained from the seed. It is also used in making soap[74] and burns well so can be used for lighting[4].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Black depression', 'Melancholia' and 'Gloom'[209].

nrakta Europe, including Britain, south and east from Norway to N. Africa, Siberia and S.W. Asia. ksakta Cultivated ground, usually on heavy calcareous soils[13, 17]. A serious weed of agriculture, especially in spring sown crops[1, 17].

propta Seed - germinates in spring and autumn in the wild. It should not really need much encouragement.

nwatta Usually found on heavy alkaline soils in the wild[17]. Succeeds on most soils. Dislikes shade. The plant harbours an eelworm that attacks other crops[13]. It is therefore best not to grow it in a garden setting.

## 5.2.103 Lamium album

White Dead Nettle

5 tlin 9 cyuc 2 kcaak 3 tcan 3 dwat 0.6 m hkuc  
hmimhtut cyuutli tcup hwicli hrasjlutnyikfrrip hpa7tli flatpriklwiss hpa7tmwatli xre7t hjonli

drutta Lamium album is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to December, and the seeds ripen from July to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw or cooked[2, 5, 7, 13, 54]. They can be added to salads or mixed with other leaves and cooked as a potherb[183]. They can also be dried for later use[12]. The leaves are a good source of vitamin A[240]. A pleasant herb tea is made from the flowers[238].

tcanta The plant has a creeping rootstock and makes a good groundcover plant for woodland edges[24].

dwatta Antiflatulent Antispasmodic Astringent Cancer Cholagogue Depurative Diuretic Expectorant Homeopathy Hypnotic Ophthalmic Pectoral Resolvent Sedative Styptic Tonic Vasoconstrictor VulneryWhite dead nettle is an astringent and demulcent herb that is chiefly used as a uterine tonic, to arrest inter-menstrual bleeding and to reduce excessive menstrual flow. It is a traditional treatment for abnormal vaginal discharge and is sometimes taken to relieve painful periods[254]. The flowering tops are antispasmodic, astringent, cholagogue, depurative, diuretic, expectorant, haemostatic, hypnotic, pectoral, resolvent, sedative, styptic, tonic, vasoconstrictor and vulnerary[4, 7, 9, 13, 21, 46, 61, 165, 238, 240]. An infusion is used in the treatment of kidney and bladder complaints[9], diarrhoea, menstrual problems, bleeding after childbirth, vaginal discharges and prostatitis[238, 254]. Externally, the plant is made into compresses and applied to piles, varicose veins and vaginal discharges[7, 238, 254]. A distilled water from the flowers and leaves makes an excellent and effective eye lotion to relieve ophthalmic conditions[7]. The plant is harvested in the summer and can be dried for later use[9]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of bladder and kidney disorders and amenorrhoea[9].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Himalayas and Japan. ksakta Fields, hedgerows, woodland edges and clearings and moist waste ground[7, 9, 17].

propta Seed - this species usually self sows freely and should not require human intervention. When required it can be sown in situ as soon as it is ripe. Division in spring. Division succeeds at almost any time in the growing season[K]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Ground cover. A very easily grown plant, it tolerates most soils and conditions[200]. Grows well in heavy clay soils. Prefers a sunny position, though it also does well in partial shade[238]. Plants are hardy to about -25°C[187]. The white dead nettle is too weedy to be grown in the flower garden, but it does well in the wild garden and self-sows when well sited[200]. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4, 24] and a good companion plant, helping any vegetables growing nearby[14, 18]. Special Features: Attractive foliage, Invasive, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length[2-1].

## 5.2.104 Berberis ulcina

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli  
flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis ulcina is a SHRUB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272].  
tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Ophthalmic  
StomachicBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - northern India, Nepal and Tibet. ksacta  
Open windy slopes at elevations of 2500 - 3500 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants can be pruned back quite severely, they resprout well from the base[200]. Hybridizes freely with other members of this genus[1].

## 5.2.105 Mimulus guttatus

Yellow Monkey Flower, Seep monkeyflower

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc  
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrp  
hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Mimulus guttatus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[94, 105, 155, 172]. A slightly bitter flavour, they are added to salads[161, 183]. The leaves are used as a lettuce substitute[257].

dwatta Astringent Bach Poultice VulneraryThe plant is astringent, poultice and vulnerary[94, 172, 257]. A decoction of the leaves and stems has been used as a herbal steam bath for chest and back soreness[257]. A poultice of the crushed leaves has been applied to wounds, rope burns etc[257]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Fear or anxiety of a known origin'[209].

nrakta Western N. America - Alaska to Mexico. Naturalized in Britain. ksacta Streams and wet places below 3000 metres[187]. Banks of streams in Britain, where it appears quite native[17].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1, 111]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. Grows well in shallow water, but it can be invasive[200]. Hardy to at least -20°C[187]. There is some confusion over the naming of this plant, the entry on edibility may refer to *M. luteus*, which is closely related to this species.

## 5.2.106 Thuja plicata

Western Red Cedar, Giant Arborvitae, Giant Cedar, Incense Cedar, Western Red Cedar

5 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 60 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrp hpa7tli flat-  
prikliwsslp hpa7tmwatli hjonli

drutta Thuja plicata is an evergreen Tree growing to 60 m (196ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner barkEdible Uses: GumInner bark - fresh or dried[2, 105, 161]. The inner bark can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. A pitch obtained from the trunk has been used as a chewing gum[257].

tcanta Baby care Basketry Brush Dye Fibre Fuel Fungicide Gum Hair Hedge Hedge Insulation Paper Roofing Scourer Shelterbelt Stuffing Thatching Tinder Wick Wood-Tolerant of light trimming and of reasonable exposure, this species can be grown as a hedge or as part of a shelterbelt[75]. An infusion of the boughs can be used as a hair wash to treat dandruff and scalp germs[257]. The fibrous inner bark can be pounded until it is soft and then used as a sponge for scouring dishes etc, or can be used for making rough clothing, blankets, mats, ropes, sanitary towels, a padding in a baby's cradle, nappies etc. Waterproof hats, capes, trousers, skirts etc can be made from the inner bark[257]. It is also used in thatching and as a stuffing material for mattresses[46, 61, 82, 99, 118, 171, 226, 257]. Inner bark strips have been used as a roofing material[257]. The bark has also been used to make paint brushes[257]. The inner bark has been used to make a wick for oil lamps[257]. The inner bark has been used for making baskets[257]. The roots are used in basket making, making nets etc[99]. The roots have been used in coiled and imbricated baskets[257]. The roots have been peeled, split and used to make coiled watertight baskets that can be used for boiling water[257]. The roots are harvested in the spring or early autumn when it is easier to remove the bark. The outer strips of the roots are used to make the bottom of the basket, the centre core is used in the coils and the root bark, because of its toughness, is used to make the edges[257]. The fibrous bark is used for roofing and the sides of shelters. It is also used as an insulation[61, 99]. A fibre obtained from the bark is used in making paper. The fibre is about 3.8mm long (this refers to the heartwood



fibres, the inner bark fibre is probably longer}[189]. Branches can be harvested at any time of the year, they are cut into usable pieces and pre-soaked in clear water prior to cooking. They are then cooked for six hours or more with lye. It is difficult to rinse it to clear water because it seems to be a dye material[189]. The fibre is then hand pounded with mallets, or put through a blender or a ball mill for six hours. It is difficult to hydrate properly. The resulting paper is a rich deep brown/red[189]. The slender pliable branches are used as a high quality rope[257]. They are gathered in spring, peeled and, if thick, are split into halves or quarters. They are then twisted and worked until soft and pliable and finally woven together to make the rope[99]. A green dye can be obtained from the leaves and twigs[257]. The inner bark can be used as a tinner[257]. Wood - aromatic, light, soft, straight-grained, not strong, very resistant to decay. This resistance to decay is probably due to the existence of powerful fungicides in the wood[226]. The wood from fallen trees remains sound for at least 100 years[226]. It is pale to dark red in colour[226]. The wood was widely utilized by many native North American Indian tribes who used it for making a wide range of items including canoes, houses, totem poles, bowls, spoons, ladles and tools[226, 257]. It is currently used in making greenhouses[1, 11, 82, 171]. The wood is not of such good quality when grown in mild humid areas[1]. It makes a good fuel, burning with very little smoke, though it burns quickly[99].

dwatta Abortifacient Analgesic Antidandruff Antirheumatic Astringent Emmenagogue Febrifuge Kidney Odontalgic Pectoral Poultice Skin Stomachic TB VDWestern red cedar was employed medicinally by a number of native North American Indian tribes, who used it to treat a wide range of complaints[257]. It is seldom, if ever, used in modern herbalism. An infusion of the leaves has been used in the treatment of stomach pains and diarrhoea[257]. A decoction of the leaves has been used in the treatment of colds[257]. A decoction of the powdered leaves has been used externally to treat various internal pains, including rheumatism[257]. The leaf buds have been chewed in the treatment of toothaches and sore lungs[257]. A decoction of the buds has been used as a gargle[257]. A decoction of the small branches has been used in the treatment of coughs, colds and tuberculosis[257]. A weak infusion has been drunk in the treatment of painful joints caused by rheumatism or arthritis[257]. A poultice of the crushed bough tips and oil has been applied to the back and chest in the treatment of bronchitis, rheumatism, stomach pains and swollen neck[257]. An infusion of the twigs has been used as a wash in the treatment of venereal disease sores[257]. A decoction of the boughs has been used as an antidandruff shampoo[257]. A decoction of the stem tips and the roots has been used in the treatment of colds[257]. An infusion of the bark and twigs has been used in the treatment of kidney complaints[257]. An infusion of the seeds and twigs has been used in the treatment of fevers[257]. The chewed bark, or a decoction of the bark, has been drunk to induce menstruation[257]. A moxa of the inner bark has been used as a counter-irritant for the skin[257]. A poultice of the inner bark has been applied to carbuncles[257]. The bark has been pounded until it is as soft as cotton and then used to rub the face[257]. The very soft bark has been used to bind wounds and cover dressings[257]. The shredded bark has been used to cauterize sores and swellings[257].

nrakta Western N. America - British Columbia to California. ksacta Grows singly and in small groves in moist to swampy soils. Usually in shady forests, from sea-level to 1350 metres[60, 82, 99].

propta Seed - best sown when ripe in the autumn in a cold frame[113]. Stored seed germinates best if given a short cold stratification[113]. It can be sown in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If growing large quantities of plants, the seed can be sown in an outdoor seed bed in mid spring[78]. Grow the plants on for two years and then plant them out into their permanent positions in late autumn or early spring. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but it should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or

spring[78].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Prefers a moist loamy soil[1, 81]. Dislikes dry soils[11]. Not suitable for light sandy soils because it is shallow rooting[75], but it succeeds on most other soil types, even on waterlogged soils and heavy clays[81, 200]. Succeeds in chalky soils[200]. Prefers some shelter from the wind according to some reports[1, 81] whilst others say that it is fairly wind resistant[11, 75]. Trees tolerate salt winds[75] but not severe maritime exposure[K]. The wood and foliage are highly aromatic[226]. The foliage has a strong fruity smell, like pear-drops or crushed apples[185]. A fast growing tree, it often puts out new growth of 1 metre a year and can average 60cm a year for the first 40 years. Increase in girth can also be rapid, 5cm a year for the first 60 years has been recorded[185]. Sometimes planted for forestry in Britain[17], it is at its best in the moister western half of the country[11, 185]. There are many named varieties selected for their ornamental value[188]. Tolerant of light trimming, so long as this is not back into old wood, plants also retain their lower branches unless these are shaded out by neighbouring plants[11]. The foliage turns bronze in cold weather[81]. Trees are notably susceptible to honey fungus[81, 200]. Special Features: North American native, Inconspicuous flowers or blooms.

## 5.2.107 *Pyrus serrulata*

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasjltunykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus serrulata* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 1.5cm in diameter[200].

nrakta E. Asia - China. ksacta Thickets in W. Hupeh, 600 - 1600 metres[109]. Among shrubs, forest margins and thickets at elevations of 100 - 1600 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A very ornamental tree. This species is closely related to *P. serotina*, differing mainly in having smaller fruit[109].

## 5.2.108 *Berberis chinensis*

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjltunykfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis chinensis* is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177].

tcanta A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China. ksakta Sandy mountain slopes and river sands[74].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but is by no means fastidious, succeeding in thin, dry and shallow soils. Grows well in heavy clay soils. Plants are hardy to about -25°C[184]. Plants can be pruned back quite severely, they resprout well from the base[200]. This species is closely related to *B. poretii*. C.K.Schn., differing in its broader leaves and dark red fruits[200]. The range of this plant is often mistakenly given as the Caucasus, this is based on a misidentification[200]. Hybridizes freely with other members of this genus[1].

## 5.2.109 Acer acuminatum

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli nyanhjen hjonli

drutta *Acer acuminatum* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[183].

tcanta Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - compact, moderately hard. It is seldom used[158].

nrakta E. Asia - W. Himalayas. ksakta Open ravines on shady aspects at altitudes between 2400 - 3300 metres[158].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before

being potted up otherwise they are unlikely to survive the winter. Good results are usually obtained.

nwatta Of easy cultivation, it prefers a good moist well-drained soil[1, 11] in a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. This species is often confused with *A. papilio*[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Dioecious. Male and female plants must be grown if seed is required.

## 5.2.110 Filipendula multijuga

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli prikrlwis hpa7tmwatli fyfixre7t hjonli

drutta *Filipendula multijuga* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

ksakta Edible Parts: LeavesEdible Uses: Young shoot tips - cooked[116].

nrakta E. Asia - Japan. ksakta Mountains, C. and S. Japan[58].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. A very ornamental plant[116]. The flowers are very attractive to bees. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.111 Aconitum violaceum

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Aconitum violaceum* is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200]. Another report suggests that the root of this species might not be toxic[240].

ksakta Edible Parts: RootEdible Uses: Root - cooked[177]. It is eaten as a pleasant tonic[240]. These reports should be treated with great distrust due to the poisonous nature of the genus[K].

dwatta Antidote Antiinflammatory FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Antidote, anti-inflammatory and febrifuge, it is used in the treatment of snake and scorpion bites, contagious infections and inflammation of the intestines[241].

nrakta E. Asia - Himalayas. ksakta Shrubberies and open slopes, 3600 - 4800 metres from Pakistan to C. Nepal[51].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by the native range of the plant it should succeed outdoors in many parts of the country. It is a polymorphic species[51]. The following notes are based on the general needs of the genus. Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

## 5.2.112 *Cornus occidentalis*

Western Dogwood

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 6 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Cornus occidentalis* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. They were often eaten by native North Americans, but they are bitter and acid[161, 257].

dwatta OphthalmicThe bitter-tasting bark is astringent, ophthalmic and tonic[118, 257]. An infusion has been used as a wash for sore eyes[257].

nrakta Western N. America. ksacta Moist soils, especially by streams[60].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in poorly drained soils[200]. Succeeds in full sun or light shade[188]. Allied to *C. stolonifera* and considered to be part of that species by some botanists[11, 60, 200]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.113 *Antirrhinum majus*

Snapdragon, Garden snapdragon

5 tlin 10 cyuc 1 kcaak 2 tcan 1 dwat m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnykfrip hpa7tli  
flatprikwis hpa7tmwatli fyifxre7t hjonli

drutta *Antirrhinum majus* is a PERENNIAL growing to 1 m (3ft 3in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not

frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn oil that is little inferior to olive oil is said to be obtained from the seeds[4]. The report also says that the plant has been cultivated in Russia for this purpose[4]. The seeds are very small and I wonder about the authenticity of this report[K].

tcanta Dye OilA green dye is obtained from the flowers, it does not require a mordant[168]. Dark green and gold can also be obtained if a mordant is used[168].

dwatta Antiphlogistic Bitter Resolvent StimulantThe leaves and flowers are antiphlogistic, bitter, resolvent and stimulant[7, 115]. They have been employed in poultices on tumours and ulcers[4]. It is effective in the treatment of all kinds of inflammation and is also used on haemorrhoids[7]. The plant is harvested in the summer when in flower and is dried for later use[7].

nrakta Europe. Naturalized in Britain[17]. ksacta Old walls, rocks and dry places[17, 100].

propta Seed - surface sow March in a greenhouse. The seed usually germinates in 10 - 21 days at 18°C[134]. Cool nights assist germination[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ in July/August and will produce larger and more floriferous plants the following summer. Cuttings of half-ripe wood in September in a cold frame[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Prefers a light well-drained loam and a sunny position[1, 200]. Plants are tolerant of clay and lime soils, and also grow well on old walls[200]. Plants are often grown as an annual since they usually degenerate in their second year[1]. They often self-sow when well-sited[K]. There are many named forms, selected for their ornamental value[200]. Special Features:Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

## 5.2.114 *Aconitum multifidum*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprik-  
wis hpa7tmwatli hjonli

drutta *Aconitum multifidum* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

kcakta Edible Parts: LeavesEdible Uses: Leaves[178]. No further details are given, apart from a claim that this species is not poisonous - a report that should be treated with extreme caution.

nrakta Europe - W. Alps and the Pyrenees. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A

preedy plant, inhibiting the growth of nearby species, especially legumes[54]. Considered to be a part of *A. napellus* by most botanists[1], it is probably *A. napellus vulgare*. (Rchb.)Rouy. and Foucaud[200]. We are keeping this record separate because the suggestion that this species is not poisonous[178] requires investigation.

## 5.2.115 *Philadelphus microphyllus*

Littleleaf Mock Orange

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkc  
pcimhmintut cyutli tcutp hwcili hyishrasjlutnykfrip hpa7tli flatprikwislip hpa7tmwatli xre7t hjonli

drutta *Philadelphus microphyllus* is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit[105, 161]. Formerly used as food[257]. No more details are given.

tcanta SoapThe leaves are rich in saponins, when crushed and mixed with water they produce a lather that is an effective cleaner, used on the body, clothes etc[169]. You can wash your hands by merely picking a couple of leaves or a bunch of blossom, wetting your hands and then rubbing the plant material vigorously as if it was a bar of soap[K]. This soap is a very gentle cleaner that does not remove the body's natural oils, but does remove dirt. It is not very effective against oil[K].

nrakta Western N. America - Utah and Colorado to California and New Mexico. ksacta Dry rocky places in sunny rocky canyons and piñon-juniper woodland, 1200 - 3000 metres[71, 184].

propta Seed - best if given 1 months cold stratification[113]. Sow February in a light position in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long side-shoots, July/August in a shaded frame. Plant out in spring. High percentage[78]. Cuttings of mature wood of the current year's growth, 15 - 25cm with a heel, December in a sheltered bed outdoors. Fair to good percentage[78]. Layering in summer. Very easy.

nwatta Easily grown in any moderately fertile preferably dry soil[184], succeeding in thin soils over chalk and tolerating poor soils[200]. Grows well in heavy clay soils. Succeeds in semi-shade but prefers a position in full sun where it will flower more freely[182, 200]. Hardy to about -20°C[184]. Plants grow best in the east and south-east of Britain, they are shy to flower in gardens with cool summers[11]. Plants are very tolerant of pruning, one third of the stems can be cut down to the ground each year in order to promote fresh growth and heavier flowering[202]. A very ornamental plant[1] with aromatic flowers smelling of pineapples[182].

## 5.2.116 *Forsythia suspensa*

Lian Qiao, Weeping forsythia

5 tlin 8 cyuc 1 kcaak 3 tcan 3 dwat 5 m hkc  
pcimhmintut cyutli tcup hwcili hrasjlutnykfrip hpa7tli flatprikwislip hpa7tmwatli dyatxre7t hjonli

drutta *Forsythia suspensa* is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade

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

pcista Leaves contain the glycoside Phillyrin[179], its potency is unknown.

kcaakta Edible Parts: LeavesEdible Uses: RutinYoung leaves - cooked[105, 177, 179]. Some caution is advised due to the presence of a glycoside[179]. The leaves are rich in rutin[218].

tcanta The sub-species *F. suspensa sieboldii* is a lax grower that roots freely where the branches touch the ground. It makes a very good tall ground cover when planted about 2.5 metres apart each way[208]. Landscape Uses: Border, Erosion control, Espalier, Massing, Screen.

dwatta Antidote Antiphlogistic Antitussive Cancer Diuretic Emmenagogue Febrifuge Laxative Tonic Urinary VermifugeLian Qiao has been used in Chinese herbalism for over 4,000 years and is considered to be one of the 50 fundamental herbs[218]. A bitter tasting pungent herb with an antiseptic effect, it is chiefly used to treat boils, carbuncles, mumps and infected neck glands[254]. The fruit is a bitter astringent herb that stimulates the heart, nervous system and gall bladder[238]. It contains vitamin P, which is used to strengthen capillaries[238]. The fruit is also antidote, antiphlogistic, antitussive, diuretic, emmenagogue, febrifuge, laxative and tonic[116, 147, 174, 176, 178, 218, 238]. It is used internally in the treatment of acute infectious diseases such as mumps, and also for tonsillitis, urinary tract infections allergic rashes etc[238]. The fruit is harvested when fully ripe and is dried for use in decoctions[238]. The plant has a similar action to *Lonicera japonica* and is usually used in combination with that species to achieve a stronger action[176]. The flowers have a broad-spectrum antibacterial action, inhibiting the growth of *Staphylococcus aureus*, *Shigella dysenteriae*, haemolytic streptococcus, *Pneumococcus*, *Bacillus typhi*, *Mycobacterium tuberculosis* etc[176]. The plant is vermifuge, though the part used is not stated[116, 147, 174, 178]. The leaves are febrifuge and are also poulticed onto ulcerated glands and haemorrhoids[218]. A decoction of the leaves and twigs is used in the treatment of breast cancer[61]. The root is used in the treatment of cancer, colds, fever and jaundice[218].

nrakta E. Asia - E. China. ksacta Thickets, moors and cliffs, 300 - 1200 metres[109]. Thickets or grassy areas on slopes, valleys and gullies at elevations of 300 - 2200 metres[266].

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78]. Layering in spring or summer. Plants often self-layer[K].

nwatta An easily grown plant, it succeeds in all soil types[202] but prefers a rich soil. Succeeds in limey soils. Grows well in heavy clay soils. It prefers a sunny position but succeeds in semi shade though it is apt to get leggy if grown in the shade of trees[182]. Succeeds against a north-facing wall[219]. Plants are hardy to about -25°C[184]. The flowers are produced quite early in the year and are frost-resistant[182]. Plants are medium to fast growing[202]. Flowers are produced on wood that is more than one year old[202]. Any pruning is best done after the plant has finished flowering[182]. A very ornamental plant, there are several named varieties[182]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 5.2.117 *Cotoneaster franchetii*

Orange cotoneaster

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkc

5 thln 9 cyuc 1 kcaok 0 tcan 0 dwat 2 m hkuc  
hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrp  
hpa7tli flatprikwislip hpa7tmwatli xre7t hjonli

drutta Cotoneaster franchetii is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta The fruit has a mild flavour though it is very mealy and full of seeds[K].

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. The plant can be grown as an informal wind-break hedge in all but the most exposed situations[29, 75, 200]. Tolerates trimming[75].

nrakta E. Asia - W. China to Tibet. ksacta Thickets in rocky sunny mountain regions, open hillsides at elevations of 1600 - 2900 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Plants also succeed in deep shade[219]. Tolerates atmospheric pollution[200]. Fairly tolerant of maritime exposure[75, 200]. Plants are hardy to about -15°C[184]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200].

## 5.2.118 Senecio nemorensis fuchsii

5 thln 9 cyuc 1 kcaok 0 tcan 0 dwat 2 m hkuc  
hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrp hpa7tli flat-  
prikwislip hpa7tmwatli xre7t hjonli

drutta Senecio nemorensis fuchsii is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcakta Edible Parts: StemEdible Uses: Young stems - pickled[177]. Some caution is advised, see the notes above on toxicity.

nrakta Europe to E. Asia. ksacta Not known  
propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in

a greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most well-drained moderately fertile soils[200]. This sub-species is the form that is used for food in Asia[177].

## 5.2.119 Paeonia suffruticosa

Moutan, Moutan peony, Tree Peony, Japanese Tree Peony  
5 thln 8 cyuc 1 kcaok 0 tcan 2 dwat 2 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprik-  
wislip hpa7tmwatli fyifxre7t hjonli

drutta Paeonia suffruticosa is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or cooked in various dishes[183].

tcanta FuelThe stems are used as firewood[11]. The plant is quite slow growing so could not really be seen as a source of fuel[K].

dwatta Analgesic Antibacterial Antiinflammatory Antipyretic Antispasmodic Emmenagogue Sedative Styptic TonicThe root and root bark is analgesic, antibacterial, anti-inflammatory, antipyretic, antispasmodic, emmenagogue, sedative, styptic and tonic[46, 61, 174, 176, 178, 218, 279]. An extract of the plant has antibacterial activity, inhibiting the growth of Staphylococcus, Bacillus dysenteriae, Typhoid bacillus, Paratyphoid bacillus, Proteus, Pseudomonas, E. coli, Haemophilus pertussis and Streptococcus[176, 218]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastrointestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China to the Himalayas. ksacta Scrub in mountains[184]. Cliffs at elevations around 300 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta Landscape Uses:Border, Foundation, Seashore, Specimen. Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°C[184], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. Plants come into growth early in the year and are then subject to damage by late frosts, they are therefore best sited in a position that is shaded from the early morning sun[11].

The branches are brittle and very subject to wind damage, especially when young[200]. There is some confusion over the name of this species, Chinese botanists believing that it was based on a cultivar. They do not recognise this name, instead raising to specific status two of its sub-species as *P. rockii* (Haw. and Lauener.) Hong, and *P. jishanensis* Hong, and *W.Z.Zhao* (syn *P. spontanea* (Rehder.) Hong, and *W.Z.Zhao.*)[214]. Most modern treatments no longer recognise this as a separate species, though some people use the name to house the large number of garden forms of tree peonies that have been developed over the centuries[250]. A very ornamental plant[1], there are many named varieties[182]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. The flowers of some forms of this species are pleasantly scented[245]. Scented forms include 'Flora', 'Fragrans Maxima', 'Kimpai' and 'Kokuho'[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

### 5.2.120 *Berberis sherriffii*

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc  
hmmihtut cyutli kyuctup hwicli hyishrasjlutnyikfripr hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis sherriffii* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked.

tcanta Dye A yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. *Berberis* has also shown antitumour activity[218].

nrakta E. Asia - Southeast Tibet. ksacta Lower subalpine to montane zone.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils but disliking waterlogged soils[11, 200]. Grows well in heavy clay soils. Plants can be pruned back quite

severely, they sprouts well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to *B. gyalalica*[11, 200].

### 5.2.121 *Senecio nemorensis*

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 2 m hkuc  
hmmihtut cyutli tcup hwicli hyishrasjlutnyikfripr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Senecio nemorensis* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcakta Edible Parts: Stem Edible Uses: Young stems - pickled[177]. Some caution is advised, see the notes above on toxicity.

dwatta Hypoglycaemic Urinary Urinary tract infections, gout, rheumatism and stone formation in the urinary tract. Lowers blood sugar. The herb is contraindicated in pregnancy and nursing and children under 12. Recommended only for external use. Do not apply to broken skin [301].

nrakta Europe to W. Asia. ksacta Damp places, 800 - 1800 metres in Turkey[93].

propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most well-drained moderately fertile soils[200]. The sub-species *S. nemorensis fuchsii*. (Gmel.) Celak. is the form used for food in Asia[177].

### 5.2.122 *Aconitum heterophyllum*

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc  
hmmihtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Aconitum heterophyllum* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1]. One report says that this plant does not contain the toxic alkaloid aconitine, and so is not poisonous[4]. It does, however, still contain an intensely bitter alkaloid[4].

kcakta Edible Parts: Leaves Root Edible Uses: Leaves and root - cooked[177]. This report should be treated with great distrust due to the poisonous nature of the genus, but see the notes above on known hazards[K].

dwatta Analgesic Antiinflammatory Antiperiodic Aphrodisiac Astringent Cholagogue Febrifuge Tonic The dried root is analgesic, anti-inflammatory, antiperiodic, aphrodisiac, astringent, cholagogue, febrifuge and tonic[4, 240]. It is used in India in the treatment of dyspepsia, diarrhoea and coughs[240, 243]. It is also used in Tibetan medicine, where it is said to have a bitter taste and a cooling potency[241]. It is used to treat poisoning from scorpion or snake bites, the fevers of contagious diseases and inflammation of the intestines[241]. The root is best harvested in the autumn as soon as the plant dies down and is dried for later use[4]. This

a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - W. Himalayas. ksacta Usually found on humus-rich soils in the alpine and subalpine zones, and in forests, 2300 - 2900 metres[145, 243].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. The roots of this plant are extensively collected from the wild for medicinal use and the species is becoming much rarer in many areas of its range[272]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

## 5.2.123 *Peonia delavayi*

Tree Peony, Dian mu dan

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1.6 m hkuc  
hmimhtut cyutli tcup hwicli hras|lutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Peonia delavayi* is a deciduous Shrub growing to 1.6 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Edible Uses: The following use is for *P. suffruticosa*. It quite probably also applies to this closely-related species.[K - see 214]. Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or can be cooked in various dishes[183].

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Cholera Dysentery The bark obtained from the root has an antimicrobial effect upon various bacteria, including *Escherichia coli*, typhoid, cholera, *Staphylococcus aureus*, *streptococcus hemolyticus* and *Pneumococci*[250]. The root is also anti-inflammatory and has been used with success in the treatment of arthritic joint swelling[250]. The root is also analgesic, sedative and anticonvulsant, it has a high success rate in the treatment of dysentery and can also be used to treat allergic rhinitis[250]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (*Glycyrrhiza* spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China in Yunnan and Likiang. ksacta Shady, moist areas of pine forests, in forest clearings and among scrub at altitudes of between 3,050 - 3,650 metres[250].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower; it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds

in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta An easily grown and undemanding plant[250], it prefers a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Grows well in heavy clay soils and on chalk[184]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°C[184]. Plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. A very ornamental and long-lived plant[1], it grows rapidly and produces lots of lateral shoots[250]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. This species comes into growth early in the year but unlike *P. suffruticosa* it does not seem to be subject to damage by late frosts[11]. It is probably best still given a position sheltered from the early morning sun. The branches are brittle and very subject to wind damage, especially when young[200]. This species is closely related to *P. lutea*[11]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. This species will often self-sow freely when well sited[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214].

## 5.2.124 *Berberis soulieana*

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishras|lutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis soulieana* is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked.

tcanta Dye A good informal hedging plant[200]. A yellow dye is obtained from the roots.

dwatta Antibacterial Cancer Dysentery Berberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them

in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

## 5.2.125 *Stachys officinalis*

Wood Betony, Common hedgenettle, Betony, Woundwort  
5 tlin 10 cyuc 1 kcak 2 tcan 2 dwat 0.6 m hkuc  
hmimhtut cyutli tcup hwicli hrasj|lutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Stachys officinalis* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: Tea The leaves and flowering tops make a good tea substitute. Refreshing and aromatic[21, 100, 183], it has all the good qualities of tea without the negative ones[4].

tcanta Dye A fine yellow dye is obtained from the leaves[4].

dwatta Anthelmintic Antiseptic Astringent Carminative Cathartic Cholagogue Digestive Diuretic Emetic Emmenagogue Expectorant Homeopathy Nervine Sedative Sternutatory Tonic VulneryWood betony was at one time commonly used as a medicinal plant in the treatment of a wide range of disorders, especially as a nervine and tonic for treating maladies of the head and as an external application to wounds[4, 7, 238]. It also stimulates the digestive system and the liver, having an overall tonic effect upon the body[254]. Wood betony is much less used nowadays, and more often forms part of a mixture of herbs[4]. The whole plant is collected when in flower in the summer and can be dried for later use[4, 254]. It is anthelmintic, antiseptic, astringent, carminative, mildly cathartic, cholagogue, digestive, diuretic, mildly emetic, emmenagogue, expectorant, nervine, sedative, sternutatory, tonic and vulnery[4, 9, 14, 21, 165, 218]. It is taken in the treatment of 'frayed nerves', pre-menstrual complaints, poor memory and tension[254]. It can be taken in combination with herbs such as comfrey, *Symphytum officinale*, and lime flowers, *Tilia* species, to treat sinus headaches and congestion[254]. Wood betony can be taken on its own, or with yarrow, *Achillea millefolium*, to staunch nosebleeds[254]. A pinch of the powdered herb will provoke violent sneezing and it has been used as part of a herbal snuff mixture in the treatment of headaches[4]. A homeopathic remedy is made from the fresh plant[9]. It is used in the treatment of asthma and excessive perspiration[9].

nrakta Europe, including Britain, south and east from Sweden to Spain, Italy, Greece and the Caucasus. ksacta Grassland, hedgebanks, heath and open woods, avoiding calcareous soils[9, 17].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Very easy, the plant can be successfully divided at almost any time of the year. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen. Prefers a light moist neutral to acid soil in sun or light shade[7, 17, 238]. A characteristic plant of healthy roadside banks on heavy soils[187]. Hardy to at least -25°C[187]. At one time bugle was often cultivated for its medicinal virtues,

though it is now little used[4]. There are some named varieties selected for their ornamental value[188]. An excellent bee plant[24]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

## 5.2.126 *Senecio vulgaris*

Groundsel

5 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 0.3 m hkuc  
htut cyutli kyuctcup hwicli hyhshrasj|lutnyikfrip hpa7tli flat-  
prikwis hpa7tmwatli fyfixre7t hjonli

drutta *Senecio vulgaris* is an ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

kcakta Edible Parts: Leaves Edible Uses: Leaves - cooked or raw[7, 105]. The young leaves have been used in many areas as a salad, though this is very inadvisable, see the notes on toxicity at the top of the page[7].

tcanta A good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars. Dynamic accumulator.

dwatta Anthelmintic Anticonvulsant Antiscorbutic Diaphoretic Diuretic Emmenagogue Homeopathy Poultice Purgative Groundsel has a long history of herbal use and, although not an official plant, it is still often used by herbalists[4]. The whole herb is anthelmintic, antiscorbutic, diaphoretic, diuretic, emmenagogue and purgative[4, 9, 21, 54]. It is often used as a poultice and is said to be useful in treating sickness of the stomach, whilst a weak infusion is used as a simple and easy purgative[4]. The plant can be harvested in May and dried for later use, or the fresh juice can be extracted and used as required[4]. Use with caution[21]. This plant should not be used by pregnant women[7], see also the notes above on toxicity. A homeopathic remedy is made from the plant[9]. It is used in the treatment of menstrual disorders and nose bleeds[9].

nrakta Europe, including Britain, south and east from Scandinavia to N. Africa and temperate Asia. ksacta Found along roadsides and waste places, it is also a common weed of cultivated land, succeeding on most soils but avoiding shade[7, 9, 17].

propta Seed - it doesn't need any encouragement from us.

nwatta A common weed of cultivated land, it does not require cultivation. Groundsel is a good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars. One report states that this plant was formerly cultivated as a food crop for livestock[54]! Since the plant is a cumulative toxin this use is most questionable.

## 5.2.127 *Monarda punctata*

Horse Mint, Spotted beebalm

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.8 m hkuc  
hmimhtut cyutli kyuctcup hwicli hrasj|lutnyikfrip hpa7tli flat-  
prikwis hpa7tmwatli fyfixre7t hjonli



*drutta Monarda punctata* is a ANNUAL/PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

**kcakta Edible Parts:** Edible Uses: Condiment TeaLeaves - raw or cooked. A strong aromatic taste, they are used as a flavouring in salads and cooked foods, and also as an aromatic tea[183].

**tcanta Essential Incense**The plant has a pleasing aroma and has been hung in the house as an incense[257].

**dwatta Antiseptic Carminative Diaphoretic Diuretic Emenagogue Rubefacient Stimulant Stomachic Vesicant**Horse mint was traditionally taken by several native North American Indian tribes to treat nausea and vomiting, and to encourage perspiration during colds. It was also applied externally as a poultice to treat swellings and rheumatic pains[254]. Nowadays it is used primarily to treat digestive and upper respiratory tract problems[254]. The leaves are carminative, diaphoretic, diuretic, emmenagogue, rubefacient, stimulant, stomachic and vesicant[4, 61, 238]. An infusion of the leaves is used in the treatment of flatulence, nausea, indigestion, catarrh in the upper respiratory tract, and to induce sweating and promote urination[4, 254]. The herb is principally used externally as a rubefacient, applied as a poultice it helps to lessen the pain of arthritic joints by increasing the flow of blood in the area and thereby hastening the flushing out of toxins[4, 254]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. The plant is a rich source of the medicinal essential oil 'thymol', which is antiseptic[4, 213, 222]. The plant has been commercially cultivated for its essential oil, though this is now produced synthetically[222]. Thymol is also an effective hookworm remedy, but must be ingested in such large quantities that it can prove fatal to the patient[213].

**nrakta N. America** - Louisiana and Florida, north to Long Island. **ksacta Dry** sandy soils in fields on or near to the coastal plain[43, 235].

**propta Seed** - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

**nwatta Easily** grown in ordinary garden soil so long as it is not too dry[1, 200]. Requires a moist soil and a sunny position[200]. This species prefers a light dry alkaline soil[238]. Plants are hardy to about -10°C[260] and should succeed outdoors in most parts of Britain. A polymorphic species[200]. A good bee plant[200]. Subject to mildew in dry summers[200].

## 5.2.128 *Carpinus betulus*

Hornbeam, European hornbeam, Common Hornbeam, European Hornbeam

5 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 25 m hkc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flat-prikhwisslip hpa7tmwatli hjonli

**drutta** *Carpinus betulus* is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on

the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

**tcanta Dye Fuel Hedge Hedge Wood**Plants can be grown as a medium to tall hedge, they retain their dead leaves throughout the winter if clipped at least once a year in late summer[11, 29, 186]. They should not be clipped in spring since they will bleed profusely[200]. A yellow dye is obtained from the bark[115]. Wood - heavy, close grained, hard, very tough, very durable, not very durable according to another report. Used for flooring, cogs, tools, piano mechanisms etc[1, 11, 13, 46, 115]. A good fuel[6].

**dwatta Bach Haemostatic Ophthalmic**The leaves are haemostatic[7]. They are used in external compresses to stop bleeding and heal wounds[7]. A distilled water made from the leaves is an effective eye lotion[7]. The leaves are harvested in August and dried for later use[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Tiredness', 'Weariness' and 'Mental and physical exhaustion'[209].

**nrakta Europe**, including Britain, from Sweden to the Pyrenees east to Iran in W. Asia. **ksacta Woodlands** and hedgerows on sandy or clay loams[17], preferring heavier soils[13].

**propta Seed** - best sown in an outdoors seedbed as soon as it is ripe[78]. Germination is usually good, though it may take 18 months[80]. If collected whilst still 'green' (after the seed is ripe but before it has dried fully on the plant) and sown immediately it should germinate in the following spring[80]. Grow the plants on for two years in the seedbed and then plant them out into their permanent positions in the winter. The average seed viability is around 65%[98]. Pre-treat stored seed with 4 weeks warm and 12 weeks cold stratification and sow in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall before planting them into their permanent positions.

**nwatta Landscape Uses:**Espalier, Pest tolerant, Hedge, Superior hedge, Specimen, Street tree. Thrives in any good loam, including chalk[1, 11], it does not demand much light[186]. Prefers a deep open loam[1] and does well on damp clays[186]. Succeeds in all but the most acid soils[186]. Dormant trees are very cold tolerant, the young growth is not usually damaged by late spring frosts[186]. The trees cast a deep shade[98, 186]. A very ornamental plant[1]. Trees are shallow-rooted[7]. The hornbeam has 28 species of associated insects[24]. Trees take 10 - 20 years from seed before they produce seed[98] and about 100 years to reach maturity[186]. At one time this tree was commonly pollarded or coppiced for its wood and for fuel[11, 13, 186]. **Special Features:** Not North American native, Inconspicuous flowers or blooms.

## 5.2.129 *Chamaecyparis lawsoniana*

Lawson Cypress, Port orford cedar, Oregon Cedar, Port Orford Cedar, Lawson's Cypress

5 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 25 m hkc  
hmimhtut cyutli hgatkyuctup hwicli hrasjlutnyikfrp hpa7tli flatprikhwisslip hpa7tmwatli hjonli

**drutta** *Chamaecyparis lawsoniana* is an evergreen Tree growing to 25 m (82ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

**tcanta Broom Hedge Hedge Resin Wood**Plants can be grown as a tall hedge[29, 75, 200] They are very tolerant

plipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. Certain dwarf forms can be used for ground cover, the cultivars 'Knowefeldensis', 'Nidiformis' and 'Tamariscifolia' have been recommended[208]. The branches have been used to make brooms[257]. Wood - very close-grained, hard, strong, durable, easily worked, light, abounding in fragrant resin, acid resistant. One of the world's finest timbers, it is widely used for flooring, fencing, making boats etc[46, 61, 82, 171]. It is now in short supply due to over-harvesting without replanting[200].

dwatta DiureticThe resin is a powerful diuretic[46, 61, 82].

nrakta Western N. America - Oregon to California. Locally naturalized in S. Europe[50]. ksacta Usually scattered in small groves on moist slopes and canyons, often on serpentine soils, below 1500 metres. Seldom more than 50 kilometres from the coast[71, 82].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Hedge, Screen, Specimen. Succeeds in most soils and situations, but prefers a moist deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. A fairly wind tolerant plant, but it does not like severe maritime exposure[75]. Plants are susceptible to wind burn and recover variably[75]. This species is hardy to about -25°C[200]. A fairly long-lived tree in the wild with specimens 500 - 600 years old[229]. It is a very valuable timber tree in N. America and it is sometimes cultivated as a forestry tree in Britain, where it occasionally self-sows[1, 11]. It establishes well and grows quickly. New shoots can make 1 metre in a year but trees rarely maintain that rate and 30cm is nearer the average[185]. New growth starts very slowly in April, speeds up in June and ceases in September[185]. A very uniform species in the wild[200], in cultivation it is polymorphic and there are many named varieties[1, 185, 200]. The crushed foliage has a pungent smell[245]. Favoured by many birds for roosting, providing high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features: Attractive foliage, North American native, Inconspicuous flowers or blooms.

## 5.2.130 *Betula utilis*

Indian Paper Birch, Whitebarked Himalayan Birch, Jacquemontii Birch

5 tlin 6 cyuc 0 kcak 3 tcan 2 dwat 20 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrif hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta *Betula utilis* is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

tanta Incense Paper Waterproofing WoodA paper is made from the inner bark[46, 51, 61]. The outer bark can be carefully peeled off the tree (this does not harm the tree) and used as a paper[158]. The outer bark can also be used as a waterproofing and for roofing houses[51, 146, 272]. The bark is sometimes used as an incense[272]. Wood - tough, even grained, moderately hard, elastic. Used for construction[51, 146, 158, 272].

dwatta Antiseborrheic Antiseptic Carminative UrinaryAn infusion of the bark is antiseptic and carminative[240, 243, 272]. It has been used in the treatment of hysteria and jaundice[240, 243, 272]. It is applied as drops to the ears to relieve earache[272]. A paste made from the bark is used as a poultice on cuts, wounds and burns[272]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta E. Asia - Himalayas to S.W. China. ksacta Forests at the upper height limit of tree growth[51], rarely found below 3000 metres[146]. Moist hillsides at elevations of 2000 - 4000 metres in Nepal[272].

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

nwatta Landscape Uses:Specimen. Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Plants are showing good wind-resistance on our Cornish trial ground[K]. Hybridizes freely with other members of this genus[50]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 5.2.131 *Acer caesium*

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 15 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrif hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta *Acer caesium* is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tanta Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, soft to moderately hard. Occasionally used for carving, bowls, cups etc[146, 158].

dwatta AstringentThe juice of the bark is used externally in Nepal to treat muscular swellings, boils and pimples[272].

nrakta E. Asia - Himalayas, China. ksacta Generally found in open places such as grazing grounds. Isolated trees are found in coniferous forests at 2400 - 3800 metres in Kashmir[145].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick

the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Of easy cultivation, it prefers a good moist well-drained soil in a sunny position but tolerates some shade. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. This species is closely related to *A. giraldii*[11].

## 5.2.132 *Catalpa bignonioides*

Indian Bean Tree, Southern catalpa

5 tlin 9 cyuc 0 kcaok 0 tcan 2 dwat 15 m hkuc  
htut cyutli tcup hwicli hrasjlutnykfrif hpa7tli flatprikliwis  
hpa7tmwatli xre7t hjonli

drutta *Catalpa bignonioides* is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista The roots are highly poisonous[254].

tcanta WoodA fast-growing tree with an extensive root system, it has been planted on land that is subject to landslips or erosion in order to stabilize the soil[7]. Wood - coarse and straight-grained, soft, not strong, moderately high in shock resistance, very durable in the soil. It weighs about 28lb per cubic foot. It is highly valued for posts and fencing rails, and is also used for interior finishes, cabinet work etc[46, 61, 82, 227].

dwatta Antidote Antiseptic Cardiac Laxative Malaria Ophthalmic Sedative VermifugeA tea made from the bark has been used as an antiseptic, antidote to snake bites, laxative, sedative and vermifuge[222]. As well as having a sedative effect, the plant also has a mild narcotic action, though it never causes a dazed condition[7]. It has therefore been used with advantage in preparations with other herbs for the treatment of whooping cough in children, it is also used to treat asthma and spasmodic coughs in children[7, 254]. The bark has been used as a substitute for quinine in treating malaria[254]. The leaves are used as a poultice on wounds and abrasions[222]. A tea made from the seeds is used in the treatment of asthma and bronchitis and is applied externally to wounds[222]. The pods are sedative and are thought to have cardioactive properties[222]. Distilled water made from the pods, mixed with eyebright (*Euphrasia officinalis*) and rue (*Ruta graveolens*) is a valuable eye lotion in the treatment of trachoma and conjunctivitis[7].

nrakta South-eastern N. America - Florida, Alabama, Missouri and Louisiana. ksacta Rich moist soils by the sides of streams and rivers[229].

propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at 1°C and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings, 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[200].

nwatta Landscape Uses:Specimen, Street tree. Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils[200]. Very resistant to atmospheric pollution[188]. Plants become chlorotic

on shallow alkaline soils[202]. Plants are hardy to about -15°C, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. A very ornamental plant[1], it is fast-growing in the wild where it often flowers when only 6 - 8 years old[229]. The sweetly-scented flowers are borne in forked panicles at the end of branches[245]. There are some named varieties selected for their ornamental value[188, 200, 202]. The trees transplant easily[200]. The crushed foliage has an unpleasant smell[202]. Another report says that the leaves are attractively scented when bruised[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Naturalizing, All or parts of this plant are poisonous, Blooms are very showy.

## 5.2.133 *Hedera helix*

Ivy, English ivy, Algerian ivy, Baltic Ivy, Common Ivy

5 tlin 11 cyuc 0 kcaok 4 tcan 3 dwat 15 m hkuc  
pcimhmimhtut cyuti hgatticuphja7n hwicli hyishrasjlutnykfrif  
hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Hedera helix* is an evergreen Climber growing to 15 m (49ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from October to November, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The plant is said to be poisonous in large doses[7, 10, 65, 76] although the leaves are eaten with impunity by various mammals without any noticeable harmful effects. The leaves and fruits contain the saponic glycoside hederagenin which, if ingested, can cause breathing difficulties and coma[274]. The sap can cause dermatitis with blistering and inflammation. This is apparently due to the presence of polyacetylene compounds[274].

kackta Although they are almost certainly not edible, there is a report that the seeds contain 16.2% protein and 35.1% fat[218].

tcanta Dye Hair Hedge Hedge Parasiticide Pollution Soap WoodA yellow and a brown dye are obtained from the twigs[46, 61]. A decoction of the leaves is used to restore black fabrics[7, 46, 53] and also as a hair rinse to darken the hair[7, 53]. If the leaves are boiled with soda they are a soap substitute for washing clothes etc[61]. An excellent ground cover for shady places, succeeding even in the dense shade of trees[197, 208]. A very effective weed suppresser[190]. The cultivars 'Hibernica', 'Lutzii' and 'Neilsonii' have been especially mentioned[190]. Plants can be grown along fences to form a hedge. The variety 'Digitata' is very useful for this[200]. Plants have been grown indoors in pots in order to help remove toxins from the atmosphere. It is especially good at removing chemical vapours, especially formaldehyde[259]. The plants will probably benefit from being placed outdoors during the summer[259]. The wood is very hard and can be used as a substitute for *Buxus sempervirens* (Box), used in engraving etc[46, 61]. Another report says that the wood is very soft and porous and is seldom used except as a strop for sharpening knives[4].

dwatta Antibacterial Antirheumatic Antiseptic Antispasmodic Astringent Cathartic Diaphoretic Emetic Emmenagogue Parasiticide Skin Stimulant Vasoconstrictor Vasodilator VermifugeIvy is a bitter aromatic herb with a nauseating taste[238]. It is often used in folk herbal remedies[218], especially in the treatment of rheumatism and as an external application to skin eruptions, swollen tissue, painful joints, burns and suppurating cuts[9, 238]. Recent research has shown that the leaves contain the compound 'emetine', which is an amoebicidal alkaloid, and also triterpene saponins, which are effective against liver flukes, molluscs, intestinal parasites and fungal infections[238]. The leaves are antibacterial, antirheumatic, antiseptic, antispasmodic, astringent,

sathartic, diaphoretic, emetic, emmenagogue, stimulant, sudorific, vasoconstrictor, vasodilator and vermifuge[7, 218, 238]. The plant is used internally in the treatment of gout, rheumatic pain, whooping cough, bronchitis and as a parasiticide[238]. Some caution is advised if it is being used internally since the plant is mildly toxic[7]. Excessive doses destroy red blood cells and cause irritability, diarrhoea and vomiting[238]. This plant should only be used under the supervision of a qualified practitioner[238]. An infusion of the twigs in oil is recommended for the treatment of sunburn[4]. The leaves are harvested in spring and early summer; they are used fresh and can also be dried[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Hedera helix* for cough, bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east to the Mediterranean and Iran. ksacta Woodlands, hedges and shady places, climbing up trees, walls etc and clambering over the ground[7]. Found on all types of soils[7].

propta Seed - remove the flesh, which inhibits germination, and sow the seed in spring in a cold frame[113]. Four weeks cold stratification will improve germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a shady position in a frame. Good percentage[78]. Cuttings of mature wood, 12cm long, November in a cold frame[78]. Layering. Plants often do this naturally.

nwatta Landscape Uses:Cascades, Container, Erosion control, Ground cover, Massing. Ivy is a very easily grown plant that dislikes waterlogged, very dry or very acid soils but otherwise succeeds in all soil types[1, 17, 238]. It grows well in heavy clay soils. Prefers some lime in the soil. Tolerates very dense shade[24, 31], though it may not flower in such a position[K]. The plant is very hardy and tolerant of atmospheric pollution[4]. Established plants are drought tolerant[190]. A very ornamental and hardy plant[190], it tolerates temperatures down to about -25°C[184]. There are many named varieties[190], the variegated forms are less hardy than the species and also require more light[238]. Ivy is a rampant climbing plant, clinging by means of aerial roots and often trailing on the ground in woods and hedges[186]. It is of benefit rather than harm when growing on a wall because it keeps the wall dry and acts as an insulation[11, 24]. It does not damage the structure of a wall. Similarly, it does not harm large trees when climbing into them, though it can shade out smaller and ailing trees[200]. It is not a parasitic plant, but instead obtains all its nutrient from the sun and the soil[186]. A very good plant for wild-life, it provides dense shelter for birds, spiders etc, an abundant late supply of nectar for insects and a supply of seeds for winter food[4, 24, 186]. It is a food plant for the larvae of many species of butterfly[24, 30]. A very variable plant, there are many named varieties. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.134 *Cotoneaster bacillaris*

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc  
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfripr hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Cotoneaster bacillaris* is a deciduous Shrub growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light wood-

land) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye WoodA rose-tan dye is obtained from the fruit[168]. Wood - very hard, elastic, close and even grained but splits and warps easily. Too small for many purposes but the branches are used for making walking sticks, agricultural implements etc[11, 146, 158].

dwatta AstringentThe stolons are said to be astringent[240].

nrakta E. Asia - W. Himalayas. ksacta Blanks in forests, old grazing camps etc, in the higher hill forests, 1500 - 3000 metres[146].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta A vigorous and easily grown plant[1], it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. A very ornamental plant[1]. Trees are notably susceptible to honey fungus[200].

## 5.2.135 *Euonymus fortunei*

Winter Creeper. Wintercreeper *Euonymus*  
5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 4.5 m hkuc  
pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyikfripr hpa7tli  
flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Euonymus fortunei* is an evergreen Climber growing to 4.5 m (14ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

tcanta Hedge HedgeA good evergreen ground cover plant[184, 200]. The sub species *E. fortunei radicans* and *E. fortunei* carrieri are particularly useful, other forms to use include 'Emerald and Gold', 'Emerald Gaiety', 'Coloratus', 'Dart's Carpet' and 'Kewensis'[182, 188, 197]. Plants can be grown as a low hedge[29], the varieties 'Emerald and Gold' and 'Variegatus' are normally used. They are very tolerant of clipping[200].

dwatta Cancer Women's complaintsPlants contain the anticancer compound dulcitol[218]. The plant is used in gynaecological applications[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and thickets in low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Landscape Uses: Container, Erosion control, Ground cover, Massing. Thrives in almost any soil, including chalk, and is particularly suited to dry shaded areas[200]. Grows well in heavy clay soils. Prefers a well-drained loamy soil. Thrives in sunny positions and in deep shade[11, 182], though it does not fruit so well in the shade. Plants are hardy to about -18°C[202]. A shrubby somewhat creeping plant that can also climb by means of aerial roots[184], if placed by a support, a wall, tree or fence, the plant will start to climb it and will be self-attaching to a large degree[182, 219]. Plants do not normally require pruning[219]. Plants have two forms of growth, a juvenile form and a mature form when the plants come into flower[219]. Plants in Britain often retain the juvenile form and never flower[219]. A polymorphic species[58], there are a number of named varieties selected for their ornamental value[182, 202]. Special Features: Not North American native, Invasive, Inconspicuous flowers or blooms.

## 5.2.136 Forsythia viridissima

Golden Bells, Greenstem forsythia, Forsythia  
5 tlin 8 cyuc 0 kcak 3 tcan 2 dwat 2.5 m hkuc  
pcimhmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprik-  
lwis hpa7tmwatli dyatre7t hjonli

drutta Forsythia viridissima is a deciduous Shrub growing to 2.5 m (8ft 2in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Leaves contain the glycoside Phillyrin[179], its potency is unknown.

tcanta Landscape Uses: Border, Erosion control, Ground cover, Massing.

dwatta Antibacterial Antifungal Antispasmodic Emmenagogue The fruit is antibacterial, antifungal, antispasmodic and emmenagogue[279]. It is used in Korea to treat carbuncles, mastitis, inflammation, suppuration, lymphadenitis and suppressed menstruation[279].

nrakta E. Asia - China. ksacta Ravines, margin of woods near river valleys and streamsides[266].

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78]. Layering in spring or summer. Plants often self-layer[K].

nwatta An easily grown plant, it succeeds in all soil types[202] but prefers a rich soil. Succeeds in limey soils. Grows well in heavy clay soils. It prefers a sunny position but succeeds in semi shade though it is apt to get leggy if grown in the shade of trees[182]. Succeeds against a north-facing wall[219]. Plants are hardy to about -25°C[184]. Plants are medium to fast growing[202]. Flowers are produced on wood that is more than one year old[202]. Any pruning is best done immediately after the plant has finished flowering[182, 200]. There are some named varieties, selected for their ornamental value[11, 200]. This species is notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 5.2.137 Solidago gigantea

Giant Goldenrod

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprik-  
lwis hpa7tmwatli xre7t hjonli

drutta Solidago gigantea is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Basketry The stems can be made into rough baskets[257].

dwatta Astringent Cathartic Diuretic Febrifuge Styptic The leaves and blossoms are astringent, cathartic and styptic[4]. They are a valuable remedy in the treatment of all kinds of haemorrhages[4]. An infusion of the blossoms has been used to treat various fevers[257]. An oil obtained from the plant (is this an essential oil?) is diuretic[4].

nrakta N. America - New Brunswick to British Columbia, south to Georgia, Texas and Utah. ksacta Low wet areas, roadsides, pond margins and the sides of streams, generally in mesic areas[274].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. This species has become a weed in its native range, increasing freely by seed and at the root[200]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

## 5.2.138 Aconitum kusnezoffii

Bei Wu Tou

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprik-  
lwis hpa7tmwatli hjonli

drutta Aconitum kusnezoffii is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta Alterative Anaesthetic Antiarthritic Deobstruent Diaphoretic Diuretic Sedative Stimulant The root is alterative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative and stimulant[178]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - N. China, N. Japan in Kamtschatka, Korea and Siberia. ksacta Grassy slopes, grasslands, forests, forest margins, by streams at elevations of 2200 - 2400 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or

late winter because the plants come into growth very early in the year[233].

*nwatta* Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. This species is closely related to *A. yezoense*[1]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

### 5.2.139 *Aconitum ferox*

Indian aconite

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

*drutta* *Aconitum ferox* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

*pcista* The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 51, 200].

*dwatta* Alternative Anaesthetic Antiarthritic Cholera Deobstruent Diaphoretic Diuretic Leprosy Sedative Stimulant-The dried root is alternative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative, stimulant[178]. It is best harvested in the autumn as soon as the plant dies down. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner. It has been used in India and Nepal in the treatment of neuralgia, leprosy, fevers, cholera and rheumatism[240, 272]. When the roots are soaked in cow's urine, they become soft and lose their depressant action on the heart, becoming a stimulant instead[240].

*nrakta* E. Asia - Himalayas. *ksacta* Shrubberies and forest clearings, 2100 - 3600 metres from C. Nepal to Bhutan[51].

*propta* Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

*nwatta* Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. The root of this plant is widely collected from the wild for medicinal use and is becoming much rarer in much of its range[272]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. napellus*[1].

### 5.2.140 *Aconitum uncinatum*

Wild Monkshood, Southern blue monkshood

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli hjonli

*drutta* *Aconitum uncinatum* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

*pcista* The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

*dwatta* Alternative Anaesthetic Antiarthritic Deobstruent Diaphoretic Diuretic Sedative Stimulant-The dried root is alternative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative, stimulant[178]. It is harvested as soon as the plant dies down in the autumn. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner. A tincture is used as an external anaesthetic[207].

*nrakta* Eastern N. America - Pennsylvania to Indiana and south to Alabama and Georgia. *ksacta* Low woods and damp slopes[43]. Wet areas along streams and in springs, also less mesic locations in woods and clearings at elevations of 200 - 2000 metres[270].

*propta* Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

*nwatta* Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Members of this genus seem to be immune to the predations of rabbits and deer[233]. Grows well in open woodlands[1, 4]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

### 5.2.141 *Aconitum orientale*

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

*drutta* *Aconitum orientale* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

*pcista* The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

*dwatta* *Anodyne* Diaphoretic Diuretic-The dried root is anodyne, diaphoretic and diuretic[4]. It should be harvested in the autumn as soon as the plant dies down[4]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

*nrakta* W. Asia - Turkey to Iran. *ksacta* Not known

*propta* Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

*nwatta* Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

### 5.2.142 *Aconitum chinense*

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

*drutta* *Aconitum chinense* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is

hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

dwatta Analgesic Anodyne Carminative Diaphoretic Diuretic Irritant SedativeThe root is analgesic, anodyne, carminative, diaphoretic, diuretic, irritant, sedative[4, 7, 9, 145, 165]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - China ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

## 5.2.143 *Primula reticulata*

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc  
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-  
wis hpa7tmwatli xre7t hjonli

drutta *Primula reticulata* is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is one report that the leaves are toxic to cattle[240].

dwatta AnodyneThe herb is used externally as an anodyne[240].

nrakta E. Asia - Himalayas from C. Nepal to S.E. Tibet. ksacta Shrubberies and open slopes, 3300 - 4800 metres[51]. Thickets on mountain slopes around 3000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta Prefers a deep moist humus-rich soil, succeeding in full sun if the soil is reliably moist throughout the growing season, otherwise it requires some shade[1, 200]. Grows well in heavy clay soils. Succeeds along the sides of streams and in woodland gardens[200]. Plants self-sow when in suitable conditions[200].

## 5.2.144 *Iris sanguinea*

Blood iris

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.8 m hkuc  
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flat-  
prikwis hpa7tmwatli fyifxre7t hjonli

drutta *Iris sanguinea* is a PERENNIAL growing to 0.8 m (2ft 7in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite

(has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

tcanta InsecticideAn insecticide is obtained from the plant[218]. (from the root?)

dwatta ExpectorantExpectorant[218].

nrakta E. Asia - Korea, Japan. ksacta Damp meadows, sunny pond banks, mountain stream banks and hillsides around 500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in August/September after flowering but can also be done in April. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it prefers a humus-rich soil[79, 200], succeeding in a moist border or by water[42, 79]. Grows well in heavy clay soils. Plants are very cold tolerant, but they can be damaged when dormant if the soil is too moist[79]. A very ornamental plant, there are some named varieties[200]. Plant the bulbs out very shallowly[79]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

## 5.2.145 *Myosotis scorpioides*

Water Forget-Me-Not, True forget-me-not

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc  
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip  
hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Myosotis scorpioides* is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

dwatta Used in the treatment of whooping cough and bronchitis[61].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and the Himalayas N. America. ksacta Wet places by streams and ponds[17].

propta Seed - sow outdoors in situ in late spring or early summer. Germination usually takes place within 2 - 4 weeks at 20°C. Division in spring[111]. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of young shoots, summer in a shady border[111].

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers a wet soil but thrives in a moist shady border[111]. Grows well in heavy clay soils. Does well on pond edges[200]. Prefers a sunny position[1]. Plants are hardy to about -20°C[187]. A long-lived species[187], it spreads freely when growing in marshy ground[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Fragrant flowers.

## 5.2.146 Inula royleana

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc  
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw  
hpa7tmwatli fyifxre7t hjonli

drutta Inula royleana is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Disinfectant Insecticide ParasiticideUsed as a parasiticide[145]. The plant is insecticidal[240].

dwatta Disinfectant ParasiticideThe plant is disinfectant[240]. It is also considered to be poisonous[240]. The root has been used to adulterate the roots of Saussurea lappa[240]. It contains 3% of an alkaloid that produces a fall in blood pressure and stimulates tone and peristaltic movements in the intestines[240].

nrakta E. Asia - Himalayas from Pakistan to Kashmir. ksacta Scrub and grassy clearings in forests, 2100 - 4000 metres[187]. Exposed dry slopes, 3100 - 3600 metres in Kashmir[145].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in ordinary garden soil[1]. Requires a moist well-drained soil in sun or partial shade[187]. Grows well in heavy clay soils. This species is hardy to about -20°C[187]. Plants take some years to become fully established[233].

## 5.2.147 Filipendula vestita

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.8 m hkuc  
hmimhtut cyutli tucphja7n hwicli hrasjlutnyikfrip hpa7tli  
prikliw hpa7tmwatli fyifxre7t hjonli

drutta Filipendula vestita is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta MiscellanyOne report says that the plant has medicinal properties but gives no details[145].

nrakta E. Asia - Himalayas from Afghanistan to Nepal and western China. ksacta Along mountain drains and in taller herbaceous vegetation, 2200 - 2900 metres[145]. Alpine meadows and riverbanks at elevations of 3000 - 3200 metres in Yunnan Povince, China[266].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.148 Helleborus viridis

Green Hellebore

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc  
hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wisslip hpa7tmwatli xre7t hjonli

drutta Helleborus viridis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76].

tcanta ParasiticideA decoction of the roots is used as a parasiticide against body lice, fleas etc[76, 213]. This use is somewhat dangerous, see the notes above on toxicity. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Anthelmintic Antiemetic Cardiac Cathartic Diuretic Emetic Emmenagogue Hypotensive Irritant Narcotic Parasiticide PurgativeThe root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagogue, irritant, violently narcotic and a drastic purgative[4, 9, 21, 46]. The dried root is used, it contains the alkaloids nervine, pseudo-nervine and veratridine[213]. It is best to harvest the root in the autumn[213]. The plant is useful for reducing blood pressure in various conditions of hypertension[213].

nrakta Central and western Europe, including Britain. ksacta Woods, scrub and sunny banks on moist chalk and limestone soils[9, 17, 187].

propta Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as possible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. Division after flowering or in autumn. Take care since the plant resents disturbance[111, 200].

nwatta Cultivation of this plant is not always easy, it prefers a rich limy soil in partial shade[187]. One report says that the plant requires an alkaline soil[17]. Succeeds in any good garden soil[1], preferring a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 111]. Succeeds when grown in the shade of a north-facing wall[233]. Does not object to lime[1]. Grows well in heavy clay soils[200]. Dislikes drought. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. Plants resent root disturbance and should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 5.2.149 Senecio erucifolius

Hoary Groundsel, Hoary ragwort

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.6 m hkuc  
htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-  
wisslip hpa7tmwatli fyifxre7t hjonli

drutta Senecio erucifolius is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.



pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

dwatta Anthelmintic Antiscorbutic Diaphoretic Diuretic Emmenagogue Poultrice PurgativeThe plant is used in plasters, ointments and poultices[4]. This species is related to groundsel, *S. vulgaris*, and is said to have similar properties[4]. These are:- The whole herb is anthelmintic, antiscorbutic, diaphoretic, diuretic, emmenagogue and purgative[4, 9, 21, 54]. It is often used as a poultice and is said to be useful in treating sickness of the stomach, whilst a weak infusion is used as a simple and easy purgative[4]. The plant can be harvested in May and dried for later use, or the fresh juice can be extracted and used as required[4]. Use with caution[21], see notes above on toxicity.

nrakta Central and southern Europe, including Britain, north to Denmark and Lithuania, east to W. Asia.. ksacta Dry banks, field borders, grassy slopes and roadsides, in limestone and chalky districts and especially on heavy soils[4, 17].

propta Seed - sow spring in situ. Division in spring.

nwatta We have very little information on the cultivation needs of this plant but, judging by its native habitats, it is likely to require a sunny position and to succeed in most moderate to heavy soils, including those of an alkaline nature[K].

## 5.2.150 *Lysimachia nemorum*

Yellow Pimpernel

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc

hmimhtut cyutli tucphja7n hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli fyifxre7t hjonli

drutta *Lysimachia nemorum* is an evergreen Perennial growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta AstringentAn astringent herb, yellow pimpernel is used as a wound herb to staunch bleeding[254].

nrakta Western and central Europe, including Britain, from Norway to Spain, east to the Carpathians. ksacta Woods and shady hedgebanks[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings, March to April in a cold frame. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in a moist or wet loamy soil in sun or partial shade[200]. Hardy to at least -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233].

# 6 Alphabetical Index

# Alphabetical Index

- Abies balsamea , 26  
Acer acuminatum , 218  
Acer argutum , 122  
Acer caesium , 226  
Acer campestre , 119  
Acer carpinifolium , 120  
Acer ginnala , 53  
Acer glabrum , 41  
Acer macrophyllum , 200  
Acer mono , 46  
Acer negundo , 24  
Acer platanoides , 37  
Acer pseudoplatanus , 118  
Acer saccharinum , 22  
Acer saccharum , 76  
Acer saccharum grandidentatum , 173  
Acer saccharum nigrum , 78  
Acer tataricum , 41  
Acer truncatum , 54  
Aconitum carmichaelii , 60  
Aconitum chinense , 230  
Aconitum ferox , 230  
Aconitum hemsleyanum , 160  
Aconitum heterophyllum , 222  
Aconitum japonicum , 161  
Aconitum kusnezoffii , 229  
Aconitum lycoctonum , 57  
Aconitum lycoctonum vulparia , 56  
Aconitum multifidum , 219  
Aconitum napellus , 56  
Aconitum orientale , 230  
Aconitum uncinatum , 230  
Aconitum violaceum , 218  
Aesculus spp , 75  
Alchemilla mollis , 62  
Allium ampeloprasum , 171  
Allium porrum , 179  
Allium schoenoprasum , 172  
Allium schoenoprasum sibiricum , 74  
Alnus cordata , 166  
Alnus glutinosa , 12  
Alnus hirsuta , 13  
Alnus incana , 5  
Alnus japonica , 67  
Alnus maritima , 13  
Alnus maximowiczii , 68  
Alnus rugosa , 4  
Alnus serrulata , 13  
Alnus sinuata , 4  
Alnus tenuifolia , 166  
Alnus viridis crispa , 67  
Amelanchier alnifolia , 71  
Amelanchier asiatica , 95  
Amelanchier humilis , 110  
Amelanchier huroensis , 186  
Amelanchier interior , 184  
Amelanchier obovalis , 196  
Amelanchier ovalis , 206  
Amelanchier parviflora , 136  
Amelanchier sanguinea , 103  
Amelanchier weigandii , 187  
Anchusa azurea , 47  
Anthemis cotula , 155  
Antirrhinum majus , 219  
Asclepias incarnata , 33  
Asplenium scolopendrium , 163  
Astrebla squarrosa , 85  
Athyrium filix , 59  
Athyrium niponicum , 58  
Avena barbata , 130  
Berberis aggregata , 196  
Berberis amurensis , 209  
Berberis angulosa , 197  
Berberis aristata , 178  
Berberis buxifolia , 83  
Berberis canadensis , 111  
Berberis chinensis , 217  
Berberis concinna , 139  
Berberis cooperi , 110  
Berberis everstiana , 141  
Berberis fendleri , 213  
Berberis gagnepainii , 138  
Berberis georgii , 31  
Berberis koreana , 57  
Berberis lycium , 188  
Berberis parisepala , 209  
Berberis rubrostilla , 197  
Berberis sherriffii , 222  
Berberis sieboldii , 149  
Berberis sikkimensis , 214  
Berberis soulieana , 223  
Berberis ulcina , 216  
Berberis verruculosa , 139  
Berberis vulgaris , 32  
Berberis x carminea , 192  
Berberis x lologensis , 191  
Berberis x stenophylla , 107  
Bergenia crassifolia , 47  
Bergenia purpurascens , 165  
Betula alleghaniensis , 28  
Betula ermanii , 59  
Betula lenta , 23  
Betula nigra , 26  
Betula pendula , 6  
Betula platyphylla , 38  
Betula populifolia , 40  
Betula pubescens , 5  
Betula schmidtii , 156  
Betula utilis , 226  
Brassica oleracea botrytis , 20  
Brassica oleracea gongylodes , 111  
Camassia leichtlinii , 20  
Camassia quamash , 16  
Campanula latifolia , 34  
Carex sylvatica , 64  
Carpinus betulus , 225  
Carpinus caroliniana , 53  
Catalpa bignonioides , 227  
Chaenomeles cathayensis , 83  
Chaenomeles japonica , 194  
Chaenomeles speciosa , 104  
Chaenomeles x superba , 193  
Chamaecyparis lawsoniana , 225  
Chamaecyparis nootkatensis , 157  
Chamaecyparis thuyoides , 158  
Chelone glabra , 61  
Convallaria majalis , 10  
Cornus alternifolia , 60  
Cornus amomum , 148  
Cornus controversa , 201  
Cornus kousa , 167  
Cornus kousa chinensis , 167  
Cornus macrophylla , 208  
Cornus mas , 89  
Cornus occidentalis , 219  
Cornus officinalis , 174  
Cornus quinquevenervis , 134  
Cornus rugosa , 158  
Cornus sanguinea , 135  
Cornus sericea , 9  
Cotoneaster bacillaris , 228  
Cotoneaster divaricatus , 160  
Cotoneaster franchetii , 220  
Cotoneaster microphyllus , 129  
Cotoneaster racemiflorus , 43  
Cotoneaster simonsii , 159  
Crataegus acclivis , 80  
Crataegus altaica , 100  
Crataegus anomala , 101  
Crataegus aprica , 186  
Crataegus arnoldiana , 168  
Crataegus azarolus , 173

- Crataegus canbyi*, 131  
*Crataegus champlainensis*, 176  
*Crataegus chrysocarpa*, 97  
*Crataegus coccinoides*, 99  
*Crataegus columbiana*, 102  
*Crataegus crus*, 122  
*Crataegus cuneata*, 183  
*Crataegus douglasii*, 79  
*Crataegus durobrivensis*, 82  
*Crataegus ellwangeriana*, 169  
*Crataegus flabellata*, 99  
*Crataegus flava*, 185  
*Crataegus heterophylla*, 205  
*Crataegus holmesiana*, 79  
*Crataegus hupehensis*, 188  
*Crataegus intricata*, 105  
*Crataegus jackii*, 133  
*Crataegus jonesiae*, 129  
*Crataegus laciniata*, 176  
*Crataegus laevigata*, 100  
*Crataegus maximowiczii*, 127  
*Crataegus missouriensis*, 70  
*Crataegus mollis*, 88  
*Crataegus monogyna*, 113  
*Crataegus nigra*, 206  
*Crataegus opaca*, 95  
*Crataegus pedicellata*, 72  
*Crataegus pedicellata gloriosa*, 96  
*Crataegus pennsylvanica*, 168  
*Crataegus pentagyna*, 187  
*Crataegus phaenopyrum*, 121  
*Crataegus pinnatifida*, 185  
*Crataegus pinnatifida major*, 180  
*Crataegus pruinosa*, 98  
*Crataegus punctata*, 92  
*Crataegus rivularis*, 133  
*Crataegus rotundifolia*, 98  
*Crataegus sanguinea*, 126  
*Crataegus schraderana*, 169  
*Crataegus submollis*, 80  
*Crataegus succulenta*, 81  
*Crataegus uniflora*, 134  
*Crataegus x grignonensis*, 103  
*Cynara cardunculus*, 190  
  
*Dactylis glomerata*, 160  
*Daphne mezereum*, 164  
*Desmanthus illinoensis*, 65  
*Dipsacus fullonum*, 161  
*Dipsacus sativus*, 161  
  
*Euonymus fortunei*, 228  
  
*Fagopyrum* spp., 178  
*Filipendula kamschatca*, 43  
*Filipendula multijuga*, 218  
*Filipendula rubra*, 60  
*Filipendula ulmaria*, 33  
*Filipendula vestita*, 232  
*Filipendula vulgaris*, 49  
*Forsythia suspensa*, 220  
*Forsythia viridissima*, 229  
*Fragaria vesca* 'Semperflorens', 72  
*Fuchsia magellanica*, 207  
  
*Glechoma hederacea*, 48  
  
*Hedera helix*, 227  
*Heliopsis helianthoides*, 43  
*Helleborus niger*, 62  
*Helleborus viridis*, 232  
*Hemerocallis aurantiaca*, 179  
*Hemerocallis citrina*, 87  
*Hemerocallis dumortieri*, 90  
*Hemerocallis exaltata*, 84  
*Hemerocallis forrestii*, 141  
*Hemerocallis fulva*, 15  
*Hemerocallis fulva longituba*, 85  
*Hemerocallis lilioasphodelus*, 86  
*Hemerocallis littorea*, 85  
*Hemerocallis middendorffii*, 70  
  
*Hemerocallis middendorffii*, 71  
*Hemerocallis minor*, 86  
*Hemerocallis multiflora*, 91  
*Hemerocallis thunbergii*, 89  
*Hemerocallis yezoensis*, 87  
*Hosta clausa*, 151  
*Hosta crispula*, 142  
*Hosta longipes*, 115  
*Hosta longissima*, 143  
*Hosta montana*, 125  
*Hosta plantaginiae*, 154  
*Hosta rectifolia*, 155  
*Hosta sieboldiana*, 140  
*Hosta sieboldii*, 152  
*Hosta undulata*, 143  
*Hosta ventricosa*, 49  
*Hyacinthoides nonscripta*, 164  
  
*Ilex aquifolium*, 203  
*Impatiens glandulifera*, 197  
*Impatiens noli*, 195  
*Inula royleana*, 232  
*Iris sanguinea*, 231  
*Iris sibirica*, 154  
  
*Juniperus communis*, 93  
*Juniperus communis nana*, 113  
  
*Kerria japonica*, 148  
  
*Laburnum alpinum*, 68  
*Laburnum anagyroides*, 68  
*Lamium album*, 215  
*Lamium galeobdolon*, 50  
*Lamium purpureum*, 141  
*Leucocjum aestivum*, 155  
*Ligustrum obtusifolium*, 135  
*Ligustrum vulgare*, 159  
*Lobelia cardinalis*, 61  
*Lysimachia clethroides*, 55  
*Lysimachia nemorum*, 233  
*Lysimachia nummularia*, 154  
*Lysimachia vulgaris*, 149  
*Lythrum salicaria*, 44  
  
*Mahonia aquifolium*, 105  
*Mahonia bealei*, 193  
*Mahonia japonica*, 191  
*Mahonia napaulensis*, 190  
*Mahonia nervosa*, 199  
*Mahonia repens*, 116  
*Malus angustifolia*, 42  
*Malus baccata*, 8  
*Malus bracteata*, 205  
*Malus brevipes*, 136  
*Malus coronaria*, 96  
*Malus domestica*, 14  
*Malus florentina*, 122  
*Malus floribunda*, 92  
*Malus fusca*, 184  
*Malus glabrata*, 206  
*Malus glaucescens*, 131  
*Malus halliana*, 132  
*Malus halliana spontanea*, 132  
*Malus hupehensis*, 124  
*Malus kansuensis*, 130  
*Malus lancifolia*, 125  
*Malus prattii*, 202  
*Malus prunifolia*, 17  
*Malus prunifolia rinkii*, 29  
*Malus pumila*, 18  
*Malus pumila nervosa*, 30  
*Malus pumila paradisiaca*, 30  
*Malus sargentii*, 133  
*Malus sieversii*, 96  
*Malus sikkimensis*, 204  
*Malus spectabilis*, 93  
*Malus sylvestris*, 92  
*Malus toringo*, 135  
*Malus toringoides*, 123  
*Malus transitoria*, 123

*Malus trilobata*, 171  
*Malus tschonoskii*, 29  
*Malus x adstringens*, 46  
*Malus x astracantha*, 42  
*Malus x micromalus*, 128  
*Malus x robusta*, 40  
*Malus x soulardii*, 131  
*Malus yunnanensis*, 41  
*Mentha aquatica*, 195  
*Mentha arvensis*, 114  
*Mentha arvensis piperascens*, 115  
*Mentha arvensis villosa*, 117  
*Mentha longifolia*, 213  
*Mentha requienii*, 198  
*Mentha satuireioides*, 214  
*Mentha spicata*, 21  
*Mentha suaveolens*, 212  
*Mentha x gracilis*, 199  
*Mentha x piperita citrata*, 50  
*Mentha x piperita officinalis*, 36  
*Mentha x piperita vulgaris*, 21  
*Mentha x smithiana*, 194  
*Mentha x villosa alopecuroides*, 90  
*Mimulus guttatus*, 216  
*Mimulus lewisii*, 144  
*Monarda clinopodia*, 149  
*Monarda didyma*, 116  
*Monarda fistulosa*, 108  
*Monarda menthifolia*, 58  
*Monarda punctata*, 224  
*Myosotis scorpioides*, 231  
  
*Narcissus jonquilla*, 150  
*Narcissus poeticus*, 162  
*Narcissus pseudonarcissus*, 165  
  
*Paeonia anomala*, 153  
*Paeonia caucasica*, 162  
*Paeonia delavayi*, 223  
*Paeonia lactiflora*, 152  
*Paeonia officinalis*, 151  
*Paeonia suffruticosa*, 221  
*Petasites albus*, 142  
*Philadelphus lewisii*, 158  
*Philadelphus microphyllus*, 220  
*Polygonatum multiflorum*, 127  
*Polypodium vulgare*, 48  
*Populus 'Balsam Spire'*, 156  
*Populus alba*, 52  
*Populus angustifolia*, 51  
*Populus fremontii*, 11  
*Populus nigra*, 52  
*Populus trichocarpa*, 144  
*Populus x canescens*, 157  
*Primula auricula*, 63  
*Primula denticulata*, 141  
*Primula elatior*, 50  
*Primula involucrata*, 163  
*Primula reticulata*, 231  
*Primula veris*, 112  
*Primula vulgaris*, 198  
*Prunus cerasifera*, 175  
*Prunus cerasifera divaricata*, 78  
*Prunus domestica*, 69  
*Prunus domestica italica*, 170  
*Prunus insititia*, 170  
*Pyrocydonia danielii*, 209  
*Pyrus amygdaliformis*, 203  
*Pyrus balsanae*, 182  
*Pyrus betulaeifolia*, 124  
*Pyrus bretschneideri*, 82  
*Pyrus calleryana*, 202  
*Pyrus communis*, 120  
*Pyrus communis sativa*, 74  
*Pyrus elaeagnifolia*, 121  
*Pyrus elaeagnifolia kotschyana*, 125  
*Pyrus nivalis*, 202  
*Pyrus pashia*, 94  
*Pyrus phaeocarpa*, 125  
*Pyrus pyraeaster*, 186  
*Pyrus pyrifolia*, 174  
  
*Pyrus pyrifolia culta*, 175  
*Pyrus regellii*, 203  
*Pyrus salicifolia*, 124  
*Pyrus serrulata*, 217  
*Pyrus ussuriensis*, 17  
  
*Quercus acutissima*, 208  
*Quercus alba*, 25  
*Quercus bicolor*, 77  
*Quercus cerris*, 180  
*Quercus ilex*, 73  
*Quercus libani*, 204  
*Quercus lyrata*, 181  
*Quercus macrocarpa*, 36  
*Quercus petraea*, 200  
*Quercus pubescens*, 119  
*Quercus robur*, 75  
*Quercus rubra*, 23  
*Quercus x bebbiana*, 27  
  
*Ranunculus repens*, 58  
*Rheum australe*, 189  
*Rheum compactum*, 214  
*Rheum palmatum tanguticum*, 192  
*Rheum rhaponticum*, 45  
*Rheum ribes*, 212  
*Rheum x cultorum*, 19  
*Ribes sanguineum*, 210  
*Rosa canina*, 31  
*Rosa centifolia*, 210  
*Rosa gallica*, 137  
*Rosa multiflora*, 128  
*Rosa nutkana*, 106  
*Rosa pisocarpa*, 210  
*Rosa rubiginosa*, 137  
*Rosa rugosa*, 15  
*Rosa villosa*, 84  
*Rosa virginiana*, 45  
*Rosa woodsii*, 138  
*Rosa x damascena*, 140  
*Rumex patientia*, 194  
  
*Salix caprea*, 145  
*Salix purpurea*, 146  
*Salix viminalis*, 146  
*Sambucus caerulea*, 82  
*Sambucus ebulus*, 150  
*Sambucus melanocarpa*, 207  
*Sambucus nigra*, 177  
*Sambucus nigra spp canadensis*, 18  
*Sambucus pubens*, 103  
*Sambucus racemosa*, 102  
*Sambucus racemosa kamtschatica*, 104  
*Sambucus racemosa var. racemosa*, 189  
*Senecio erucifolius*, 232  
*Senecio jacobaea*, 162  
*Senecio nemorensis*, 222  
*Senecio nemorensis fuchsii*, 221  
*Senecio vulgaris*, 224  
*Silphium integrifolium*, 108  
*Sinapis arvensis*, 215  
*Solidago canadensis*, 211  
*Solidago canadensis scabra*, 47  
*Solidago gigantea*, 229  
*Solidago graminifolia*, 57  
*Solidago odora*, 44  
*Solidago rigida*, 61  
*Solidago virgaurea*, 153  
*Sorbus aria*, 91  
*Sorbus aucuparia*, 39  
*Sorbus torminalis*, 172  
*Stachys officinalis*, 224  
*Stellaria media*, 126  
*Symphoricarpos albus laevigatus*, 54  
*Symphoricarpos occidentalis*, 55  
*Symphytum asperum*, 109  
*Symphytum grandiflorum*, 64  
*Symphytum officinale*, 34  
*Symphytum orientale*, 63  
*Symphytum tuberosum*, 143  
*Symphytum uplandicum*, 109

*Syringa vulgaris* , 54  
*Tagetes erecta* , 8  
*Tagetes patula* , 10  
*Tagetes tenuifolia* , 9  
*Tamarix gallica* , 147  
*Tamarix ramosissima* , 10  
*Tamus communis* , 148  
*Taxus baccata* , 182  
*Thuja occidentalis* , 38  
*Thuja plicata* , 216  
*Tragopogon crocifolius* , 142  
*Tragopogon dubius* , 111  
*Tragopogon porrifolius* , 112  
*Tragopogon pratensis* , 35  
*Trifolium repens* , 66  
*Tussilago farfara* , 117  
  
*Ulmus glabra* , 181  
  
*Viburnum edule* , 107  
*Viburnum lantana* , 146  
*Viburnum opulus* , 29  
*Viburnum trilobum* , 7  
*Vicia faba equina* , 65  
*Vicia faba major* , 64  
*Vicia faba minuta* , 67  
*Vinca minor* , 164