

propta Unless stored in damp sand at around 4°C the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°C but can be much longer[200]. The plant produces just one seedling in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils, preferring to grow in a bog garden[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233]. In some N. American Indian tribes, following the death of a chief, all the young aspirants to be chief were given a drink of this toxic plant and the person least affected was deemed to be the strongest and therefore made chief[200].

4.2.26 *Ilex verticillata*

Winterberry, Common winterberry

3 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 2 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikkwis hpa7tmwatli nyanhjen hjonli

drutta *Ilex verticillata* is a deciduous Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a slow 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 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 Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruit is poisonous[177].

kcakta Edible Parts: Edible Uses: TeaA tea is made from the dried and crumbled leaves[161, 177]. It does not contain caffeine[183].

dwatta Antiseptic Astringent Cathartic Malaria Skin TonicThe bark is antiseptic, astringent, cathartic and tonic[4, 238]. A decoction is used internally in the treatment of diarrhoea, malaria etc, and externally in the treatment of indolent sores and chronic skin disease[4, 238]. The bark contains about 4.8% tannin[4]. It is harvested in the autumn before the first frosts[4]. Another report says that the bark is harvested in the spring and dried for later use[238]. The fruit is cathartic[4].

nrakta Eastern N. America - Newfoundland to Minnesota and south to Georgia and Tennessee.. ksacta Swamps, pond margins and damp thickets[43].

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 germi-

nation 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[78]. Division in the dormant season.

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species tolerates wetter conditions than most members of the genus[238]. A very ornamental and cold-hardy plant, tolerating temperatures down to about -35°C[184]. A slow-growing tree in the wild[229]. A number of named forms have been selected for their ornamental value[182]. Flowers are produced on the current year's growth[229]. The plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Unlike most members of the genus, this species produces suckers[200]. 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]. Dioecious. Male and female plants must be grown if seed is required.

4.2.27 *Juncus balticus*

Baltic Rush

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli jlutnyik hpa7tli flat-prikkwishsom hpa7tmwatli xre7t hjonli

drutta *Juncus balticus* is a PERENNIAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline 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 reports of toxicity have been seen for this species, there is a report that one member of this genus is possibly toxic to mammals[76].

kcakta Edible Parts: SeedEdible Uses: Drink SweetenerA sugar forms along the top of the plant. This can be gathered and eaten as candy[257]. Seed[257]. No more details are given but the seed is very small[K]. The stems are used to make a fermented drink[257].

tcanta WeavingThe stems are used in making woven baskets, thatching, weaving mats etc[212, 257]. The basal portions of the stems have been used as a light yellow-brown decoration on baskets[257].

nrakta N. Europe, Northern N. America, N. Asia in boreal areas. ksacta Damp to wet soils, usually in saline conditions[212].

propta Seed - surface sow in pots in a cold frame in early spring and keep the compost moist. 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 sufficiently, otherwise in late spring of the following year. Division in spring. 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 Easily grown in a moist soil, bog garden or shallow water[1, 200]. Prefers a heavy soil in sun or light shade[200]. Plants can form large clumps and spread aggressively at the roots[200, 212].

4.2.28 *Berula erecta*

Cutleaf Waterparsnip

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikkwis hpa7tmwatli xre7t hjonli

dwatta Anodyne Febrifuge Vitamin C 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 North-western N. America - Alaska to British Columbia, east to Hudson Bay. ksacta Moist tundra and gravels[172, 204]. Prefers rocky soils along the sides of rivers and lakes[226]. Grows up to and beyond the tree-line, when it becomes a small recumbent low-spreading shrub[226].

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 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 this country. It is an aggregate species[172] and ranges in habit from a small tree right down to a dwarf shrub growing along the ground in exposed sites[229]. The following notes are based on the general needs of the genus. 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]. Rarely thrives on chalk[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

4.2.24 Hydrangea paniculata

Panicled hydrangea, Hybrid Hydrangea, PeeGee Hydrangea, Panic Hydrangea

3 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 4 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjltunyk hpa7tli frus-
flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hydrangea paniculata 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 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) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

kcaakta Edible Parts: Edible Uses: Rutin The flowers contain up to 4.06% rutin[240].

tcanta Nails Paper Wood The bark is used to make Japanese paper[46, 61, 74]. Wood - hard, white, fine grained. Used for small items, nails, walking sticks etc[46, 61, 74].

dwatta Blood tonic The flowers contain up to 4.06% rutin[240]. This makes them useful for reducing the incidence of recurrent haemorrhages associated with increased capillary fragility, particularly in hypertension[240]. The flowers also contain 2.5% of a phenolic compound[240].

nrakta E. Asia - China, Japan. ksacta Bamboo scrub, open forests and by streams[184]. Sparse forests or thickets in valleys or on mountain slopes or tops, at elevations of 300 - 2100 metres in China[266].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. 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, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses: Border, Massing, Specimen, Woodland garden. Tolerates most soil[200], thriving in a

well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Tolerates boggy soils[74]. Dislikes very alkaline soils[202]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Plants are hardy to about -25°C[184] when dormant but the young growth in spring can be killed by late frosts. A fast-growing plant[202]. A number of cultivars have been selected for their ornamental value[182]. Plants are very tolerant of pruning and can be cut back into old wood if required[188]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

4.2.25 Veratrum viride

Indian Poke, American Hellebore

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjltunyk hpa7tli flat-
prikliwis hpa7tmwatli xre7t hjonli

drutta Veratrum viride is a PERENNIAL growing to 2 m (6ft 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, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 All parts of the plant are highly poisonous[1, 4, 19, 62, 65]. After the plant dies down in the autumn and has been frosted, the toxins decrease and the plant becomes harmless to animals[212].

kcaakta One report says that the leaves have been used in soups[257]. The plant is highly toxic, so this use is probably best avoided[K].

tcanta Cleanser Fibre Insecticide The dried and powdered root is used as an insecticide and a parasiticide[46, 61, 212]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20]. The roots have been grated, then added to the laundry water and used to clean clothing[257]. A fibre obtained from the stem is used for weaving wallets etc[99].

dwatta Analgesic Diaphoretic Emetic Expectorant Febrifuge Hypotensive Narcotic Sedative Indian poke is a highly toxic plant that was widely employed medicinally by several native North American Indian tribes who used it mainly externally in the treatment of wounds, pain etc[257]. It is rarely used in modern herbalism, though it is of potential interest because it contains steroidal and other alkaloids and chelidonic acid. Some of these alkaloids lower blood pressure and dilate the peripheral vessels - they have, for example, been used in conventional medicine to treat high blood pressure and rapid heart beat[207, 212, 254]. Any use of this plant should be carried out with great caution and preferably only under the supervision of a qualified practitioner[21]. Even when applied externally to unbroken skin it has been known to cause side-effects[254]. See also the notes above on toxicity The root is analgesic, diaphoretic, emetic, expectorant, febrifuge, narcotic and sedative[4, 21, 257]. It has been used in the treatment of acute cases of pneumonia, peritonitis and threatened apoplexy[244]. A decoction of the root has been used in the treatment of chronic coughs and constipation[257]. A portion of the root has been chewed, or a decoction used, in the treatment of stomach pain[257]. The roots are harvested in the autumn and can be dried for later use[254]. The root has been used to make a skin wash and compresses for bruises, sprains and fractures[257]. The powdered root has been applied as a healing agent to wounds[207] and as a delousing agent[254]. The stems have been scraped and the powder snuffed to induce sneezing[257]. An infusion of the leaves has been used as a wash to treat aches and pains[257]. The plant is used in homeopathic preparations to slow the heart rate[254].

nrakta Eastern N. America - New England to Georgia and Wisconsin, western from Alaska to Oregon. ksacta Swamps, moist meadows and low ground[21].

hmmihtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikwis hpa7tmwatli hjonli

drutta Osmunda claytoniana is a FERN growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

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: Leaves StemEdible Uses: The young fronds are eaten[183]. Cooked as a vegetable[177, 272]. The centre of the clump, below ground level, is the source of a small edible pith called 'fern butter'[183].

dwatta VermifugeThe roots are used as an adulterant for Dryopteris felix-mas in the treatment of internal worms[240]. nrakta E. Asia - China, Japan, Himalayas. Eastern N. America. ksakta Wet places in C. Japan[58]. Open slopes, rarely in forests, 2800 - 3300 metres in Kashmir[145].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, 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. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -20°C, they are evergreen in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1].

4.2.22 Caltha palustris

Marsh Marigold, Yellow marsh marigold
3 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 0.3 m hkuc
hmmihtut cyutli hja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Caltha palustris 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 3. It is in flower from March to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, beetles, 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 wet soil and can grow in water.

pcista The whole plant, but especially the older portions, contains the toxic glycoside protoanemonin - this is destroyed by heat[172]. The sap can irritate sensitive skin[172].

ksakta Edible Parts: Flowers Leaves RootEdible Uses: Root - must be well cooked[183]. The raw root should not be eaten[K]. Some caution is advised, see the notes above on toxicity. Flower buds - raw, cooked or pickled and used as a caper substitute[142, 183]. Eating the raw flower buds can lead to intoxication[222]. Some caution is advised, see the notes above on toxicity. Young leaves - raw or cooked[2, 46, 55, 62, 161]. The leaves are harvested in the spring as the plant is coming into flower and is used like spinach after cooking in two or more changes of water[2, 183]. Eating the raw leaves can lead to intoxication[222]. Some caution is advised, see the notes above on toxicity. Older leaves, before

the plant flowers, can be eaten if they are well cooked[172]. Some caution is advised, see the notes above on toxicity.

tcanta DyeA yellow dye is obtained from the flowers[100, 115], a saffron substitute[142]. It is used as a dye when mixed with alum, though it is not very permanent[4]. Plants can be grown for ground cover when planted about 45cm apart each way[208].

dwatta Anodyne Antirheumatic Antispasmodic Diaphoretic Diuretic Expectorant Irritant Rubefacient Wart-sEvery part of this plant is strongly irritant and so it should be used with caution[4]. The whole plant is anodyne, antispasmodic, diaphoretic, diuretic, expectorant and rubefacient[21, 172]. It has been used to remove warts and is also used in the treatment of fits and anaemia[4, 21, 172]. The root is antirheumatic, diaphoretic, emetic and expectorant[218, 222]. A decoction is used in the treatment of colds[257]. A poultice of the boiled and mashed roots has been applied to sores[257]. A tea made from the leaves is diuretic and laxative[222, 257]. All parts of the plant can irritate or blister the skin or mucous membranes[222].

nrakta Much of the northern Temperate zone in Europe, including Britain, N. America and Asia.. ksakta Wet areas in marshes, fens, ditches and wet alder woods[17, 19]. Rare on very base poor peat[17].

propta Seed - best sown as soon as it is ripe in a cold frame in late summer[200]. Stand the pots in 2 - 3cm of water to keep the soil wet. The seed usually germinates in 1 - 3 months at 15°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in a cold frame until they are at least 15cm tall. Plant them out into their permanent positions in the summer. Division in early 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 summer or following spring.

nwatta A plant of the waterside, it prefers growing in a sunny position in wet soils or shallow water up to 15cm deep[1, 111, 233], though it will tolerate drier conditions if there is shade from the summer sun[233]. Another report says that it grows best in partial shade[17]. Requires a deep rich slightly alkaline soil[31, 111]. Grows well in heavy clay soils. Prefers a chalky soil[31]. Tolerates a pH in the range 4.8 to 7.5. A very ornamental[1] and polymorphic plant[17], there are some named varieties[233]. Plants often self-sow when well sited[208]. A good bee plant[24]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. This species is probably the most primitive flower in the British flora[17].

4.2.23 Salix alaxensis

Feltleaf Willow
3 tlin 7 cyuc 1 kcaak 2 tcan 2 dwat 10 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix alaxensis is a deciduous Tree growing to 10 m (32ft 10in). 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 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

ksakta Edible Parts: Inner bark Leaves NectarEdible Uses: Inner bark - raw or cooked. A sweet flavour[172], it has been eaten as a winter titbit[257]. The taste is somewhat like watermelon or cucumber[257]. The bark has been used as a survival food[229]. It can be dried, ground into a powder and used as a thickening in soups or can be added to cereal flour for use in making bread etc. Young tender leaves and shoots - raw or cooked[257]. The shoots are peeled and eaten in spring[172]. A source of vitamin C[257]. The flowers have been sucked by children for the sweet nectar[257].

tcanta In northern parts of this plant's range, its wood is often the sole source of firewood[229]. Dynamic accumulator.

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hvis /hjis/ poor (soil), hras /hras/ sandy, jlut /jlut/ loamy, nyik /njik/ mud (silt/clay loam), frip /frip/ pottery (heavy clay), hpa7t /hpa 7t/ topsoil.

frus /frus/ corrosive (very acid), flat /flat/ acid, prik /prik/ passive (neutral), lwis /lwis/ alkaline, slip /slip/ slippery (very alkaline), hsom /hsom/ salt (saline), hpa7tmwat /hpa 7tmwat/ topsoil taste.

fyif /fjif/ self (fertile), xre7t /xre 7t/, nyanhjen /nyanhjen/ male-female (dioecious, distinct male and female plants), hjon /hjon/ sex.

hmuc /hmu/ purpose, pcis /pjis/ danger, trot /trot/ temperature, prop /prop/ fertile, tcan /tjan/ other, hyum /hyum/ uses, dwat /dwat/ medicine, drut /drut/ description, kcec /kcej/ region, tfo2n /tfo 2n/ nitrogen-fixing, xlutkfam /xlut,kfam/ plant quantity, bwon /bwon/ bean, mran /mran/ corn/grain non-nitrogen-fixing plant, nrak /nrak/ continent (of origin), ksac /ksaj/ circumstances/habitat.

6 hmucrotkcec
hja7n hmuchwic
344 xlutkfam

2 1 tlin

2.0.1 Pinus contorta

Beach Pine, Lodgepole pine, Bolander beach pine, Beach pine, Sierra lodgepole pine, Yukon pine, Shor
1 tlin 7 cyuc 3 kcaak 0 tcan 2 dwat 15 m hkuc
htut cyutli hgatkuyectcuphja7n hwicli vyhyshrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

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

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

ksakta Edible Parts: Inner bark Sap SeedEdible Uses: Condiment GumInner bark - raw or cooked[2, 94, 105, 161, 257]. It can be used fresh or dried. It is mashed into a pulp and made into cakes then baked[94]. Harvested in early spring, the taste is not unpleasant, but it develops a strong taste of turpentine as the season advances[2]. The inner bark is ready to harvest when the male cones are producing pollen[257]. A famine food, it is only used when all else fails. Sap - collected in spring and used as a drink[161, 177]. Seed - raw or cooked[257]. A gum is made from the pitch obtained from the trunk. It is allowed to harden and used for chewing[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dye Fuel Gum Herbicide Pitch String Waterproofing WoodA tan or green dye is obtained from the needles[168]. The roots have been braided by the N. American Indians to make a rope[226]. The needles contain a substance called terpene, this is released when rain washes

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

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

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

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

nwatta Landscape Uses:Alpine garden, Screen, Seashore, Specimen, Woodland garden. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Tolerates water-logged soils[81]. Succeeds in exposed maritime positions[49, 81]. Established plants tolerate drought[200]. The coastal form of this species is a very fast growing tree, especially when young, with new growth of 1 metre or more per year[185]. The forms from coastal Washington and Oregon do best in Britain. The subspecies *P. contorta latifolia* is normally slower growing than the species type though it is sometimes faster in some in-

land sites at higher altitudes[185]. New growth takes place from mid-April until early July[185]. Trees are long-lived, with specimens 600 years old recorded[229]. Extensively cultivated for timber in N. Europe[50, 200], this is an aggressive colonizing species that can form huge pure stands following a forest fire or clear-felling an area for timber[226]. Trees can be shrubby in habit when they are grown on poor sites[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow below the tree[18]. There are some named forms, selected for their ornamental value[188]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species hybridises in the wild with *P. banksiana* where their ranges overlap[226]. Trees come into flower at an early age, usually between 6 and 10 years[229]. Good seed crops are produced every 1 - 3 years[229]. The cones are 2 - 5cm long[82], they open and shed their seed whilst still attached to the tree[226], though many of the cones will remain unopened on the tree, preserving the vitality of the seeds until they are stimulated to open by excessively hot weather or a forest fire[82, 229]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native.

2.0.2 Equisetum scirpoides

Dwarf scouring rush

1 tlin 9 cyuc 2 kcaak 3 tcan 2 dwat 0.2 m hkuc pcmhmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

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

pcista None Known

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

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

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

nrakta Native to northern Eurasia and America. ksacta Tundra, mossy places, and woods. Stems often partly buried

areas from sea level to near the tree-line in the Rocky mountains[60]. The best specimens are found on well-drained deep loamy soils with plenty of moisture[229].

propta Seed - best sown in the autumn to winter in a cold frame so that it is stratified[80]. The seed can also be stored dry and sown in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the 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. Seedlings tolerate light shade for their first few years of growth. Cones often fall from the tree with their seed still inside[80]. If you have plenty of seed then it can be sown in an outdoor seedbed in early spring[80]. Grow the plants on for at least two years in the seedbed before planting them out in late autumn or early spring.

nwatta Landscape Uses:Christmas tree, Firewood, Aggressive surface roots possible, Screen, Specimen. Prefers a moist but not water-logged alluvial soil[1]. Dislikes calcareous soils[1]. Trees are a failure on dry hungry soils.[11]. Whilst they are moderately wind resistant[166], tall specimens are likely to lose their crowns once they are more than 30 metres tall in all but the most sheltered areas[185]. A very ornamental tree[1], it is the most cultivated timber tree in the world and is extensively used for re-afforestation in Britain[200]. There are several named varieties selected for their ornamental value[188]. Trees can be established in light shade but this must be removed in the first few years or growth will suffer[185]. Very slow growing for its first few years, growth soon becomes extremely fast with new shoots of up to 1.2 metres a year[185]. This annual increase can be maintained for many years[185]. Trees in sheltered Scottish valleys have reached 55 metres in 100 years[200]. New growth takes place from May to July[185]. The trees require abundant rainfall for good growth[11, 49]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. 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 are very long-lived, specimens over 1,000 years old are known[226]. Seed production commences when trees are about 10 years old, though good production takes another 15 - 20 years[229]. Good crops are produced about every 6 years[229]. This tree is a pioneer species because it cannot reproduce under its own canopy[226]. The bark on mature trees can be 30cm thick, and this insulates the trunks from the heat of forest fires[213]. This species is notably resistant to honey fungus[81, 200]. Young growth can be damaged by late frosts[81]. The leaves have a strong sweet fruity aroma[185]. Special Features: North American native, Inconspicuous flowers or blooms.

4.2.19 Caltha leptosepala

Western Marsh Marigold, Howell's marsh marigold, Sulphur marsh marigold

3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasljutnyikfrp hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Caltha leptosepala 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 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, beetles, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

pcista The whole plant, but especially the older portions, contains the toxic glycoside protoanemanin - this is destroyed by heat[172]. The sap can irritate sensitive skin[172].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - it must be well cooked[172]. Some caution is advised, see the notes above on toxicity. Flower buds - raw, cooked or pickled and used as a caper substitute[85, 105, 172, 183]. Some caution is advised, see the notes above on toxicity. Young leaves, before the flowers emerge are eaten raw or cooked[85, 172, 183]. Some caution is advised, see the notes above on toxicity. Older leaves, before the plant flowers, can be eaten if well cooked[85]. Some caution is advised, see the notes above on toxicity.

dwatta Antispasmodic Expectorant Poulitice WartsThe whole plant is antispasmodic and expectorant. It has been used to remove warts[172]. A poultice of the chewed roots has been applied to inflamed wounds[257].

nrakta Western N. America - Alaska to Oregon. ksacta Open, wet, subalpine and alpine marshes, wet seepages and marshy meadows at elevations of 750 - 3900 metres[60, 85, 270].

propta Seed - best sown as soon as it is ripe in a cold frame in late summer[200]. Stand the pots in 2 - 3cm of water to keep the soil wet. The seed usually germinates in 1 - 3 months at 15°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in a cold frame until they are at least 15cm tall. Plant them out into their permanent positions in the summer. Division in early 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 summer or following spring.

nwatta A plant of the waterside, it prefers growing in a sunny position in wet soils or shallow water[1, 11, 233], though it will tolerate drier conditions if there is shade from the summer sun[233]. It requires a deep rich slightly acidic soil[111, 200]. Grows well in heavy clay soils. Plants are hardy to about -20c[187]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

4.2.20 Caltha leptosepala howellii

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasljutnyikfrp hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Caltha leptosepala howellii 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 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, beetles, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

pcista The whole plant, but especially the older portions, contains the toxic glycoside protoanemanin - this is destroyed by heat[172]. The sap can irritate sensitive skin[172].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - cooked. A survival food, used when all else fails[172]. Some caution is advised, see the notes above on toxicity. Flower buds - cooked. Added to stews etc or pickled as capers[172]. Some caution is advised, see the notes above on toxicity. Young leaves - cooked. Best before the plant flowers[172]. Some caution is advised, see the notes above on toxicity.

nrakta Western N. America - Alaska to California. ksacta Wet alpine and sub-alpine places[60]. Bogs and wet ground by streams, 1500 - 3000 metres[187].

propta Seed - best sown as soon as it is ripe in a cold frame in late summer[200]. Stand the pots in 2 - 3cm of water to keep the soil wet. The seed usually germinates in 1 - 3 months at 15°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in a cold frame until they are at least 15cm tall. Plant them out into their permanent positions in the summer. Division in early 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 summer or following spring.

nwatta A plant of boggy soils and shallow pond margins[1], it requires a deep rich slightly acidic soil[200]. It grows well in heavy clay soils. Plants are hardy to about -20°C[187]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. There is some disagreement over the correct name for this species, with some authorities calling it *C. howellii*.

4.2.21 Osmunda claytoniana

Interrupted Fern

3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 0.5 m hkuc

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].

4.2.17 Ajuga reptans

Bugle, Common Bugelweed, Bugleweed, Carpet Bugleweed, Carpetweed, Carpet Bugle
3 tlin 10 cyuc 2 kcaak 2 tcan 3 dwat 0.3 m hkuc
pcimhmimhtut cyutli hgatyuctuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Ajuga reptans is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) 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 July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, 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. 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 and can tolerate drought.

pcista None Known

kcaakta Edible Parts: LeavesEdible Uses: Young shoots - raw[7].

tcanta A good ground-cover for a position in semi-shade[200], forming a carpet and rooting as it spreads[208]. Fairly fast growing but it does not always smother out weeds and can become bare at the centre if not growing in good conditions[197]. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, these are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel.

dwatta Aromatic Astringent Bitter HomeopathyBugle has a long history of use as a wound herb and, although little used today, it is still considered very useful in arresting haemorrhages and is also used in the treatment of coughs and spitting of blood in incipient consumption[4, 254, 268]. The plant contains digitalis-like substances (these are commonly found in Digitalis species and are used in treating heart complaints) and is thought to possess heart tonic properties[268]. It has also been considered good for the treatment of excessive alcohol intake[4]. The whole plant is aromatic, astringent and bitter[4, 7, 9]. The plant is usually applied externally[7]. It is harvested as it comes into flower in late spring and dried for later use[4, 7]. It is also commonly used fresh in ointments and medicated oils[238]. A homeopathic remedy is made from the whole plant. It is widely used in various preparations against throat irritations and especially in the treatment of mouth ulcers[7].

nrakta Most of Europe, including Britain, to S.W. Asia and N. Africa. ksacta Damp grassy fields and damp woods[7, 13, 17].

propta Seed - sow spring or autumn in a cold frame. The seed usually germinates in 3 - 4 weeks at 10°C[133], though it can be erratic[238]. Prick out the seedlings when they are large enough to handle and plant them out in the summer[K]. Division of runners at almost any time of year. Very easy, the divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers a humus-rich, moisture retentive soil and partial shade[28, 31, 200]. Does well in marshy soil and in the spring meadow[24]. Grows well in dry shade[187, 190] and is fairly drought tolerant once established, though it shows distress in severe drought[190]. Plants do not always ripen their seeds in Britain, they spread freely by runners, however, and soon form an extensive patch in suitable conditions[4]. A number of forms have been selected for their ornamental value, several of them are variegated and these are used especially as ground cover plants for dry shade[187]. A purple-leaved form, 'Atropurpurea' does well in full sun

so long as the soil is not dry[208]. A good bee and butterfly plant[24]. Special Features:Attractive foliage, Not North American native, Naturalizing. Heat Zone: 9-1.

4.2.18 Pseudotsuga menziesii

Douglas Fir, Rocky Mountain Douglas-fir
3 tlin 6 cyuc 2 kcaak 0 tcan 2 dwat m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Pseudotsuga menziesii is an evergreen Tree growing to 75 m (246ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from March to May, 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: Inner bark MannaEdible Uses: Coffee Condiment Gum TeaYoung shoot tips - used as a flavouring in cooked foods[15, 177]. A subtle woody flavour[183]. A refreshing tea is made from the young leaves and twigs[14, 46, 177, 257]. Rich in vitamin C[183]. It is used as a coffee substitute according to some reports[92, 95, 161, 257]. The fresh leaves have a pleasant balsamic odour and are used as a coffee substitute[213]. Inner bark - dried, ground into a meal and mixed with cereals for making bread etc[161, 213]. A famine food used when all else fails[177]. A sweet manna-like substance is exuded from the bark[177, 183]. This report possibly refers to the resin that is obtained from the trunk[K], and is used as a chewing gum by various native North American Indian tribes[226]. Alternatively, the report could be referring to the sap which is used as a sugar-like food[257].

tcanta Basketry Cork Dye Fertilizer Fuel Gum Insecticide Resin Shelterbelt Tannin WoodA light brown dye is obtained from the bark[118, 257]. The bark is a source of tannins[46, 82]. The bark can be used as a cork substitute[171] and is also used to make fertilizer[226]. The bark contains pitch, it burns with a lot of heat and almost no smoke, so it is prized as a fuel[226, 257]. The small roots have been used to make baskets[257]. The plant has insecticidal properties[171]. A resin is obtained from the trunk, similar to Abies balsamea[61, 64] which is used in the manufacture of glues, candles, as a cement for microscopes and slides and also as a fixative in soaps and perfumery[171]. The resin can also be used as a caulking material on boats[257]. A fast growing and fairly wind-resistant tree, it is often used in shelterbelt plantings[185]. Wood - heavy, strong, fine grained, durable, though it can be of variable quality. It dries quickly, does not warp and is easily worked, it is used for heavy construction, telegraph poles, furniture etc[21, 46, 61, 82, 99, 171, 200, 226]. It is also used as a good quality fuel[46, 99, 257].

dwatta Antirheumatic Antiseptic Kidney Mouthwash Poultrice Skin Vitamin CDouglas fir was often employed medicinally by various native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. An antiseptic resin is obtained from the trunk. It is used as a poultice to treat cuts, burns, wounds and other skin ailments[226, 257]. The poultice is also used to treat injured or dislocated bones[257]. The resin is used in the treatment of coughs and can be chewed as a treatment for sore throats[257]. An infusion of the green bark has been used in the treatment of excessive menstruation, bleeding bowels and stomach problems[257]. An infusion of the leaves has been used as a wash and a sweat bath for rheumatic and paralyzed joints[257]. An infusion of the young sprouts has been used in the treatment of colds[257]. An infusion of the twigs or shoots has been used in the treatment of kidney and bladder problems[257]. A decoction of the buds has been used in the treatment of venereal disease[257]. Young shoots have been placed in the tips of shoes to keep the feet from perspiring and to prevent athletes foot[257]. A mouthwash is made by soaking the shoots in cold water[15].

nrakta Western N. America - Canada to California. Occasionally self-sows in Britain[17]. ksacta Moist to very dry

in humus. Part shade, shade; moist woods, peat bogs, shady, mossy wetlands.

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

nwatta A Long-lived perennial evergreen with fibrous roots and the smallest living horsetail. Can be used as an aquatic fern. Light requirement: Sun , Part Shade , Shade. Soil moisture: moist or wet (recommended water depth over crown of plant: 0 - 3cm (0 - 1 inch)). Water quality: pH 5.6-6.5. Useful for winter interest in a small pond, barrel, or tub garden, especially in shady areas. Pond Zone: flood plain - Upland. High marsh - saturated. soil spores shed from July through August, or persisting unopened until the following summer. 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]. Evergreen. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. Not a flowering plant. Reproduces by spores contained within sporangia borne on pelate sporophylls.

3 2 tlin

3.1 bwon

3.1.1 Myrica gale

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

drutta Myrica gale 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 1. It is in flower from March to May, and the seeds ripen from August to 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 Wind. The plant is not self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

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

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

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

dwatta Abortifacient Antipruritic Aromatic Astringent Emmenagogue Parasiticide StomachicThe leaves are abor-

tifacient, aromatic, astringent, emmenagogue and stomachic[4, 46, 172, 238]. The leaves are normally used as a tea, but they do contain a poisonous aromatic oil, so some caution is advised in their use[4].

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

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

nwatta There is some difference of opinion about the needs of this plant. Most reports say that it prefers a moist soil and that it grows well in an open position in a well-drained soil in sun or light shade. Most reports also say that it prefers or even requires a lime-free loamy or peaty soil[1, 200] but another report says that it succeeds in any ordinary garden soil[11]. In the wild it is usually found in soils with a pH between 3.5 and 6, but it is also sometimes found in fens with a pH as high as 7.5[186]. A suckering shrub, when well sited it can form thickets[186]. 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].This habit also allows the plant to succeed in water-logged soils[186]. Dioecious. Male and female plants must be grown if seed is required. This plant is occasionally monoecious and also can change sex from year to year[50]. Flowers are produced mainly on one-year old wood[4]. All parts of the plant are pleasantly aromatic[186]. A good food plant for the caterpillars of many species of butterflies[30]. Plants in this genus are notably resistant to honey fungus[200]. 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 well-stemmed with multiple stems from the crown [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

3.1.2 Alnus sinuata

Sitka Alder
tfo2n 2 tlin 9 cyuc 1 kcaak 3 tcan 1 dwat 4 m hkuc
hmimhtut cyutli tcuphja7n hwicli hysjlutnyikfrip hpa7tli flatprikliwis 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: FlowersEdible Uses: Catkins - raw or cooked. A bitter flavour[172].

tcanta Fuel Pioneer Soil stabilization Tannin WoodThis 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 Astrigent Emetic Haemostatic Stomachic TonicThe 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.

nwwatta 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].

3.1.3 *Alnus rugosa*

Speckled Alder

tfo2n 2 tlin 6 cyuc 0 kcaak 3 tcan 2 dwat 22 m hkuc hmimhtut cyutli tucphja7n hwicli hysijlutnyikfrip hpa7tli flat-prikkwis 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 WoodThis is an excellent pioneer species for re-establishing woodlands on dis-

used 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 TonicThe 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.

nwwatta 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].

3.1.4 *Alnus incana*

Grey Alder, Speckled alder, Thinleaf alder, White Alder tfo2n 2 tlin 6 cyuc 0 kcaak 3 tcan 0 dwat 18 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprikkwis 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 hardiness. 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

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.

nwwatta 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].

4.2.15 *Aruncus dioicus*

Goat's Beard, Bride's feathers

3 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikkwisslip hpa7tmwatli nyanhjen hjonli

drutta *Aruncus dioicus* is a PERENNIAL growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. 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. 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.

pcista Cyanogenic glycosides are found in the leaves[74].

kcakta Edible Parts: LeavesEdible Uses: Budlings, stems and young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

tcanta Plants form a dense growth that is very effective at holding invasive plants at bay[208]. They can be used as a tall ground cover for large areas[208].

dwatta Antipyretic Astringent Birthing aid Salve Stings Stomachic VDTThe poulticed root is applied to bee stings[222, 257]. A tea made from the roots is used to allay bleeding after child birth, to reduce profuse urination and to treat stomach pains, diarrhoea, gonorrhoea, fevers and internal bleeding[222, 257]. The tea is used externally to bathe swollen feet and rheumatic joints[222, 257]. A salve made from the root ashes is rubbed onto sores[257].

nrakta Europe, N. America and Asia. ksacta Damp woods, shady places and by streams, usually in mountainous areas[50, 187].

propta Seed - best sown in a cold frame as soon as it is ripe. Sow stored seed in late winter or early spring in a cold frame. When 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. They can be planted out into their permanent positions at any time of the year. Division in early spring or autumn[200]. Very easy, the clumps can be planted out direct into their permanent positions.

nwwatta Landscape Uses:Border, Massing, Seashore, Specimen, Woodland garden. Succeeds in most moist soils in sun or partial shade[187, 200, 233]. Plants do well in moist to wet soils but will also tolerate fairly dry sites[208]. Succeeds in acid or limey soils[208]. Grows well on the woodland edge[200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to at least -20°C[187]. This is a polymorphic species, especially the form that grows in Japan[187]. There are some named forms selected for their ornamental value, 'Kneiffii' is only half the size of the type species[208]. Plants are fast-growing[208] and form very large clumps[187]. The flowers are sweetly perfumed[245]. Dioecious, male and female plants must be grown if seed is required[208]. Special Features:Attractive foliage, Naturalizing, Wetlands plant.

4.2.16 *Lythrum salicaria*

Purple Loosestrife

3 tin 10 cyuc 2 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tucphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikkwis 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.

kcakta 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 is 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 stimulants 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.

nwwatta 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

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. 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.

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 Antinflammatory Antirheumatic Antiseptic Antiviral Aromatic Astringent Diaphoretic Diuretic Emmenagogue Homeopathy Rubefacient Vitamin CAmerican 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 alternative, 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 for 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[111]. 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.

4.2.14 Filipendula kamschatica

3 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 2 m hkuac hmimhtut cyutti tcuphja7n hwicli hrasjlutnyikfrip hpa7tli prikliwis hpa7tmwatli fyfxre7t 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 - raw[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

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 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]. 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 Salix hybrids

Hybrid willows
2 tlin 11 cyuc 3 kcaok 5 tcan 3 dwat 25 m hkuac htut cyutti tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

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

pcista See individual species.

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

tcanta Basketry Biomass Fencing Filter Fodder Soil stabilization Weaving WoodWastewater treatment - converting wastewater to biomass fuel by taking up excess nutrients in warer for fertilizer. A strong, light flexible wood used for basketry, fencing and natural building. Erosion control and bank stabilization akong streams and rivers [1-1]. Carbon Farming Solutions - Industrial Crop: biomass (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]. Fodder: bank. The leaves are a good fodder for livestock. Other Systems: SRC. Dynamic accumulator.

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

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

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

3.2.2 Betula pubescens

White Birch, Downy birch
2 tlin 9 cyuc 3 kcaok 5 tcan 3 dwat 20 m hkuac htut cyutti kyucuphja7n hwicli hyishrasjlutnyikfrip hpa7tli frusflatprikliwis 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 hardiness. 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 stirred together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scum'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 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[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 Lithotropic 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 wood 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 environment 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].

3.2.3 Picea abies

Norway Spruce

2 tlin 7 cyuc 2 kcaak 4 tcan 1 dwat 30 m hkuic
htut cyutli tucphja7n hwicli hyishrasjltutnyik hpa7tli frusflat-prik hpa7tmwatli hjonli

drutta *Picea abies* is an evergreen Tree growing to 30 m (98ft) by 10 m (32ft) 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 from May to June, 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 and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure. It cannot tolerate atmospheric pollution.

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

tcanta Adhesive Essential Pitch Shelterbelt Tannin Varnish WoodThe tree is a source of pitch (Burgundy pitch) and turpentine (Jura turpentine)[1, 7, 46, 64]. Burgundy pitch is used as a varnish and in medicinal plasters[57]. It is a strong adhesive[61, 64]. The turpentine is a waterproofer and wood preservative. They are obtained by incisions in the trunk, the resin is scraped out some months later[64]. An essential oil from the leaves is used in perfumery[46, 61]. The

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

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional TimberLandscape Uses:Christmas tree, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Trees grow well on poor dry sandy soils[11, 81]. Fairly shade tolerant[186]. Prefers a light acid soil, becoming chlorotic at a pH higher than 6.5[186]. Trees can succeed for many years on shallow soils over chalk[185]. Tolerates chalk for a while, but trees are then short-lived[81]. Tolerates some water-logging[186]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[186]. Very wind resistant[49, 75], tolerating maritime exposure[166]. Tolerates atmospheric pollution[226]. Fairly long-lived, to 200 years or more and quite fast growing[185], but trees are very slow growing in wet soils[81]. Young trees can make new growth of 1 metre a year though growth slows down rapidly by the time the tree is 18 metres tall[185]. This species is extensively used in cool temperate forestry as a timber tree[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Cones take two seasons to ripen[7]. Plants are easily killed by fire and cannot regenerate from the roots[186]. A good food plant for the caterpillars of several species of butterflies[30]. This tree has over 50 species of associated insects[81]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. There are several named forms selected for their ornamental value[188]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms.

4.2.12 Picea engelmannii

Mountain Spruce, Engelmann spruce

3 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 20 m hkuic
htut cyutli tucphja7n hwicli hyishrasjltutnyik hpa7tli frusflat-prik hpa7tmwatli hjonli

drutta *Picea engelmannii* is an evergreen Tree growing to 20 m (65ft) by 6 m (19ft) 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 all year, 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 and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are about 5cm long[82]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229] and is too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta Basketry Charcoal Fibre Fuel Tannin WoodThe bark is a source of tannin[46, 61, 82]. The branches and the roots have been shredded, pounded and used to make cord

and rope[257]. (It is probably the bark that was used[K].) The bark has been used to make baskets and various small utensils[257]. Wood - close-grained, light, soft, not strong. It is used for lumber, construction, fuel and charcoal[46, 61, 82, 171]. It is also valued for its use in the pulp industry to make paper[171].

dwatta Cancer Eczema Pectoral Salve Skin TB Vitamin CAn infusion of the bark has been used in the treatment of respiratory complaints, TB etc[257]. A decoction of the leaves and gum has been used in the treatment of cancer[257]. It was said that if this treatment did not work then nothing would work[257]. The decoction was also used in the treatment of coughs[257]. The ashes of the twigs, mixed with oil, have been used as an ointment or salve on damaged skin[257]. The pitch obtained from the trunk has been used in the treatment of eczema[257].

nrakta Western N. America - Alberta and British Columbia to Arizona and New Mexico. ksacta Montane regions to the tree-line, especially by swamps[60]. Often found on poor thin rocky soils, though the best specimens are growing in deep well-drained clay-loam soils[229].

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

nwatta Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. Plants have a shallow root system and are easily wind-blown[155]. Often planted for its timber in N. Europe[50]. Trees are of moderate growth after a slow start, older trees often averaging over 40cm a year[185]. Trees grow better and faster in the north of Britain than in the south. This is not an easy tree to grow in Britain[1], it prefers a continental climate and, although the dormant tree is very cold hardy, the new growth in spring is very susceptible to damage by late frosts in this country[11]. Quite long-lived in its native range, with specimens 500 - 600 years old[229]. Seed production commences around the age of 20 - 25 years, with excellent crops every 2 - 6 years[229]. Closely related to *P. glauca*, this species also hybridizes with *P. sitchensis* in the south of its range[226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. The crushed foliage is often said to be foetid but after the first sniff the scent is sweet and like menthol or camphor[185]. Plants are susceptible to damage by the green spruce aphid[1].

4.2.13 Thuja occidentalis

American Arbor-Vitae, Arborvitae, Eastern Arborvitae, Siberian Arborvitae, Northern White Cedar. Wh

3 tlin 7 cyuc 2 kcaak 0 tcan 3 dwat 15 m hkuic
hmimhtut cyutli tucphja7n hwicli hrasjltutnyikprik 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

4.2.10 Pontederia cordata

Pickerel Weed

3 tlin 11 cyuc 3 kcaak 0 tcan 1 dwat 0.8 m hkuc
htut cyutli hja'nhs6s hwicli hrsajlutnyik hpa7tli flatprikliws
hpa7tmwatli xre7t hjonli

drutta Pontederia cordata 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 3. It is in flower 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - raw, cooked like rice or dried and ground into a powder[55, 62, 106, 183]. A very acceptable nutty flavour and texture when raw, they are said to be excellent if the seed is lightly roasted in an oven[183]. Young leafstalks - raw or cooked[62]. The whole plant is edible cooked or raw[106]. It can be added to salads, cooked like spinach or added to soups[183].

dwatta ContraceptiveAn infusion of the plant has been used as a contraceptive[257].

nrakta Eastern N. America - Nova Scotia to Florida and Texas. A garden escape occ naturalized in Britain[17] ksacta Marshes and borders of muddy ponds[55].

propta Seed - best sown as soon as it is ripe in pots standing in 2cm of water in a cold frame. Cover the seed lightly with silver sand. Submerge in 3cm depth of water after the seedlings emerge[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in water 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 is best in April but it can be done at almost any time of the year[1]. 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. Lateral shoots.

nwwatta Landscape Uses:Container, Specimen. A water or bog garden plant, it requires a rich soil[56] and prefers growing in water 15 - 30 cm deep[1]. Plants are hardy to about -25°C[187]. A very ornamental plant, it forms spreading patches by means of a thick creeping rhizome[187]. There is a species of bee (*Dufourea novae-angliae*) which visits this plant for nectar and pollen and does not visit any other species of plant[103]. The reproductive biology of *Pontederia cordata* has been well studied. It is a tristylous species, and most populations contain all three forms. At least some degree of self-incompatibility exists, being strongest with the short-style forms and weakest with the midstyle forms[270]. Special Features:Attracts birds, Attractive foliage, North American native, Grows submerged, Invasive, Naturalizing, Wetlands plant, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

4.2.11 Pinus sylvestris

Scot's Pine, Scotch Pine

3 tlin 7 cyuc 2 kcaak 5 tcan 3 dwat 25 m hkuc
hmimhtut cyutli hgatkuyctuphja7n hwicli hyhsrasjlut
hpa7tli frusflatprikwiisslip hpa7tmwatli dyat hjonli

drutta *Pinus sylvestris* is an evergreen 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 2. It is in leaf all year, in flower in May, and the seeds ripen from March to 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. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor 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 and can tolerate

drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. kcakta Edible Parts: Inner barkEdible Uses: Condi-mentInner bark - dried and ground into a powder and used in making bread[2, 66, 105, 177]. It is often mixed with oatmeal[115]. A famine food, it is only used when all else fails[115]. A vanilla flavoured is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Essential Fibre Fuel Herbicide Lighting Packing Resin Shelterbelt WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A reddish yellow dye is obtained from the cones[6]. This tree yields resin and turpentine[64, 66, 100, 171]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. An essential oil obtained from the leaves is used in perfumery and medicinally[46, 61]. A fibre from the inner bark is used to make ropes[115]. The roots are very resinous and burn well. They can be used as a candle substitute[115]. The leaves are used as a packing material[46]. The fibrous material is stripped out of the leaves and is used to fill pillows, cushions and as a packing material[7]. Trees are very wind resistant and quite fast growing. They can be planted as a shelterbelt, succeeding in maritime exposure[75, 200]. Wood - light, soft, not strong, elastic, durable, rich in resin. Used in construction, furniture, paper manufacture etc.[13, 46, 100]. A good fuel but it is somewhat smokey[6, 66, 115].

dwatta Antirheumatic Antiseptic Aromatherapy Bach Balsamic Diuretic ExpectorantScot's pine has quite a wide range of medicinal uses, being valued especially for its antiseptic action and beneficial effect upon the respiratory system. It should not be used by people who are prone to allergic skin reactions whilst the essential oil should not be used internally unless under professional supervision[254]. The turpentine obtained from the resin is antirheumatic, antiseptic, balsamic, diuretic, expectorant, rubefacient and vermifuge[4, 13, 46]. It is a valuable remedy in the treatment of kidney, bladder and rheumatic affections, and also in diseases of the mucous membranes and the treatment of respiratory complaints[4]. Externally it is used in the form of liniment plasters and inhalers[4]. The leaves and young shoots are antiseptic, diuretic and expectorant[9]. They are harvested in the spring and dried for later use[9]. They are used internally for their mildly antiseptic effect within the chest and are also used to treat rheumatism and arthritis[254]. They can be added to the bath water for treating fatigue, nervous exhaustion, sleeplessness, skin irritations[9]. They can also be used as an inhalant in the treatment of various chest complaints[9]. The essential oil from the leaves is used in the treatment of asthma, bronchitis and other respiratory infections, and also for digestive disorders such as wind[254]. An essential oil obtained from the seed has diuretic and respiratory-stimulant properties[254]. The seeds are used in the treatment of bronchitis, tuberculosis and bladder infections[254]. A decoction of the seeds can be applied externally to help suppress excessive vaginal discharge[254]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Self-reproach', 'Guilt feelings' and 'Despondency'[209]. The essential oil is used in aromatherapy. Its keyword is 'Invigorating'[210].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Albania and temperate Asia. ksacta Forming woods in the mountains of Scotland[7, 9].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°C can

seed contains 30% of a fatty oil, this is used in the production of a varnish[74]. The bark contains some tannin[171]. Both the bark and bark extract have been widely used in Europe as a source of tannin, the bark containing up to 13% tannin[223]. Yields of tannin have been doubled by heating or steaming the bark as soon as possible after the tree has been felled[223]. A fairly wind resistant tree and fast growing, it can be planted in shelterbelts to provide protection from the wind[200]. The dwarf cultivar 'Inversa' can be grown as a ground cover plant in a sunny position[188]. The cultivars 'Reflexa' and 'Procumbens' can also be used[208]. They are best spaced about 1 metre apart each way[208]. Wood - medium hard, fairly elastic, durable under water, light in weight and colour. Used for general carpentry, joinery, musical instruments etc. Valued for its use in the pulp industry to make paper[1, 11, 13, 46, 66].

dwatta Antibiotic Antiseptic Balsamic Expectorant Poul- tice Sedative Vitamin CThe buds, leaves and resin are antibi-otic, antiseptic, balsamic, expectorant, sedative[7]. A pitch, or resin, obtained from the trunk is rubefacient and stimu- lant[240]. It is used externally in plasters etc for its heating and antiseptic properties[7]. A poultice of the sap or gum has been used in the treatment of boil and abscess pain[257].

nrakta N. and C. Europe. ksacta Not known

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

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

3.2.4 Picea glauca

White Spruce, Black Hills Spruce, Canadian Spruce

2 tlin 6 cyuc 2 kcaak 3 tcan 2 dwat 15 m hkuc
htut cyutli tucpja7n hwicli hyhsrasjlutnyikfrkip hpa7tli frus-
flatprik hpa7tmwatli hjonli

drutta *Picea glauca* is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, 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 and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark Seed Seed-podEdible Uses: Condiment Gum TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are about 5cm long[82]. Inner bark - raw or cooked[257]. It can be dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. Usually harvested in the spring[257], it is an emergency food that is only used when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229] and is too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172]. The trunk yields a gum, used for chewing[183, 257]. Spruce oil, distilled from the leaves and twigs, is used in the food industry to flavour chewing gum, ice cream, soft drinks and sweets[183].

tcanta Baby care Dye Gum Musical Pitch Repellent Shelterbelt String Tannin Waterproofing WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. The cultivar 'Denstat' has been recommended[200]. The leaves have been burnt to repel insects[257]. Various native North American Indian tribes made a string from the long roots of this species and used it to stitch the bark of their canoes and to make baskets etc[226, 257]. The rotten, dried, finely powdered wood has been used as a baby powder and as a treatment for skin rashes[257]. The bark is a source of tannin[226]. A yellow-brown dye can be obtained from the rotten wood[257]. The pitch obtained from the trunk can be used as a waterproofing sealant in canoes[257]. Wood - straight-grained, resilient, light, soft, not strong. Used for construction and as a source of pulp for paper making[46, 61, 171, 229]. The resonance of the wood, and its capacity to transmit vibrations, make it an ideal wood for guitars, violins, piano soundboards etc[226].

dwatta Antiseptic Digestive Diuretic Laxative Pectoral Poul- tice Salve Skin TB Urinary Vitamin CWhite spruce was widely employed medicinally by several native North American Indian tribes, who valued it especially for treating chest complaints[257]. It is little, if at all, used in modern herbalism. An infusion of the cones has been used in the treatment of urinary troubles[257]. The inner bark is pectoral[257]. It has been chewed, and an infusion drunk, in the treatment of TB, influenza, coughs and colds[257]. An infusion is also drunk in the treatment of rheumatism[257]. The inner bark has also been used as a poultice on sores and infected areas, and has also been used to bandage cuts[257]. The tea made from the young shoot tips has antiseptic properties[226]. It is used in the treatment of respiratory infections[257]. A decoction of the stems is used as a herbal steam bath in the treatment of rheumatism[257]. The gum is antiseptic, digestive, laxative, pectoral and salve[257]. A decoction has been used in the treatment of respiratory complaints[257]. The gum obtained from the trunk (probably pitch[K]) has been used as a salve on sores and cuts[257]. A poultice of the gum mixed with oil has been used to treat skin rashes, scabies, persistent scabs, growing boils etc, and has also been used on wounds where there is blood poisoning[257]. The rotten, dried, finely powdered wood has been used as a baby powder and as a treatment for skin rashes[257].

nrakta Northern N. America - Alaska to Newfoundland. ksacta Woods in good soils[43]. Along streams and lakes and also on rocky hills and slopes, succeeding in a variety of soil conditions[229].

propta Seed - stratification will probably improve ger-

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

nwatta Landscape Uses:Christmas tree, Firewood, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates pot peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. A fast growing tree, especially when young with annual increases of up to 1 metre in height[185]. New growth takes place from April to July. Growth slows considerably as the trees grow older[185]. It is an important forestry tree in N. America and is also planted for timber in N. Europe. It is sometimes used as a 'Christmas tree', but is unsuited for this because its leaves quickly fall[226]. Seed production begins at approximately 20 years, though reliable crops make take twice that long[229]. Heavy crops are produced every 2 - 5 years[229]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are some named varieties selected for their ornamental value[200]. The crushed leaves are quite aromatic. Some people find the smell distasteful saying that it is like skunks[226], whilst others say it has a pleasant smell like blackcurrants or mouldy grapefruit[185]. Special Features:North American native, Inconspicuous flowers or blooms.

3.2.5 Cornus sericea

Red Osier Dogwood, Western dogwood

2 tlin 7 cyuc 2 kcaak 4 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tucpja7n hwicli hrasjlutnyikfril hpa7tli flat-prikliwis 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 hardness. 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 SeedEdible Uses: Oil OilFruit - 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 Poul-tice Purgative Skin Stimulant TonicRed 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 CropAn 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].

3.2.6 Andromeda polifolia

Marsh Andromeda, Bog rosemary

2 tlin 6 cyuc 2 kcaak 0 tcan 1 dwat 0.3 m hkuc hmim cyutli tucpja7n hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

4.2.8 Geum rivale

Water Avens, Purple avens

3 tlin 7 cyuc 3 kcaak 1 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tucpja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Geum rivale is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to September, and the seeds ripen from June 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), medium (loamy) and heavy (clay) 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: Edible Uses: Chocolate Condiment DrinkThe dried or fresh root can be boiled in water to make a delicious chocolate-like drink[85, 95, 106, 183, 213]. It can also be used as a seasoning[102, 183]. It is best harvested in the spring or autumn but can be used all year round[213]. Fragrant[161], it was once used to flavour ales[2, 183].

tcanta RepellentThe dried root repels moths. Plants are suitable for ground cover when spaced about 30cm apart each way[208]. The cultivar 'Leonard's Variety' is the best for this purpose[208].

dwatta Antidiarrhoeal Antinflammatory Antiseptic Aromatic Astringent Diaphoretic Febrifuge Stomachic Styptic TonicThe root is anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, febrifuge, stomachic, styptic and tonic[4, 21]. An infusion is taken internally in the treatment of diarrhoea (and is suitable for children to use), intestinal and stomach complaints, liver disorders etc, it is also applied externally as a wash to various skin affections - it is said to remove spots, freckles and eruptions from the face[4, 9]. This plant has similar properties but is less active than the related *G. urbanum* and so is seldom used medicinally[9, 238]. The root is best harvested in the spring, since at this time it is most fragrant[4]. Much of the fragrance can be lost on drying, so the root should be dried with great care then stored in a cool dry place in an airtight container, being sliced and powdered only when required for use[4]. The root is rich in tannin and is a powerful astringent[213, 222].

nrakta Europe, including Britain, from Iceland south and east to Spain, Siberia and W. Asia. N. America. ksacta Dampp places, such as moist ditches and streambanks, most frequently in the shade[9, 17].

propta Seed - sow spring or 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. This should be done every 3 - 4 years in order to maintain the vigour of the plant[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 Easily grown in any moderately good garden soil that is well-drained[1]. Easily grown in a moist or shady border[28, 187]. Prefers a soil rich in organic matter[200]. Prefers a base rich soil[17]. Hybridizes freely with other members of this genus, especially with *G. urbanum*[187]. There are some named varieties selected for their ornamental value[208, 233]. 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 rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.9 Viola cucullata

Marsh Blue Violet

3 tlin 8 cyuc 3 kcaak 3 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tucpja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Viola cucullata is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained 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: Flowers LeavesEdible Uses: TeaY-oung leaves and flower buds - raw or cooked[61, 105]. When added to soup they thicken it in much the same way as okra[85, 159, 177]. A tea can be made from the leaves[85].

tcanta RepellentA good ground cover plant but it is slow to thicken up and may need weeding for the first year or so[197]. An infusion of the root has been used to soak corn seeds before planting them in order to keep off insects[257]. Faunal Associations: The floral nectar of Marsh Violet attracts bumblebees, mason bees (Osmia spp.), Halictid bees, Andrenid bees, bee flies (Bombyliidae), butterflies, and skippers (Robertson, 1929). Some of the bees also collect pollen. An oligolectic bee, *Andrena violae*, visits the flowers of Marsh Violet and other Viola spp. (violets). The caterpillars of several Frityllary butterflies feed on the foliage of violets primarily in open areas: *Boloria bellona* (Meadow Frityllary), *Boloria selene myrina* (Silver-Bordered Frityllary), *Euptoieta claudia* (Variegated Frityllary), *Speyeria aphrodite* (Aphrodite Frityllary), *Speyeria atlantis* (Atlantis Frityllary), *Speyeria cybele* (Great Spangled Frityllary), and *Speyeria idalia* (Regal Frityllary). Other insect feeders include caterpillars of the moths *Elaphria grata* (Grateful Midget) and *Eubaphe mendica* (The Beggar), the leaf-mining larvae of *Ametastegia pallipes* (Violet Sawfly), the aphid *Notoxoptera violae*, and the thrips *Odontothrips pictipennis*. The seeds and other parts of violets are occasionally eaten by such birds as the Ruffed Grouse, Wild Turkey, and Mourning Dove, and they are also consumed by the White-Footed Mouse, Pine Mouse, and Eastern Chipmunk. Similarly, the foliage of these low-growing plants is a source of food for the Cottontail Rabbit and Wood Turtle (*Clemmys insculpta*) [1-6].

dwatta Analgesic Dysentery Poul-ticeAn infusion of the plant has been used in the treatment of coughs, colds and dysentery[257]. A poultice of the leaves has been used to reduce the pain of headaches[257]. A poultice of the crushed root has been applied to boils[257].

nrakta Eastern N. America - Quebec to Ontario and south to Georgia. ksacta Wet places, often in open woods[187]. Wet meadows, springs, bogs, swamps etc[43].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though 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.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Very intolerant of drought[187]. Succeeds in dense shade[197]. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5. This plant produces cleistogamous flowers as well as the usual insect pollinated flowers[187]. It usually self-sows freely[188]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. A polymorphic species[188], there are many named forms, selected for their ornamental value[200].

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 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, 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.

4.2.7 *Asclepias incarnata*

Swamp Milkweed, Swamp Butterfly Weed, Marsh Milkweed 3 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprkiklwis hpa7tmwatli fyfxfre7t 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].

ksacta Edible Parts: Flowers Leaves Oil SeedpodEdible Uses: Oil SweetenerUnopened 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 Waxa 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 repellent. 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].

drutta *Andromeda polifolia* is an evergreen Shrub growing to 0.3 m (1ft) by 0.6 m (2ft in) 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 May to September. 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) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista A toxin, called 'andromedotoxin' can be released from the plant if it is infused in boiling water[183]. See notes below regarding use of the plant for tea.

ksacta Edible Parts: Edible Uses: TeaThe tender leaves and shoot-tips are boiled as an aromatic tea[161, 177]. A delicious drink[183]. Some caution is advised since boiling the plant or infusing it in hot water is said to release a toxic chemical[183]. It is safer to soak the leaves in a jar of water in direct sunlight to make 'sun tea'[183].

tcanta TanninTannin is obtained from the leaves and twigs[61].

dwatta PectoralThe plant is used as a respiratory aid in the treatment of catarrh[257].

nrakta Northern temperate regions, in Europe, including Britain, Asia and America. ksacta Bogs, rarely on wet heaths, at altitudes up to 500 metres[17]. Rare and decreasing in the south of Britain[17].

propta Seed - sow February/March in an acid compost in the greenhouse. Surface sow or only just cover the seed and place in a lightly shaded position[78, 133]. The seed usually germinates in 1 - 2 months at 12°C[133]. Prick out the young seedlings into individual pots as soon as possible, they are prone to damp-off and so should be kept well ventilated[78]. Grow them on in the greenhouse for at least their first winter and plant them out in early summer once they are 15cm or more tall. Cuttings of half-ripe wood, 5 - 7cm with a heel, July/August in a frame in a shady position. Takes 15 months[78]. Layering in August in a semi-shady position. Takes 18 months[78]. Division in early spring. The plants should be 'dressed' beforehand[78]. This entails digging up the plant 6 to 12 months earlier and replanting it somewhat more deeply. The buried branches will then root and form new plants when divided.

nwatta Landscape Uses:Border, Container, Rock garden, Specimen. Requires a well-drained, moisture-retentive, lime-free, humus-rich soil and a shady position[133, 182, 200]. Plants spread slowly by means of suckers when they are grown in a suitable position[182]. A very ornamental plant, there are many named varieties[182]. Special Features:North American native, Attractive flowers or blooms.

3.2.7 *Menyanthes trifoliata*

Bogbean, Buckbean, Marsh Trefoil, 2 tin 7 cyuc 2 kcaak 0 tcan 3 dwat 0.3 m hkuc htut cyutli hja7nhs6s hwicli brasjlutnyik hpa7tli flatprk hpa7tmwatli xre7t hjonli

drutta *Menyanthes trifoliata* 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. It is in flower from May to July. 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. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista Large doses may cause abdominal pains, nausea, diarrhoea and vomiting. Reports of red cell damage (haemolysis). Effects may be due to the salicylic acid constituent [301].

ksacta Edible Parts: RootEdible Uses: CondimentRoot - cooked[2, 55]. It must be treated to get rid of an acrid taste[115, 172]. This can be done by drying the root, grinding it into a powder and then washing it in running water[2]. Unfortunately, this treatment will also get rid of many of the vitamins and minerals contained in the root[K]. The powder can be used for making 'missen bread' (famine bread)[183]. The root is an emergency food that is used when all else fails[177]. The intensely bitter leaves are used as a substitute for hops in making beer[2, 7, 13, 145, 183].

dwatta Antiinflammatory Appetizer Astringent Carminative Cathartic Deobstruent Digestive Diuretic Dysentery Emetic Emmenagogue Febrifuge Hypnotic Stomachic TonicBogbean is closely related to the gentians, which are famous bitter herbs used as a digestive and general body tonic[238]. This plant can be used similarly, but it can irritate the digestive system of patients with gastric inflammation or infection[238]. The plant is anti-inflammatory, astringent, carminative, cathartic, deobstruent, digestive, diuretic, emetic, emmenagogue, febrifuge, hypnotic, stomachic, tonic[4, 7, 9, 13, 21, 165, 172, 174, 207, 222, 238]. All parts of the plant are medically active, but the leaves are the part most commonly used[4, 213]. The leaves are best harvested in late spring or early summer and dried before use[9, 222], the fresh plant causes vomiting[222]. An infusion is given in the treatment of muscular weakness in M.E., chronic infections with debility and exhaustion, indigestion, anorexia and rheumatism[238]. Given in small doses of about 10 grains it imparts vigour to the stomach and aids digestion[207, 222]. Using the plant helps a person to gain weight[254]. It is also believed to be an effective remedy for rheumatoid arthritis, especially when this condition is associated with weakness, weight loss and lack of vitality[254]. Bogbean is usually prescribed in combination with other herbs such as celery seed (*Apium graveolens*) and white willow (*Salix alba*)[254]. This plant should not be prescribed for patients with diarrhoea, dysentery or colitis[238]. Excess doses cause vomiting[238].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, N. and C. Asia, Morocco. ksacta Shallow water on the edges of ponds and in marshy ground, usually in acid soils[7, 17, 24].

propta Do not allow the seed to dry out. Sow late winter to early spring in a pot in a cold frame and keep the pot just submerged in water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water 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. Very easy, the divisions can be planted straight out into their permanent positions if required. However, particularly with smaller divisions, we find it better to pot them up and grow them on in a cold frame for a few weeks until they are established. Cuttings taken in summer can be inserted into the mud at the side of the pond and will normally root well.

nwatta Landscape Uses:Container, Ground cover, Woodland garden. Grow in a bog garden in wet peaty soil or in shallow water at the edge of a pond[187]. Prefers acid conditions[238]. Succeeds in water up to 30cm deep[24]. Dislikes shade. Plants can be very invasive, spreading by means of long-creeping thick surface rhizomes[187]. A very hardy plant, tolerating temperatures down to about -25°C[187]. Cats are very fond of this plant[174]. Special Features: Attractive foliage, North American native, Edible, Naturalizing.

3.2.8 *Convallaria majalis*

Lily Of The Valley, European lily of the valley 2 tin 7 cyuc 1 kcaak 3 tcan 3 dwat m hkuc pcmimhmhtut cyutli kyuctcuphja7n hwicli hyishrasjlutnyikfrp hpa7tli flatprkiklwis hpa7tmwatli fyfxfre7t 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].

ksakta 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 shrubbery[200, 208]. As a garden ornamental it has gained the Royal Horticultural Society's Award of Garden Merit.

dwatta Antianxiety Antiarhythmic 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 Scandanavia to Spain east to N.E. Asia, Greece and the Caucasus. ksacta 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.

nwatta 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.

3.2.9 Salix alba

White Willow

2 thin 8 cyuc 1 kcaak 4 tcan 3 dwat 25 m hkuc htut cyutli tcuphja7n hwicli hrasljutnykrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix alba 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 2 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

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].

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

tcanta Basketry Charcoal Paper Pioneer Shelterbelt String WoodLandscape Uses: Aggressive surface roots possible, Pollard, Specimen. The young stems are very flexible and are used in basket making[13, 46, 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 can be used for tying plants[61]. A fibre obtained from the stems is used in making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The fibres are cooked for 2 hours with lye and then beaten with mallets or put through a blender. The paper is red/brown in colour[189]. A fast growing tree and tolerant of maritime exposure, it can be grown as a shelterbelt[75]. The plant's rapid growth and wind tolerance make it a very good pioneer species to use in establishing woodland conditions in difficult sites. Spacing cuttings about every 5 metres will soon provide shelter and a suitable environment for planting out woodland trees that are not so wind tolerant. The main disadvantage in using this species is that the roots are far-ranging and the plant is quite greedy, so it will not as much effect as species such as the alders (Alnus species) in enriching the soil and thus feeding the woodland plants[K]. Wood - elastic, soft, easy to split, does not splinter. Used for construction, turnery, poles, tool handles etc[11, 46, 61]. The wood is also used to make charcoal[11], which has medicinal uses[7]. Dynamic accumulator.

dwatta Anodyne Antiinflammatory Antiperiodic Antirheumatic Antiseptic Astringent Diaphoretic Diuretic Dysentery Febrifuge Hypnotic Sedative TonicJustly famous as the original source of salicylic acid (the precursor of aspirin), white willow and several closely related species have been used for thousands of years to relieve joint pain and manage fevers[254]. The bark is anodyne, anti-inflammatory, antiperiodic, antiseptic, astringent, diaphoretic, diuretic, febrifuge, hypnotic, sedative and tonic[4, 7, 9, 21, 165]. It has been used internally in the treatment of dyspepsia connected with debility of the digestive organs[4], rheumatism, arthritis, gout, inflammatory stages of auto-immune diseases, feverish illnesses, neuralgia and headache[238]. Its tonic and astringent properties render it useful in convalescence from acute diseases, in treating worms, chronic dysentery and diarrhoea[4]. The fresh bark is very bitter and astringent[222]. It contains salicin, which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[213]. The bark is harvested in the spring or early autumn from 3 - 6 year old branches and is dried for later use[7, 9]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238]. An infusion of the leaves has a calming effect and is helpful in the treatment

tolerates 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.

ksakta Edible Parts: Flowers Fruit SeedEdible Uses: Coffee TeaFruit - 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 Hedger HedgePlants make a dense and stock-proof hedge, especially when trimmed[186].

dwatta Antirheumatic Astringent Bach Cancer Carmine Diuretic Laxative Ophthalmic Tonic Vermifuge Vitamin CThe 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 cancer 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].

4.2.6 Filipendula ulmaria

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

3 thin 9 cyuc 3 kcaak 3 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnykrip hpa7tli prikwiis hpa7tmwatli fyfkrx7e 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].

ksakta Edible Parts: Flowers Leaves RootEdible Uses: Condiment TeaAll 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 StrewingA 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 TonicMeadowsweet 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 peptic 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

propta Seed - sow spring in a pot emmersed to half its depth in water. Germination should take place within a couple of weeks. Prick out seedlings into individual pots whilst they are still small and increase the depth of water gradually until they are submerged. Plant out into a pond in the summer. Cuttings can be taken at any time in the growing season. Virtually any part of the plant, including a single leaf, will form roots if detached from the parent plant[56]. Just put it in a container of water until the roots are well formed and then plant out in shallow water.

nwatta Landscape Uses:Container. Watercress is easily grown when given the correct conditions of slowly flowing clean water, preferably coming from chalky or limestone soils[264]. It prefers to grow in water about 5cm deep[37] with an optimum pH 7.2[200]. Plants can be grown in wet soil if the position is somewhat shaded and protection is given in winter, though the flavour may be hotter[27, 37]. Hardy to about -15°c[200]. Watercress is often cultivated for its edible leaves, there are some named varieties[16, 183]. The plant is very sensitive to pollution so a clean source of water is required[200]. Plants will often continue to grow all through mild winters. A fast-growing plant, the stems trail along the ground or float in water and produce new roots at the leaf nodes, thus making the plant very easy to propagate vegetatively[238]. Unfortunately, virus diseases have become more common in cultivated plants and so most propagation is carried out by seed[264]. This is a diploid species. It has hybridised naturally in the wild with the triploid species *N. microphyllum* to produce the sterile hybrid *N. x sterilis* which is also commonly cultivated as a salad crop[264]. The flowers are a rich source of pollen and so are very attractive to bees[7]. Special Features: Attractive foliage, Edible, Not North American native, Wetlands plant, Flower characteristics are unknown. 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 fibrous dividing into a large number of fine roots [1-2].

4.2.4 Viburnum opulus

Guelder Rose, Cramp Bark, European cranberrybush, American cranberrybush, Crampbark, European Highb 3 tlin 8 cyuc 3 kcaak 3 tcan 3 dwat 5 m hkuic hmimhtut cyutli tucphja7n hwicli hrasjlutnykfrip hpa7tli flat-prikwslip hpa7tmwatli fyfxre7t 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 in 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].

kcaakta 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 seda-

tive[4, 9, 46, 165, 213]. The bark contains 'scopoletin', a coumarin that has a sedative affect 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 Scandanavia 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].

4.2.5 Rosa canina

Dog Rose

3 tlin 7 cyuc 3 kcaak 4 tcan 3 dwat 3 m hkuic hmimhtut cyutli tucphja7n hwicli hrasjlutnykfrip hpa7tli flat-prikwls hpa7tmwatli fyfxre7t 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

of nervous insomnial[7]. When added to the bath water, the infusion is of real benefit in relieving widespread rheumatism[7]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. 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 Norway south and east to N. Africa, Siberia, Himalayas, Israel. ksacta By streams and rivers, marshes, woods and wet fens on richer soils[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. Branches of older wood as long as 2.5 metres can be used[1]. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Very easy.

nwatta A very easily grown plant, it succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200] and dislikes poor thin soils[186]. Very tolerant of maritime exposure and atmospheric pollution[75, 186]. Trees respond well to coppicing or pollarding[186]. Best planted into its permanent position as soon as possible, trees respond badly to transplanting unless they are moved regularly. The root system is rather aggressive and can cause problems with drains[200]. A very important food plant for the caterpillars of many species of butterflies[30] and a good bee plant, providing an early source of nectar and pollen[11]. A very good wildlife habitat, more than 200 species of insects are associated with this tree[24]. There are many sub-species and cultivars in this species[182]. *S. alba caerulea* is the cricket bat willow, cultivated for its wood[11, 131]. *S. alba vitellina*. (L.)Stokes. has been cultivated for its very tough stems that are used as tie rods in basket making[123, 131]. The cultivar 'Cardinal' is also grown for its use in basket making[131]. This species is used commercially in papermaking[189]. Hybridizes freely with other members of this genus, especially *S. fragilis*, to which it is closely related[11]. Trees cast a relatively light shade. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attractive foliage, Not North American native, Wetlands plant, Inconspicuous flowers or blooms.

3.2.10 Salix cinerea

Grey Willow, Large gray willow

2 tlin 7 cyuc 0 kcaak 3 tcan 3 dwat 5 m hkuic htut cyutli tucphja7n hwicli hrasjlutnykfrip hpa7tli flatprik hpa7tmwatli nyanjhren hjonli

drutta Salix cinerea is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from March to April, 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 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

tcanta Pioneer Soil stabilizationLandscape Uses: Border, Massing, Specimen. Plants have an extensive root system and are used to stabilize waste tips and old slag heaps[199]. 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]. Special Features: Not North American native, Wetlands plant, Attractive flowers or blooms. Dynamic accumulator.

dwatta Anodyne Dysentery FebrifugeThe 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]. 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 autoimmune 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]. The leaves can be harvested throughout the growing season and are used fresh or dried[238].

nrakta Europe, including Britain, from Scandanavia south and east to France, Siberia and Iran. ksacta Fens etc in E. England, it is often dominant in carr. Occasionally found in damp woods in other areas of England[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. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame.

nwatta 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]. Rarely thrives on chalk[200]. A relatively slow-growing but extremely durable plant when growing in very exposed positions[199]. Closely related to *S. caprea*[11]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

3.2.11 Polytrichum commune

Common haircap, Great golden maidenhair, 2 tlin 10 cyuc 0 kcaak 3 tcan 1 dwat 0.2 m hkuic pcmhmihtut cyutli tucphja7n hwicli hyishrasjlutnyk hpa7tli frusflat hpa7tmwatli hjonli

drutta Polytrichum commune is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid 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 moist or wet soil.

pcista None Known

kcakta None Known

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

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

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

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

nwatta Prefers lightly shaded areas with moist slightly acidic soil, it can also survive in areas of full sunlight provided the soil is moist. Can also grow in areas of poor soil and slow drainage. 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 spreading indefinitely [1-2].

3.2.12 *Gymnocarpium dryopteris*

Northern oak fern
2 tlin 7 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hku
pcimhkm cyuti kyuctuphja7n hwicli hrasjlut hpa7tli frus-
flatprikwlis hpa7tmwatli hjonli

drutta *Gymnocarpium dryopteris* is a deciduous Fern growing to 0.3 m (1ft) by 0.3 m (1ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) 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) or semi-shade (light woodland). It prefers moist or wet soil.

peista None Known
kckahta None Known
tcanta A good medium density groundcover for a woodland garden; their lush, bright green fronds brighten a dark forest floor. Grizzly Bear and Elk have been observed eating Oak Fern. Locations: Accent: Good Texture/Form. Flower borders and beds. Ground Cover. Cottage and Informal. Garden Architectural. Massed. Wild Flower. Woodland. Cut Flower (leaf). Containers.

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

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

nwatta A small deciduous Mat forming fern with a slender creeping rhizome, and much-divided, triangular to ovate fronds. USDA Hardness Zones: 2 - 7. Soil pH: 4.5 - 6.4. Growth Rate: Slow to moderate. Life Span: Long. Texture: Fine. Sun: Partial Shade, Shade. Prefers a neutral to acid, leafy, moist soil, enriched with garden compost, in deep shade. Soil Type: Loamy, Soil Moisture: Moderate. Minimum Root Depth: 12 inches (30cm). Root Type: Long Rhizome. Seasonal Interest: Spring-Fall. The broadly triangular leaves are divided into 3 approximately equal primary divisions, each turned to a heavily horizontal position. Sprawling, it often shows slightly twisted leaves and leaflets. Requires cool, moist, acidic soil. Good ground cover. Drought: Intolerant. Flood: Moderate. Salt: Sensitive. Soil Compaction: Intolerant. Mowing: Intolerant. Fire Damage: Intolerant. Cold Injury: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Plant Concerns: Oak fern can interfere with the growth of Engelmann spruce (*Picea engelmannii*) seedlings. 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 3 tlin

4.1 bwon

4.1.1 *Hippophae salicifolia*

Willow-Leaved Sea Buckthorn
tfo2n 3 tlin 7 cyuc 5 kcak 5 tcan 3 dwat 15 m hku
htut cyuti kyuctuphja7n hwicli hyishrasjlutnyik hpa7tli flat-
prikwlis hpa7tmwatli nyanhjen hjonli

drutta *Hippophae salicifolia* 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 8 and is not frost tender. It is in flower in April, 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 Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

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

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

dwatta Cancer Cardiac Eczema Poultice Vitamin CThe tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit 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 E. Asia - Himalayas. ksacta Alluvial gravel, wet landslips and riversides to 3500 metres[51].

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

nwatta Succeeds in most soils so long as they are not too dry[200]. Grows well by water[1, 11]. A fast-growing and very wind-resistant tree, it is an excellent pioneer species

raw or cooked. The pollen can be used as a protein rich additive to flour when making bread, porridge etc[12, 55, 62, 94, 102]. It can also be eaten with the young flowers[85], which makes it considerably easier to utilize. The pollen can be harvested by placing the flowering stem over a wide but shallow container and then gently tapping the stem and brushing the pollen off with a fine brush[9]. This will help to pollinate the plant and thereby ensure that both pollen and seeds can be harvested[K].

tcanta Baby care Biomass Fibre Insulation Lighting Miscellany Oil Paper Soil stabilization Stuffing Thatching Tinder WeavingThe stems and leaves have many uses. Gathered in the autumn they make a good thatch, can be used in making paper, can be woven into mats, chairs, hats etc[94, 99, 257]. They are a good source of biomass, making an excellent addition to the compost heap or used as a source of fuel etc. The pulp of the plant can be converted into rayon[222]. The stems can be used to make rush lights. The outer stem is removed except for a small strip about 10mm wide which acts as a spine to keep the stem erect. The stem is then soaked in oil and can be lit and used like a candle[55]. The female flowers make an excellent tinder and can be lit from the spark of a flint[212]. A fibre is obtained from the blossom stem and flowers[55, 57, 99]. A fibre obtained from the leaves can be used for making paper[189] The leaves are harvested in summer, autumn or winter and are soaked in water for 24 hours prior to cooking. The fibres are cooked for 2 hours with soda ash and then beaten in a ball mill for 1½ hours. They make a green or brown paper[189]. The hairs of the fruits are used for stuffing pillows etc[257]. They have good insulating and buoyancy properties and have also been used as a wound dressing and a lining for babies nappies[99]. The flowering stems can be dried and used for insulation, they also have good buoyancy properties[55, 171]. The pollen is highly inflammable, it is used in making fireworks etc[115].

dwatta Anticoagulant Astringent Diuretic Emmenagogue Galactogogue Haemostatic Miscellany Refrigerant Sedative Tonic VulneryThe leaves are diuretic[218]. The leaves have been mixed with oil and used as a poultice on sores[257]. The pollen is astringent, diuretic, emmenagogue, haemostatic, refrigerant, sedative, suppurative and vulnerary[218]. The dried pollen is said to be anticoagulant, but when roasted with charcoal it becomes haemostatic[238]. It is used internally in the treatment of kidney stones, haemorrhage, painful menstruation, abnormal uterine bleeding, post-partum pains, abscesses and cancer of the lymphatic system[222, 238]. It should not be prescribed for pregnant women[238]. Externally, it is used in the treatment of tapeworms, diarrhoea and injuries[238]. A decoction of the stems has been used in the treatment of whooping cough[257]. The roots are diuretic, galactogogue, refrigerant and tonic[218]. The roots are pounded into a jelly-like consistency and applied as a poultice to wounds, cuts, boils, sores, carbuncles, inflammations, burns and scalds[222, 257]. The flowers are used in the treatment of a wide range of ailments including abdominal pain, amenorrhoea, cystitis, dysuria, metrorrhagia and vaginitis[218]. The young flower heads are eaten as a treatment for diarrhoea[222]. The seed down has been used as a dressing on burns and scalds[257].

nrakta Throughout the world from the Arctic to latitude 30° S, incl Britain but absent from Africa, S. Asia ksacta Shallow water up to 15cm deep in ponds, lakes, ditches, slow-flowing streams etc, succeeding in acid or alkaline conditions[9, 17].

propta Seed - surface sow in a pot and stand it in 3cm of water. Pot up the young seedlings as soon as possible and, as the plants develop, increase the depth of water. Plant out in summer. Division in spring. Very easy, harvest the young shoots when they are about 10 - 30cm tall, making sure there is at least some root attached, and plant them out into their permanent positions.

nwatta Industrial Crop: Biomass Industrial Crop: Fiber Management: Hay Minor Global Crop Landscape Uses:Container, Erosion control, Massing, Specimen. A very easily grown plant, succeeding in the boggy margins of ponds or in shallow water up to 15cm deep[17]. It succeeds in acid and calcareous soils and requires a less organic-rich soil than *T. angustifolia* in order to do well[17]. It succeeds in sun or part shade[200]. A very invasive plant spreading freely at the roots when in a suitable site, it is not suitable for growing in small areas[24]. Unless restrained by some means, such as

a large bottomless container, the plant will soon completely take over a site and will grow into the pond, gradually filling it in. This species will often form an almost complete monoculture in boggy soil. Provides excellent cover for wild fow[1]. Special Features: Attracts birds, North American native, Grows submerged, Invasive, Wetlands plant, Suitable for dried flowers.

4.2.3 *Nasturtium officinale*

Watercress
3 tlin 11 cyuc 4 kcak 2 tcan 3 dwat 0.5 m hku
htut cyuti hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikwlis
hpa7tmwatli fyifkre7t hjonli

drutta *Nasturtium officinale* is a PERENNIAL growing to 0.5 m (1ft 8in) 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 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. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

peista Whilst the plant is very wholesome and nutritious, some care should be taken if harvesting it from the wild. Any plants growing in water that drains from fields where animals, particularly sheep, graze should not be used raw. This is due to the risk of it being infested with the liver fluke parasite[5, 244]. Cooking the leaves, however, will destroy any parasites and render the plant perfectly safe to eat[244]. May inhibit the metabolism of paracetamol [301].

kckahta Edible Parts: Leaves SeedEdible Uses: ConditionLeaves - raw or cooked[2, 5, 7, 9, 16, 27]. Watercress is mainly used as a garnish or as an addition to salads, the flavour is strong with a characteristic hotness[183]. It has a reputation as a spring tonic, and this is its main season of use, though it can be harvested for most of the year and can give 10 pickings annually[238]. Some caution is advised if gathering the plant from the wild, see the notes above on toxicity. The leaves are exceptionally rich in vitamins and minerals, especially iron[200]. A nutritional analysis is available[218]. The seed can be sprouted and eaten in salads[183]. A hot mustardy flavour[K]. The seed is ground into a powder and used as a mustard[46, 183]. The pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild but bitter mustard[238].

tcanta Hair MiscellanyThe juice of the plant is a nicotine solvent and is used as such on strong tobaccos[7]. 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 Antiscorbutic Appetizer Depurative Diuretic Expectorant Hypoglycaemic Miscellany Odontalgic Purgative Stimulant Stomachic TB Vitamin CWatercress is very rich in vitamins and minerals, and has long been valued as a food and medicinal plant[254]. Considered a cleansing herb, its high content of vitamin C makes it a remedy that is particularly valuable for chronic illnesses[254]. The leaves are antiscorbutic, depurative, diuretic, expectorant, purgative, hypoglycaemic, odontalgic, stimulant and stomachic[4, 7, 9, 21, 46, 222, 238]. The plant has been used as a specific in the treatment of TB[4]. The freshly pressed juice has been used internally and externally in the treatment of chest and kidney complaints, chronic irritations and inflammations of the skin etc[9]. Applied externally, it has a long-standing reputation as an effective hair tonic, helping to promote the growth of thick hair[244]. A poultice of the leaves is said to be an effective treatment for healing glandular tumours or lymphatic swellings[244]. Some caution is advised, excessive use of the plant can lead to stomach upsets[9, 21]. The leaves can be harvested almost throughout the year and are used fresh[238].

nrakta Europe, including Britain, from Sweden and Denmark south and east to N. Africa and W. Asia. ksacta Stream margins, ditches, flushes etc with moving water[17, 27], usually in chalk or limestone areas[52].

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 microorganisms, 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].

4.2 mran

4.2.1 Typha angustifolia

Small Reed Mace, Narrowleaf cattail
3 tin 7 cyuc 5 kcaak 0 tcan 3 dwat 3 m hkuc
htut cyutli hja7nhs6s hwicli hrasljutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta Typha angustifolia is a PERENNIAL growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardness. It is hardy to UK zone 3. It is in flower from June to July. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Flowers Leaves Oil Pollen Root Seed StemEdible Uses: OilRoots - raw or cooked[12, 13, 46, 94]. They can be boiled and eaten like potatoes or macerated and then boiled to yield a sweet syrup[183]. The roots can also be dried, ground into a powder and then used as a thickener in soups etc or added to cereal flours[62]. Rich in protein, this powder is used to make biscuits etc[183]. Young shoots in spring - raw or cooked[2, 12, 94, 159, 183]. An asparagus substitute[62]. Base of mature stem - raw or cooked[62]. It is best to remove the outer part of the stem[62]. Young flowering stem - raw, cooked or made into a soup[85, 94, 183]. It tastes like sweet corn. Seed - cooked[183]. The seed is very small and fiddly to harvest, but it has a pleasant nutty taste when roasted[12]. An edible oil is obtained from the seed[85]. Due to the small size of the seed this is probably not a very worthwhile crop. Pollen - raw or cooked. A protein rich additive to flour used in making bread, porridge etc[12, 105, 183]. It can also be eaten with the young flowers[85], which makes it considerably easier to utilize[K]. The pollen can be harvested by placing the flowering stem over a wide but shallow container and then gently tapping the stem and brushing the pollen off with a fine brush[9]. This will help to pollinate the plant and thereby ensure that both pollen and seeds can be harvested[K].

tcanta Biomass Insulation Miscellany Oil Paper Soil stabilization Stuffing Thatching Tinder Weaving The stems and leaves have many uses, they make a good thatch, can be used in making paper, can be woven into mats, chairs, hats etc[13, 46, 57, 61, 94]. They are a good source of biomass, making an excellent addition to the compost heap or used as a source of fuel etc. The hairs of the fruits are used for stuffing pillows etc[46, 57, 159]. They have good insulating and buoyancy properties[171]. The female flowers make an excellent tinder and can be lit from the spark of a flint[212]. The pollen

is highly inflammable and is used in making fireworks[115]. This plants extensive root system makes it very good for stabilizing wet banks of rivers, lakes etc[200].

dwatta Anticoagulant Diuretic Emmenagogue Haemostatic Lithotropic MiscellanyThe pollen is diuretic, emmenagogue and haemostatic[176]. The dried pollen is said to be anticoagulant, but when roasted with charcoal it becomes haemostatic[238]. It is used internally in the treatment of kidney stones, internal haemorrhage of almost any kind, painful menstruation, abnormal uterine bleeding, postpartum pains, abscesses and cancer of the lymphatic system[222, 238, 254]. It should not be prescribed for pregnant women[238]. Externally, it is used in the treatment of tape-worms, diarrhoea and injuries[238]. An infusion of the root has been used in the treatment of gravel[257].

nrakta Throughout the world from the Arctic to latitude 30° S, including Britain but absent from Africa. ksacta Water up to 15cm deep, avoiding acid conditions[17]. Often somewhat brackish or subsaline water or wet soil in America, growing from sea level to elevations of 1900 metres[270].

propta Seed - surface sow in a pot and stand it in 3cm of water. Pot up the young seedlings as soon as possible and, as the plants develop, increase the depth of water. Plant out in summer. Division in spring. Very easy, harvest the young shoots when they are about 10 - 30cm tall, making sure there is at least some root attached, and plant them out into their permanent positions.

nwatta Experimental Crop Industrial Crop: Biomass Industrial Crop: Fiber Management: Hay Staple Crop: ProteinA very easily grown plant, it grows in boggy pond margins or in shallow water up to 15cm deep[17]. It requires a rich soil if it is to do well[17]. Succeeds in sun or part shade. A very invasive plant spreading freely at the roots when in a suitable site, it is not suitable for growing in large areas. Unless restrained by some means, such as a large bottomless container, the plant will soon completely take over a site and will grow into the pond, gradually filling it in. This species will often form an almost complete monoculture in boggy soil. The dense growth provides excellent cover for water fowl[1].

4.2.2 Typha latifolia

Reedmace, Broadleaf cattail, Bullrush, Nailrod
3 tin 10 cyuc 5 kcaak 4 tcan 3 dwat 2.5 m hkuc
htut cyutli hja7nhs6s hwicli hrasljutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta Typha latifolia is a PERENNIAL growing to 2.5 m (8ft) by 3 m (9ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 3. It is in flower from June 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Flowers Leaves Oil Pollen Root Seed StemEdible Uses: OilRoots - raw or cooked[2, 12]. They can be boiled and eaten like potatoes or macerated and then boiled to yield a sweet syrup. The roots can also be dried and ground into a powder, this powder is rich in protein and can be mixed with wheat flour and then used for making bread, biscuits, muffins etc[55, 62, 95, 183]. One hectare of this plant can produce 8 tonnes of flour from the rootstock[85]. The plant is best harvested from late autumn to early spring since it is richest in starch at this time[9]. The root contains about 80% carbohydrate (30 - 46% starch) and 6 - 8% protein[85]. Young shoots in spring - raw or cooked[12, 55, 62, 94, 102, 183]. An asparagus substitute. They taste like cucumber[212]. The shoots can still be used when they are up to 50cm long[85]. Base of mature stem - raw or cooked[2, 9, 55]. It is best to remove the outer part of the stem[62, 183]. It is called 'Cossack asparagus'[183]. Immature flowering spike - raw, cooked or made into a soup[62, 85, 94]. It tastes like sweet corn[183]. Seed - raw or cooked[2, 257]. The seed is rather small and fiddly to utilize, but has a pleasant nutty taste when roasted[12]. The seed can be ground into a flour and used in making cakes etc[257]. An edible oil is obtained from the seed[55, 85]. Due to the small size of the seed this is probably not a very worthwhile crop[K]. Pollen -

for re-establishing woodlands[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°C[200]. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. The deeply cleft bark favours the growth of epiphytes[146]. Plants in this genus are notably resistant to honey fungus[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]. Dioecious. Male and female plants must be grown if seed is required.

4.1.2 Hippophae rhamnoides

Sea Buckthorn, Seaberry
tfo2n 3 tin 7 cyuc 5 kcaak 5 tcan 5 dwat 6 m hkuc
htut cyutli hgakkyuctuphja7n hwicli vyhshyrasljutnyik hpa7tli flatprklwis hpa7tmwatli nyanhjen hjonli

drutta Hippophae rhamnoides is a deciduous Shrub growing to 6 m (19ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, 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 Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure.

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

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

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

dwatta Astringent Cancer Cardiac Eczema Poultice Tonic Vermifuge Vitamin CThe twigs and leaves contain 4 - 5% tannin[240]. They are astringent and vermifuge[7, 100]. The tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. Yields of around

3% of oil are obtained[240]. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is astringent and used as a tonic[9, 254]. The freshly-pressed juice is used in the treatment of colds, febrile conditions, exhaustion etc[9]. The fruit 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]. The juice is also a component of many vitamin-rich medications and cosmetic preparations such as face-creams and toothpastes[9]. A decoction of the fruit has been used as a wash to treat skin irritation and eruptions[254].

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

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

nwatta Agroforestry Services: Alley crop Agroforestry Services: Nitrogen Agroforestry Services: Wind-break Fodder: Bank Industrial Crop: Biomass Management Coppice Management: Standard Other Systems: Strip intercrop Staple Crop: OilLandscape Uses:Border, Seashore, Specimen. Succeeds in most soils[200], including poor ones[186], so long as they are not too dry[182, 200]. Grows well by water and in fairly wet soils[182]. Established plants are very drought resistant[186]. Requires a sunny position[3], seedlings failing to grow in a shady position and mature shrubs quickly dying if overshadowed by taller plants[186]. Does well in very sandy soils[1, 186]. Very tolerant of maritime exposure[75]. Plants are fairly slow growing[75]. Although usually found near the coast in the wild, they thrive when grown inland[11] and are hardy to about -25°C[184]. A very ornamental plant[1, 11], it is occasionally cultivated, especially in N. Europe, for its edible fruit, there are some named varieties[183]. 'Leikora' is a free-fruiting form, developed for its ornamental value. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. 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[113, 186, 200]. Plants produce abundant suckers, especially when grown on sandy soils[186]. Dioecious. Male and female plants must be grown if seed is required. The sexes of plants cannot be distinguished before flowering, but on flowering plants the buds of male plants in winter are conical and conspicuous whilst female buds are smaller and rounded[11]. Plants in this genus are notably resistant to honey fungus[200].Special Features:Not North American native, Naturalizing, 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. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [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 suckering with new plants from underground runners away from the plant [2-1].

4.1.3 *Alnus glutinosa*

Alder, European alder , Common Alder, Black Alder tfo2n 3 tlin 7 cyuc 0 kcaak 5 tcan 3 dwat 25 m hkuc hmimhtut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprikliw 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 VermifugeThe 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 in 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, 75, 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].

4.1.4 *Alnus hirsuta*

tfo2n 3 tlin 7 cyuc 0 kcaak 0 tcan 0 dwat 18 m hkuc hmimhtut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprikliw 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].

4.1.5 *Alnus serrulata*

Smooth Alder, Hazel alder tfo2n 3 tlin 9 cyuc 0 kcaak 2 tcan 2 dwat 4.5 m hkuc htut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprikliw 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 Astringent 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].

4.1.6 *Alnus maritima*

Seaside Alder, Beach Alder tfo2n 3 tlin 7 cyuc 0 kcaak 0 tcan 0 dwat m hkuc htut cyutli tcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprikliwshom 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-

plant might be carcinogenic - see the notes above on toxicity for more information. The root is anodyne, aphrodisiac, aromatic, carminative, diaphoretic, emmenagogue, expectorant, febrifuge, hallucinogenic, hypotensive, sedative, stimulant, stomachic, mildly tonic and vermifuge[4, 7, 9, 21, 147, 165, 213, 240, 279]. It is used internally in the treatment of digestive complaints, bronchitis, sinusitis etc[238]. It is said to have wonderfully tonic powers of stimulating and normalizing the appetite. In small doses it reduces stomach acidity whilst larger doses increase stomach secretions[254] and it is, therefore, recommended in the treatment of anorexia nervosa[244]. However if the dose is too large it will cause nausea and vomiting[K]. Sweet flag is also used externally to treat skin eruptions, rheumatic pains and neuralgia[238]. An infusion of the root can bring about an abortion[213] whilst chewing the root alleviates toothache[213]. It is a folk remedy for arthritis, cancer, convulsions, diarrhoea, dyspepsia, epilepsy etc. Chewing the root is said to kill the taste for tobacco[218]. Roots 2 - 3 years old are used since older roots tend to become tough and hollow[4]. They are harvested in late autumn or early spring and are dried for later use[4]. The dry root loses 70% of its weight, but has an improved smell and taste[244]. It does, however, deteriorate if stored for too long[244]. Caution is advised on the use of this root, especially in the form of the distilled essential oil, since large doses can cause mild hallucinations[192]. See also the notes above on toxicity. A homeopathic remedy is made from the roots[9]. It is used in the treatment of flatulence, dyspepsia, anorexia and disorders of the gall bladder[9]. Bath oils containing calamus have caused redness of the skin (erythema) and dermatitis, particularly in hypersensitive individuals [301].

nrakta Europe, Asia and N. America. Naturalized in Britain[17]. ksacta Found in moist soils and shallow water in ditches, marshes, river edges and ponds[1, 100, 187, 244].

propta Seed - best sown in a cold frame as soon as it is ripe. Stand the pot in about 3cm of water. Pot up young seedlings as soon as they are large enough to handle, keep them wet by standing the pots in shallow water and overwinter for the first year in a greenhouse or cold frame. Seed is rarely produced in Britain[4, 17]. Division in spring just before growth starts[1]. Very easy, it can be carried out successfully at any time in the growing season and can be planted direct into its permanent positions[K].

nwatta Landscape Uses:Container, Ground cover, Massing, Rock garden, Seashore. Prefers growing in shallow water or in a very moist loamy soil[200]. Requires a sunny position[200]. Prefers a pH in the range 5.5 to 7.5. Plants are hardy to about -25°C[187]. The sweet flag has a long history of use as a medicinal and culinary plant. It has been cultivated for this purpose but was more commonly allowed to naturalize and was then harvested from the wild. The plant seldom flowers or sets seed in Britain and never does so unless it is growing in water[4]. It can spread quite freely at the roots however and soon becomes established. Special Features: Attractive foliage, North American native, Edible, Fragrant foliage, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms.

5.2.37 Butomus umbellatus

Flowering Rush
4 tlin 8 cyuc 3 kcaak 1 tcan 0 dwat 1 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Butomus umbellatus is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from August 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Root SeedEdible Uses: Tuber - cooked[5, 46, 61, 100, 177]. It should be peeled and the rootlets removed[179]. The root can also be dried and ground into a powder[179], it can then be used as a thickener in soups etc, or be added to cereal flours when making bread[2]. It contains more than 50% starch[13]. Seed[1, 2,

5, 177]. No more details are given, but the seed is very small and fiddly to use[K].

tcanta Butomus umbellatus is cultivated as an ornamental waterside plant.

nrakta Most of Europe, including Britain, and temperate Asia. ksacta Pond margins, ditches and canals, avoiding shade[13, 17].

propta Seed - best surface-sown in a cold frame as soon as it is ripe, it usually germinates in the spring. The seed quickly loses its vitality if it is not kept moist[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame, planting them out into their permanent positions in early summer. Division in spring[188]. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer.

nwatta Requires a sunny position[200]. A plant of wet habitats, it succeeds in wet soils and in water up to 30cm deep[24, 56]. A very ornamental plant[2]. The flowers have a scent of bitter almonds[245].

5.2.38 Polygonum bistorta

Bistort, Meadow bistort, Snakeweed
4 tlin 7 cyuc 3 kcaak 2 tcan 3 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikkwis hpa7tmwatli xre7t hjonli

drutta Polygonum bistorta is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. 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: Leaves Root SeedEdible Uses: Leaves - raw or cooked[2, 7, 9, 103]. One report says that they are rather bitter[5], but we have found them to have a fairly mild flavour, especially when the leaves are young, though the texture is somewhat chewy when they are eaten raw[7, K]. They make an excellent substitute for spinach[183]. In northern England the leaves are an ingredient of a bitter Lenten pudding, called Easter ledger pudding, that is eaten at Lent[183]. The leaves are available from late winter in most years and can be eaten until the early autumn though they become much tougher as the season progresses[K]. The leaves are a good source of vitamins A and C[257], a nutritional analysis is available[218]. Seed - raw or cooked[172]. The seed is very small and rather fiddly to utilize[K]. Root - raw or cooked[7, 172, 257]. Rich in starch and tannin, it is steeped in water and then roasted in order to reduce the tannin content[4, 115]. It is then said to be a tasty and nutritious food[4]. The root has also been boiled or used in soups and stews[183] and can be dried then ground into a powder and used in making bread[4]. The root contains 30% starch, 1% calcium oxalate and 15 - 36% tannin[218].

tcanta TanninThe roots contain up to 21% tannin[223].
dwatta Antidiarrhoeal Astringent Cholera Demulcent Diuretic Dysentery Epilepsy Febrifuge Laxative StypticBistort is one of the most strongly astringent of all herbs and it is used to contract tissues and staunch blood flow[254]. The root is powerfully astringent, demulcent, diuretic, febrifuge, laxative and strongly styptic[4, 218]. It is gathered in early

drutta *Berula erecta* is a PERENNIAL growing to 1 m (3ft 3in). 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 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. 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 plant is toxic, and capable of causing death to grazing animals[274].

kcakta The leaves and flowers have been used for food[257].

dwatta The plant is used externally in the treatment of rheumatism[257]. An infusion of the whole plant can be used as a wash for swellings, rashes and athletes foot infections[257].

nrakta Most of Europe, including Britain, N. America, W. and C. Asia. ksacta Ditches, canals, ponds, fens and marshes throughout Britain[17].

propta Seed - nwatta We have no information on the cultivation needs of this plant but, judging by its native habitats, it is likely to need a moist to wet soil in full sun or light shade[K]. The leaves of this plant are very similar to *Apium nodiflorum*, differing in colour and in the usually greater number of pairs of segments[17].

4.2.29 Carex aquatilis

Water sedge, Sitka sedge
3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli hjonli

drutta *Carex aquatilis* is an evergreen Perennial growing to 1 m (3ft 3in) by 1.5 m (5ft). 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 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 Stem bases - raw[257].

nrakta Northern Europe, including Britain, from Norway to Sweden, Finland, N. Russia and Siberia. ksacta Margins of lake and streams in mountainous districts in west and northern Britain[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[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 summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.30 Athyrium niponicum

Painted Fern, Japanese Silver Painted Fern
3 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc
pcimhmim cyutli tcuphja7n hwicli hrasjlutnyikfrrip hpa7tli frusflatprikkwis 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: LeavesEdible 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. A 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.

4.2.31 Chrysosplenium americanum

Water Mat, American golden saxifrage
3 tlin 7 cyuc 1 kcaak 2 tcan 0 dwat 0.1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikkwis hpa7tmwatli fyfxre7t hjonli

drutta *Chrysosplenium americanum* 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 3. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

kcakta Edible Parts: Edible Uses: CondimentUsed as a spice in salads[177].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Central and Western N. America - Quebec to Minnesota, south to Nova Scotia and Montana. ksacta Acid soils[200] in springheads, rills and cold wet places[43]

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the 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. Division in spring. 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 light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist. Requires a constantly wet but well-drained soil[200]. Prefers acid soils[200]. Prefers a shady position, succeeding in woodland. 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 fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

4.2.32 Potentilla palustris

Marsh Cinquefoil

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli hja7n hwicli hrasjlutnyik hpa7tli frusflat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla palustris is a PERENNIAL growing to 0.5 m (1ft 8in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May 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. 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 wet soil.

kcakta Edible Parts: Edible Uses: TeaThe dried leaves are a tea substitute[177, 183, 257].

tcanta Dye TanninA red dye is obtained from the flowers[61]. Tannin is obtained from the root[61].

dwatta Astringent DysenteryThe root is astringent. A decoction has been used in the treatment of dysentery and stomach cramps[257].

nrakta Europe, including Britain, from Iceland south and east to the Pyrenees, temperate Asia and Japan. ksacta Marshes, bogs, acid fens and wet heaths[17].

propta Seed - sow early 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. Division in spring. 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 Requires a moist to wet soil, preferably on the acid side. A very cold-hardy plant, tolerating temperatures down to about -25°C[187]. A rapidly spreading plant, capable of forming clumps several metres across[187]. It is a plant for the wild wet garden[187]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.33 Convallaria keiskei

Lily Of The Valley

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc pcmhmmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Convallaria keiskei is a PERENNIAL growing to 0.3 m (1ft). 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 Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaThe whole plant is cooked as a potherb or put in miso soup[177, 183]. Caution is advised, see the notes above on toxicity. The flowers and flower buds are preserved in salt or mixed with leaf tea and drunk[177, 183].

tcanta Plants can be grown as a ground cover in woodland shade or in a shrubbery[200].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Highlands and mountain meadows all over Japan[58].

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.

nwatta Succeeds in almost any situation, including the dense dry shade of large trees[1, 24]. Prefers a position in semi-shade in a moderately fertile well-drained moist woodland soil[200]. Grows well in heavy clay soils. Plants are hardy to -20°C or lower[200]. A good bee plant[4]. A very ornamental plant, though it can become very invasive once it is established[200]. Plants seem to be immune to the predations of rabbits[233].

4.2.34 Catabrosa aquatica

Water WhirlGrass

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.7 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Catabrosa aquatica is a PERENNIAL growing to 0.7 m (2ft 4in). 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 Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Seed[257]. No more information is given, but the seed is very small and fiddly to use. It would probably have been used as piñole or have been ground into a powder and used as a mush, as a thickener in soups and stews, or in making cakes, bread etc[K].

tcanta The plant has been burnt as an incense[257]. dwatta A decoction of the plant has been used as a stimulant and tonic[257].

nrakta Most of Europe, including Britain but absent in Spain and Portugal, N. and W. Asia, Algeria. ksacta Shallow streams and ditches, at the muddy margins of ponds and in wet sandy places near the sea all over Britain[17].

propta Seed - surface sow in the spring in a pot standing in shallow water. 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. Division in the spring. The divisions can be planted direct into their permanent positions.

nwatta We have no information on this, though judging by the plants native habitat it requires a wet soil and also succeeds in shallow water. It will also probably require a fairly sunny position[K].

4.2.35 Pinguicula vulgaris

Butterwort, Common butterwort

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli hja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Pinguicula vulgaris is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil.

kcakta Edible Parts: Edible Uses: Curdling agentThe plant can be used to curdle plant milks[46, 61, 66]. The milk is poured over a strainer on which fresh leaves of butterwort have been laid. The milk is then left for a day or two until it sours when it becomes solid like yoghurt and is considered to be most delicious. A small quantity of the milk can be kept to inoculate further batches[183]. Another report says that the leaves are infused in the milk for some time[115]. tcanta DyeA colouring substance is obtained from the leaves[7].

dwatta Antispasmodic Antitussive HomeopathyButterwort is little used in contemporary herbal medicine, though it was commonly used in the past as a purgative in Wales[254]. Its main application is as a cough remedy[254]. The leaves

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, 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 wet to moisture retentive soil, pond margins and shallow water in full sun or shade[1, 200]. Plants can succeed in fairly deep water. Hardy to about -25°C[187]. Some named forms have been selected for their ornamental value[187].

5.2.35 Stachys palustris

Marsh Woundwort, Marsh hedgenettle

4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Stachys palustris is a PERENNIAL growing to 1 m (3ft 3in) by 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 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. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained 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 Avoid during pregnancy and breast feeding [301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Tubers - raw or cooked[K]. A wholesome and nutritious food[4], they have a pleasant mild nutty flavour[K]. The tubers can be dried and ground into a powder that is used in making bread etc[2, 4, 12, 115, 183]. The tubers are formed in the autumn[17]. Although quite small, they are fairly smooth and produced in a reasonable quantity so are not too fiddly to utilize[K]. Young shoots - cooked. Used as an asparagus substitute[183]. A pleasant taste but the smell is disagreeable[4]. Seed[257]. No further details are given[257].

tcanta DyeA yellow dye is obtained from the plant[207].

dwatta Antiseptic Antispasmodic Emetic Emmenagogue Expectorant Haemostatic Nervine Sedative Tonic Vulnerary-The plant is antiseptic, antispasmodic, emetic, emmenagogue, expectorant, haemostatic, nervine, sedative, tonic, vulnerary[4, 61, 218]. The plant has been highly valued for its wound-healing activity, being effective against both internal and external bleeding, and is also used in the treatment of gout, cramps and pains in the joints[4]. The herb is harvested in the summer when just coming into flower and can be dried for later use[4].

nrakta Europe, including Britain, south and east from Norway to Portugal and temperate Asia to Japan. ksacta By streams and ditches, also in swamps and fens. Occasionally found on arable land[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. 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 Requires a moist soil for good root production[2, 24]. A good bee plant[24]. All parts of the plant emit an unpleasant smell when bruised[245]. 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].

5.2.36 Acorus calamus

Sweet Flag - Calamus

4 tlin 11 cyuc 3 kcak 0 tcan 4 dwat 1 m hkuc htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Acorus calamus 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 3 and is not frost tender. It is in flower from May to July, and the seeds ripen 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista The fresh root can be poisonous[7]. When using the plant medicinally, the isolated essential oil should not be used[165]. The essential oil in the roots of some populations of this plant contains the compound asarone. This has tranquillising and antibiotic activity, but is also potentially toxic and carcinogenic[218, 238]. It seems that these compounds are found in the triploid form of the species (found in Asia) whilst the diploid form (found in N. America and Siberia) is free of the compounds[218, 238]. However, the root (but not the isolated essential oil) has been used in India for thousands of years without reports of cancer which suggests that using the whole herb is completely safe, though more research is needed[254]. Only roots free from or with a low content of beta asarone should be used in human herb therapy. Should be avoided in patients taking monoamine oxidase inhibitor antidepressants as possible side-effects [301].

kcakta Edible Parts: Leaves Root StemEdible Uses: CondimentThe rhizome is candied and made into a sweetmeat[2, 4, 13, 55, 62, 115, 183]. It can be peeled and washed to remove the bitterness and then eaten raw like a fruit[106, 179]. It makes a palatable vegetable when roasted[192] and can also be used as a flavouring[61]. Rich in starch, the root contains about 1% of an essential oil that is used as a food flavouring[1, 13, 57]. The root also contains a bitter glycoside[179]. Some caution is advised, see the notes above on toxicity. The dried and powdered rhizome has a spicy flavour and is used as a substitute for ginger, cinnamon and nutmeg[4, 55, 142, 177, 183]. A pinch of the powdered rhizome is used as a flavouring in tea[272]. The young and tender inflorescence is often eaten by children for its sweetness[4]. Young leaves - cooked[55]. The fresh leaves contain 0.078% oxalic acid[240]. The leaves can be used to flavour custards in the same way as vanilla pods[244]. The inner portion of young stems is eaten raw[62]. It makes a very palatable salad[183].

tcanta Basketry Incense Insecticide Repellent Strewing Thatching WeavingThe leaves are used in basket making or woven into mats[169]. They have also been used as a thatch for roofs[4]. An essential oil from the rhizome is used in perfumery and as a food flavouring[1, 13, 57]. The oil is contained mainly in the outer skin of the root[245], it has a fragrance reminiscent of patchouli oil[192]. The fresh roots yield about 1.5 - 3.5% essential oil, dried roots about 0.8%[4, 240]. Some plants from Japan have yielded 5% essential oil[4]. The essential oil is also an insect repellent and insecticide[218, 272]. It is effective against houseflies[240]. When added to rice being stored in granaries it has significantly reduced loss caused by insect damage because the oil in the root has sterilized the male rice weevils[244]. An essential oil obtained from the leaves is used in perfumery and for making aromatic vinegars[245]. The leaves and the root have a refreshing scent of cinnamon[245]. All parts of plant can be dried and used to repel insects or to scent linen cupboards[8, 14, 61]. They can also be burnt as an incense[14], whilst the whole plant was formerly used as a strewing herb[4, 14, 115, 238]. The growing plant is said to repel mosquitoes[20, 201].

dwatta Abortifacient Anodyne Antirheumatic Aphrodisiac Aromatic Carminative Diaphoretic Emmenagogue Epilepsy Febrifuge Hallucinogenic Homeopathy Odontalgic Sedative Stimulant Stomachic Tonic VermifugeSweet flag has a very long history of medicinal use in many herbal traditions. It is widely employed in modern herbal medicine as an aromatic stimulant and mild tonic[4]. In Ayurveda it is highly valued as a rejuvenator for the brain and nervous system and as a remedy for digestive disorders[254]. However, some care should be taken in its use since some forms of the

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, 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].

5.2.33 Vaccinium fuscatum

Black Highbush Blueberry

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 3.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta *Vaccinium fuscatum* is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from March 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) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid 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.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked[3, 105, 200]. Large, sweet, juicy and very flavourful[183]. The fruit is about 8mm in diameter[200].

nrakta Eastern N. America - New Hampshire, Ontario and Indiana south to Florida and Arkansas. **ksacta Swamps** and pine barrens, wet woods and the edges of lakes[43, 184].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded 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. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist or wet lime free soil[11, 184, 200], preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants are hardy to about -25°C[184]. This species is often cultivated for its edible fruit[3]. Plants are self-sterile, at least two different varieties must be grown if seed is required[11]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Closely related to *V. corymbosum*[11, 182]. Plants in this genus are notably resistant to honey fungus[200].

5.2.34 Scirpus lacustris

Bulrush

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 2.5 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnykri hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Scirpus lacustris* is a PERENNIAL growing to 2.5 m (8ft 2in). See above for USDA hardness. It is hardy to UK zone 4. 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 Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 and can grow in water.

kcakta Edible Parts: Leaves Pollen Root Seed Stem**Edible Uses:** Root - raw or cooked[2, 85, 95, 183]. Rich in starch, it can be dried and ground into a powder or made into a syrup[13, 85, 95, 183]. The buds at the end of the rhizomes are crisp and sweet, making excellent eating raw[183]. Young shoots - raw or cooked[85, 183]. Used in spring. Seed - ground up into a powder and mixed with flour for use in making cakes etc[85, 183]. The seed is small and rather fiddly to harvest and utilize. Base of mature stems - raw or cooked. Somewhat tough[85]. Pollen - raw or cooked. Rich in pollen, it is mixed with flour and used in making cakes etc[85, 183].

tcanta Paper Thatching WeavingThe stems are frequently used for making matting, chair bottoms etc and thatching[1, 4, 23, 85, 100, 115]. They were at one time imported in large quantities for this purpose[4]. The pith of the stems is used in paper making[100].

dwatta Astringent Cancer DiureticThe roots are astringent and diuretic[240]. They were formerly employed medicinally but have fallen into disuse[4]. This plant is a traditional medicine for cancer[218].

nrakta Europe, incl Britain, south and east from Lapland to Africa and Asia. N. and C. America, Polynesia. **ksacta Bogs**, shallow pond margins, rivers and lakes, usually where there is abundant silt, in acid or calcareous conditions[1, 17].

are antispasmodic and antitussive[7, 13]. The plant is an effective treatment for whooping cough[7]. Used externally as a poultice, it has a healing effect on the skin[7]. The leaves are harvested in early summer as the plant comes into flower and are dried for later use[7]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of whooping cough and nervous throat irritations[9].

nrakta Europe, including Britain, from Iceland south and east to Spain, Macedonia and N. Asia. N. America. ksacta Boggy soils on wet rocks and damp places, avoiding shady places[17].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse as soon as it is ripe in the summer if this is possible otherwise in early spring. Place the pots in shallow water to keep them 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 two growing seasons. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of the resting buds in the winter[200]. Leaf cuttings.

nwatta Requires a boggy soil[1]. Because of their insectivorous habit, plants are able to succeed on soils very deficient in nitrogen. Butterwort is an insectivorous plant, the leaves are sticky and trap insects which are then digested by the plant[7]. Plants overwinter as a tight winter-resting bud with virtually no roots[200].

4.2.36 Salix fluviatilis

River Willow

3 tlin 7 cyuc 0 kcak 3 tcan 2 dwat 7 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnykri hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta *Salix fluviatilis* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower in 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry Pioneer Soil stabilization StringThe peeled stems have been used in basket making[257]. The inner bark can be twisted and made into a string[257]. This plant rapidly colonizes sandbanks and wet areas near streams, lakes etc. It is therefore an extremely useful species for stabilizing banks, its network of roots holding the soil securely. It can also be used as a pioneer species to prepare the way for mature woodland. It provides good conditions for other trees to establish and is eventually out-competed by them[229]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe bark has been used in the treatment of certain fevers[257]. 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 Western N. America - Washington and Oregon. **ksacta** Forms extensive thickets and rapidly colonizes sandbars along lowland ponds, lakes and streams in moist sand or gravel overladen with silt[229].

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 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 this country. It is a fast-growing but short-lived species in the wild[229]. The following notes are based on the general needs of the genus. 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]. Rarely thrives

on chalk[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

4.2.37 Salix bebbiana

Beak Willow, Bebb Willow

3 tlin 7 cyuc 0 kcak 4 tcan 2 dwat 7 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnykri hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta *Salix bebbiana* is a deciduous Shrub growing to 7 m (23ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower in 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry Charcoal Fibre Pioneer WoodA pioneer species, readily invading any cleared-out area if there is sufficient moisture[229]. It is short-lived and not very shade tolerant and so, having provided good conditions for other woodland trees to become established, it is eventually out-competed by them[K]. The pliable stems are used in basket making[226, 229]. 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 has been twisted into cord and made into strong rope, bags and dresses[257]. The bark has been used for sewing birch bark onto basket frames[257]. The wood often has diamond-shaped depressions on the bark caused by a fungus. This wood is considered to be very ornamental and is carved into canes, lamp posts and furniture[229]. The wood has also been used to make baseball bats and to make charcoal[229]. Dynamic accumulator.

dwatta Anodyne Astringent Febrifuge PoulitceA poultice of the chewed root inner bark has been applied to a deep cut[257]. The shredded inner bark has been used as sanitary napkins to 'heal a woman's insides'[257]. A poultice of the damp inner bark has been applied to the skin over a broken bone[257]. A decoction of the branches has been taken by women for several months after childbirth to increase the blood flow[257]. A poultice of the bark and sap has been applied as a wad to bleeding wounds[257]. 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 N. America - Newfoundland to Alaska, south to California. **ksacta** Moist rich soils along streams, lakes and swamps, but also forming dense thickets in open meadows[229]. Found at elevations up to 3000 metres[229].

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 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]. Rarely thrives on chalk[200]. A fast-growing but short-lived species[229]. This species is closely related to *S. starkeana*, differing mainly in its more vigorous habit[11]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

4.2.38 Rhamnus frangula

Alder Buckthorn

3 tlin 7 cyuc 0 kcaak 3 tcan 3 dwat 5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprikwiv hpa7tmwatli xre7t hjonli

drutta Rhamnus frangula is a deciduous Shrub growing to 5 m (16ft) by 4 m (13ft) at a slow 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 September 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. 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 plant is poisonous unless stored for 12 months before use[4, 19, 76]. This report is probably referring to the bark. Do not use in cases of intestinal obstruction, stenosis, atony, inflammatory colon disease, appendicitis, abdominal pain of unknown origin. Avoid long-term use. Two weeks recommended under medical supervision [301].

tcanta Charcoal Dye Hedge Hedge Nails WoodA yellow dye is obtained from the leaves and bark[4, 115]. It is much used in Russia and turns black when mixed with salts of iron[4]. A green dye is obtained from the unripe fruit[4, 115]. A blue or grey dye is obtained from the ripe berries[4, 115]. Plants can be grown as an informal (untrimmed) hedge, though they are also amenable to trimming[200]. The cultivar 'Tallhedge (syn 'Columnaris') is very suitable for this purpose[200]. The wood is used to make wooden nails, shoe lasts, veneer etc[46, 61]. It is the source of a high quality charcoal that is used by artists[4, 11, 13, 17, 100, 115, 182, 186].

dwatta Aperient Cathartic Cholagogue Laxative Purgative Tonic VermifugeAlder buckthorn has been used medicinally as a gentle laxative since at least the Middle Ages[244]. The bark contains 3 - 7% anthraquinones, these act on the wall of the colon stimulating a bowel movement approximately 8 - 12 hours after ingestion[254]. It is so gentle and effective a treatment when prescribed in the correct dosages that it is completely safe to use for children and pregnant women[244]. The bark also contains anthrones and anthranols, these induce vomiting but the severity of their effect is greatly reduced after the bark has been dried and stored for a long time[254]. The bark is harvested in early summer from the young trunk and moderately sized branches, it must then be dried and stored for at least 12 months before being used[4, 238]. The inner bark is cathartic, cholagogue, laxative (the fresh bark is violently purgative), tonic, vermifuge[4, 9, 13, 21, 165]. It is taken internally as a laxative for chronic atonic constipation and is also used to treat abdominal bloating, hepatitis, cirrhosis, jaundice, and liver and gall bladder complaints[238]. It should be used with caution since excess doses or using the bark before it is cured can cause violent purging[9, 21]. Externally, the bark is used to treat gum diseases and scalp infestations[238], or as a lotion for minor skin irritations[244]. The fruit is occasionally used, it is aperient without being irritating[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Rhamnus frangula for constipation (see [302] for criticisms of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, the Urals and Siberia. ksacta Swamps and damp places, usually on moist heaths and damp open woods, preferring a peaty soil[9, 17, 21].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Germination is usually good, at least 80% by late spring. 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 winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta An easily grown plant, it succeeds in any reasonably good soil[11, 98], preferring neutral to acid conditions[238]. It grows well on damp or peaty soils[98]. Prefers a moist moderately fertile soil in sun or semi-shade[200].

Grows well in wet soils but not if they are water-logged[186]. Dislikes drought or exposure to strong winds[186]. Plants are hardy to at least -15°c[238]. Alder buckthorn is a slow-growing plant, though it coppices well. It was at one time often grown for its wood which was used in making charcoal[186]. The plants regenerate well after forest fires or grazing[186]. Plants flower on one-year old wood and also on the current year's growth[4]. Cultivated as a medicinal plant in S. Europe[57]. Often bears the aecidiospore stage of 'crown rust' of oats[1]. The species in this genus are notably resistant to honey fungus[200]. A good bee plant[4] and a main food plant for the larvae of the yellow brimstone butterfly[186]. 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].

4.2.39 Rhus vernix

Poison Sumach

3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 3 m hkuc htut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprikwiv hpa7tmwatli nyanhjen hjonli

drutta Rhus vernix is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in 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. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista This plant contains toxic substances and skin contact with it can cause severe irritation to some people[11]. The sap is extremely poisonous[11]. The sap contains 3-N pentadecycatechol. Many people are exceedingly sensitive to this, it causes a severe spreading dermatitis. The toxins only reach the skin if the plant tissues have been damaged, but even indirect contact can cause severe problems[200].

tcanta Dye Ink Miscellany Mordant Oil Varnish WoodThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An indelible black ink can be made from the sap[226]. A varnish is obtained from the sap, it is black, lustrous and durable[19, 82]. The final product is toxic[226]. Wood - light, soft, coarse grained[82]. It weighs 27lb per cubic foot[235].

dwatta Febrifuge Miscellany SkinPoison sumach has occasionally been used medicinally, though it is an extremely poisonous plant and great caution should be exercised. Any herbal use should only be undertaken under the supervision of a qualified practitioner. See also the notes above on toxicity. The plant has been used in the treatment of fevers, ague, ulcerated bladder, asthma and wasting diseases[257]. The plant has been used as a wash to treat foul ulcers[257].

nrakta Eastern N. America - Maine to Vermont and Ontario, south to Florida, Missouri and Louisiana. ksacta Wooded swamps, often inundated for part of the year[4, 43, 82].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. The stored seed also needs hot water treatment and can be sown in early spring 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. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

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 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 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].

5.2.31 Crataegus x grignonensis

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 4 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasljutnyikfrip hpa7tli flatprikwiv 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: FruitEdible 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 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 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].

5.2.32 Crataegus intricata

Copenhagen hawthorn

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasljutnyikfrip hpa7tli flatprikwiv 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

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].

5.2.29 Crataegus columbiana

Columbian Hawthorn

4 tin 8 cyuc 3 kcaak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli flatprikwlwisslip hpa7tmwatli xre7t hjonli

drutta 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.

kaakta Edible Parts: FruitEdible 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 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 - 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].

5.2.30 Crataegus anomala

Arnold Hawthorn

4 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 5 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli flatprikwlwisslip hpa7tmwatli xre7t hjonli

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.

kaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177, 235]. Juicy[43]. A very nice flavour, it

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. Requires a moist soil[14]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

4.2.40 Filipendula rubra

Queen Of The Prairie, Meadowsweet

3 tin 9 cyuc 0 kcaak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfriphpa7tli prikliws hpa7tmwatli fyifxre7t 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 Antinflammatory 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.

4.2.41 Lobelia cardinalis

Cardinal Flower

3 tin 9 cyuc 0 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfriphpa7tli flatprikliws hpa7tmwatli xre7t 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 (light 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]. The sap of the plant has been known to cause skin irritation[274].

dwatta Analgesic Anthelmintic Antispasmodic Emetic Epilepsy Expectorant Febrifuge Homeopathy Nerve 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[22, 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].

4.2.42 Chelone glabra

Balmoney, White turtlehead

3 tin 7 cyuc 0 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfriphpa7tli flatprikliws hpa7tmwatli xre7t 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 VermifugeBalmony 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].

4.2.43 *Carex sylvatica*

Wood sedge

3 tin 8 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli jltunykfrkip hpa7tli flatprikwsl 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.

pcista None Known

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].

dwatta None Known

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-myrcorrhizal. 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.

4.2.44 *Erica tetralix*

Bog Heather, Crossleaf heath

3 tin 7 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc htut cyutli tcuphja7n hwicli hyhshrasjlut hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta *Erica tetralix* is an evergreen Shrub growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from June to October, 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) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

tcanta Broom DyeStems are used for making brooms, brushes etc[109]. A yellow dye is obtained from the plant[46, 61]. Plants can be grown as a ground cover[208]. They should be clipped in the spring in order to encourage denser growth[208].

nrakta Western Europe, including Britain, from Scandinavia to Spain east to N. Germany and Poland. ksacta Bogs, wet heaths and moors, rarely on drier soils[17].

propta Seed - surface sow in a sandy compost in a cold frame in spring. Keep moist. Prick out the plants as soon as they are large enough to handle and plant them in their permanent positions when they are 5 - 8cm tall[11]. Cuttings of half-ripe wood, 3cm long taken from twigg lateral growths near the base of the plant, July/August in a frame. Remove the leaves from the bottom part of the stem without causing any damage to the bark. The cuttings root in a few weeks if they are given some bottom heat. Plant out in spring[11]. Layering in spring or autumn. Plants can be 'dropped' and then dug up and divided about 6 - 12 months later. Dropping involves digging up the plant and then replanting it about 15 - 20cm deeper in the soil to encourage roots to form along the stems[78].

nwatta Requires a light lime-free loam[1]. A calcifuge plant, requiring a pH below 6[186]. Grows best in a poor soil[11]. Resents dry soils[1], doing well in boggy areas[186]. Prefers an open situation[1]. A good bee plant[108]. There are many named forms, selected for their ornamental value[188]. Plants in this genus are notably resistant 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].

4.2.45 *Geranium maculatum*

Spotted Cranesbill, Spotted geranium, Crowfoot, Wild Geranium, Cranesbill

3 tin 10 cyuc 0 kcak 2 tcan 3 dwat m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikklwsl hpa7tmwatli xre7t hjonli

drutta *Geranium maculatum* is a PERENNIAL 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 5 and is not frost tender. It is in flower from April 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

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].

5.2.27 *Crataegus chryscarpa*

Fireberry Hawthorn, Red haw, Piper's hawthorn, 4 tin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrkip hpa7tli flatprikwsl hpa7tmwatli xre7t hjonli

drutta *Crataegus chryscarpa* 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[K].)

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive LaxativeA 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 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].

5.2.28 *Crataegus coccinoides*

Kansas Hawthorn

4 tin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrkip hpa7tli flatprikwsl 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].

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].

5.2.25 Crataegus pruinosa

Frosted Hawthorn, Waxfruit hawthorn
4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrjp hpa7tli flatprikhwisslip 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 Midgees. 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.

kcaakta 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 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. ksacta 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].

5.2.26 Crataegus flabellata

Fanleaf hawthorn
4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrjp hpa7tli flatprikhwisslip 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 Midgees. 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.

kcaakta 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

tcanta Dye Miscellany TanninA brown dye is obtained from the flowers[168]. The roots and the leaves are rich in tannin[4]. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Antidiarrhoeal Antiseptic Astringent Cholera Diuretic Dysentery Kidney Miscellany Styptic TonicThe whole plant, but especially the root, is antiseptic, highly astringent, diuretic, styptic and tonic[4, 21, 102, 165, 222, 238]. An infusion of the whole plant, or of the roots alone, is used in the treatment of diarrhoea (especially in children and the elderly), dysentery, irritable bowel syndrome, cholera, kidney complaints, bleeding and a wide range of other ailments[61, 213, 254]. It is often used in combination with other herbs[238]. Externally, it is applied to purulent wounds, haemorrhoids, thrush, vaginal discharges and inflammations of the mouth[238]. The plants are rich in tannin[213], the root containing 10 - 20%[222]. The roots can be harvested in the autumn then dried and stored[213]. It is best to harvest the roots as the plant comes into flower since it is then at its most active medicinally[4]. The leaves are harvested as the plant comes into flower and are dried for later use[238].

nrakta Eastern N. America - Maine to Georgia, west to Arkansas, Kansas and Manitoba. ksacta Wet places in woods, wet rocks and in swamps[187]. Woodlands, thickets and meadows[43].

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 or autumn. 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, Massing, Woodland garden. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200], including water-logged soils[187]. Plants are hardy to about -25°C[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant 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 rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.46 Liatris spicata

Gayfeather, Dense blazing star, Spiked Blazing Star, Button Snakewort, Gayfeather, Spiked Gayfeather,
3 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 0.6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlut hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta *Liatris spicata* is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in September, 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) and medium (loamy) soils and prefers well-drained 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.

pcista Although we have no records of toxicity for this plant, one record says that the leaves contain coumarins. These have an anti-clotting effect on the blood and can prevent natural clotting of the blood when there is a cut[K].

tcanta Pot-pourri RepellentThe aromatic leaves and roots are added to pot-pourri[238]. The leaves and the roots are added to various insect-repellent herbal mixtures[238].

dwatta Anodyne Antibacterial Astringent Carminative Diaphoretic Diuretic Emmenagogue Expectorant Stimulant Tonic VDThe leaves and root are anodyne, antibacterial, astringent, carminative, diaphoretic, diuretic, emmenagogue, expectorant, stimulant and tonic[4, 21, 106, 238, 257]. The plant is said to be extremely efficacious when used as a local application in the treatment of sore throats and gonorrhoea[4]. It is also used in treating kidney diseases[238]. The leaves are harvested in the summer, the roots in the autumn. Both can be used fresh or dried[238].

nrakta Eastern N. America - Pennsylvania and New Jersey to Wisconsin, south to Florida and Louisiana. ksacta Meadows, borders of marshes, savannahs, damp slopes etc[43]. Poor dry ridges[190].

propta Seed - best sown as soon as it is ripe in autumn in a greenhouse[200]. Sow stored seed as soon as possible in the year in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow the plants on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring[1]. 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 taken in spring as growth commences. 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.

nwatta Landscape Uses:Border, Foundation, Massing, Seashore, Specimen. Grows well in a moderately good light soil[1]. Requires a moist to wet position[1, 200, 238]. Established plants are very drought tolerant so long as there is plenty of humus in the soil[190]. Prefers a sunny position[108] but succeeds in shade[111]. Plants are hardy to about -25°C[187]. The plant has an agreeable odour, due to the presence of coumarins[4]. A good bee plant[1]. Rodents are very fond of the tubers so the plants may require some protection[200]. Slugs are fond of the young shoots in spring[238]. Special Features: Attracts birds, Attractive foliage, North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers.

4.2.47 Agrostis capillaris

Browntop Bent Grass
3 tlin 10 cyuc 0 kcaak 4 tcan 0 dwat 0.4 m hkc
hmimhtut cyutli tcuphja7n hwicli hvihsrasjlut hpa7tli frusflatprikhwisom hpa7tmwatli hjonli

drutta *Agrostis capillaris* is an evergreen Perennial growing to 0.4 m (1ft 4in) by 0.1 m (0ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. It can tolerate atmospheric pollution.

pcista None Known
kcaakta None Known
tcanta FodderForest garden path mix [1-9]. Environmental Uses: Amenity, Erosion control or dune stabilization, Landscape improvement, Revegetation, Soil conservation. Ornamental: garden plant, Seed trade [1-8]. Agronomically valuable fodder and pasture grass for livestock production, occasionally cut for hay. Used in garden lawn mixtures and in particular for tennis courts and golf course fairways. Widely grown in mild (cool-humid) summers, including some parts of Australia, northern Europe, the USA and New Zealand. Compared to *A. stolonifera*, *A. capillaris* has a more upright growth habit and does not spread aggressively. Used outside its native range for erosion control and in rehabilitation work. A food source for herbivores, including rabbits [1-8].

dwatta None Known
nrakta Native to Eurasia, from Ireland and Britain in the west, through Siberia and Central Asia, as far east as

China and from Scandinavia south to the Mediterranean, including Tunisia in North Africa. Introduced and naturalized in the Americas (USA, Canada, Greenland, Brazil, Argentina and Chile), southern Africa, Australia and New Zealand [1-8]. ksacta Grasslands and pastures. Dominant on poor and acidic soils and is well adapted to grazing pressure. Invades ruderal, disturbed areas, heathland, woodland, scrub and sand dune habitats. Abundant in wetlands and cultivated areas. In Australia, it is reported from dry coastal vegetation, healthy woodlands, lowland grasslands, grassy woodlands, dry and damp sclerophyll forests, riparian vegetation and alpine and sub-alpine vegetation, including montane peatlands and swamps [1-8].

propta Seed

nwatta A rhizomatous and stoloniferous attractive, relatively short perennial grass. Ranging from 10 to 70 cm high. Soil drainage: free or impeded. Soil reaction: acid, alkaline, neutral. Dominant on poor and acidic soils. Soil texture: light or medium [1-8]. Found on a wide range of soils both damp and dry and from neutral to acidic. A hardy grass forming short grazed turf on poor soils on hills and mountains. Common and widespread in both lowland and upland pasture, meadows, heaths, open woodlands, road verges and banks. Upper elevation limit = 945m. Lower elevation limit = 0m.

4.2.48 Woodwardia virginica

Virginia Chain Fern

3 tlin 10 cyuc 0 kcaak 3 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Woodwardia virginica is a deciduous Fern growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista None Known

kcaakta None Known

tcanta Groundcover. A good high density groundcover that will work in a wet and shady spot. Garden Uses: Shade gardens, native plant gardens, woodland gardens or naturalized areas. Also effective along streams and ponds [368-1]. Provides shelter for frogs, toads, newts.

nrakta Endemic to eastern North America from Florida to Nova Scotia and west to Michigan and Illinois. ksacta Grows in anthropogenic (man-made or disturbed habitats), bogs, marshes, swamps, and wetland margins (New England Wild Flower Society 2011-2015). Wet soils of open wet swampy woods, acid bogs, and along streams and roadside ditches, avoiding calcareous substrates. An important constituent of the field layer of flatwoods, Atlantic white cedar (*Chamaecyparis thoides*) swamp forest and bay (*Magnolia virginiana*) forests.

propta Propagate by spores or rhizome division.

nwatta A deciduous, perennial, colony-forming, waxy green, deciduous fern. Prefers organically rich, medium to wet, well-drained soils in part shade to full shade. Does well in average garden soils and will take considerable sun as long as soils are kept consistently moist[368-1]. Soil pH: Acidic (pH<6.8). Typically occurs in woodland swamps and bogs. Bloom Time: Non-flowering. Bloom Description: Non-flowering. Can be mistaken for *Osmundastrum cinnamomeum* (Cinnamon Fern). 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].

4.2.49 Myosotis alpestris

Alpine Forget-Me-Not, Scorpion Grass, Forget-Me-Not

3 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli prik-wis hpa7tmwatli xre7t hjonli

drutta *Myosotis alpestris* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July 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 prefers well-drained 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 *Astringent Ophthalmic*The whole plant is astringent and ophthalmic[7]. Used as a lotion, it is an excellent remedy for many eye diseases[7]. It is also ground into a powder and applied externally to wounds, at one time the leaf juice was used to stop nose bleeds[7]. The plant is harvested in May and can be dried for later use[7].

nrakta Britain, Europe, W. Asia and N. America. ksacta Rare and local in Britain, growing in damp woodlands and meadows, usually on basic rock formations[17, 200].

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, Woodland garden. Prefers a well-drained gritty soil[245]. Plants are hardy to about -20°C[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. The flowers are deliciously fragrant in the evening and night time though there is little or no scent in the daytime[245]. Special Features: North American native, Naturalizing, Fragrant flowers.

4.2.50 Packera aurea

Golden Groundsel - Life Root, Golden ragwort

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikhwisslip hpa7tmwatli xre7t hjonli

drutta *Packera aurea* is a 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 3. It is in flower from May 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. 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.

pcista Possible liver damage due to pyrrolizidine alkaloids. Toxic if taken internally (legally restricted in some countries) [301].

dwatta *Abortifacient. Birthing aid. Diaphoretic. Diuretic. Emmenagogue. Pectoral Stimulant. Tonic. Uterine tonic.*Golden groundsel is a medicinal plant that is deserving of greater attention[4]. This species was widely used by N. American Indians to treat various complaints of the female reproductive system, and also to ease childbirth[238]. Whilst often stated to be completely safe to use, recent research has found that the plant contains pyrrolizidine alkaloids that, in isolation, can cause liver damage and so this remedy can no longer be recommended for internal use[238, 254]. The roots and leaves are abortifacient, diaphoretic, diuretic, emmenagogue, pectoral, stimulant and uterine tonic[4, 46, 165, 207, 222]. It is used externally in the treatment of vaginal discharge[238]. A tea made from the plant was frequently used by the N. American Indians as a remedy for various female troubles, including the pain of childbirth[207, 213]. Pharmacologists have not reported any uterine effects, but the plant does contain an essential oil (inuline) plus the alkaloids senecine and senecionine (which are poisonous to grazing animals)[213]. The plant is harvested before flowering and the roots are harvested in the autumn, both are dried for later use[238].

nrakta Eastern N. America - Newfoundland to Florida, west to Texas. ksacta Rich calcareous woods and bottoms and upland swamps[43]. Damp thickets and prairies[200].

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.

5.2.23 Crataegus rotundifolia

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikhwisslip 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.

kcaakta 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. 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

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 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. chrysoarpa* phoenicea, *C. rotundifolia* Borchk. is a synonym of *C. chrysoarpa*. There is also a *C. rotundifolia* Lam, which is a synonym of *Amelanchier rotundifolia*[200].

5.2.24 Crataegus altaica

Altai Mountain Thorn

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikhwisslip 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.

kcaakta 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

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:** PectinFruit - 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 WoodThe plant can be used as a rootstock for cultivated apples, conferring a greater hardness[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 Lithontritic OphthalmicAn 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].

5.2.22 Crataegus laevigata

Midland Hawthorn, Smooth hawthorn, English Hawthorn 4 tlin 8 cyuc 3 kcaak 5 tcan 5 dwat 6 m hkuc pcmimhmint cyuti hgactcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwssip 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.

ksakta Edible Parts: Fruit **Leaves****Edible Uses:** Coffee TeaFruit - 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 Rootstock WoodA 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 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, 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

propta Seed - sow spring in a greenhouse. 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. Division in spring[200]. Root cuttings in early spring[200].

nwatta An easily grown plant, it succeeds in a sunny position in most moderately fertile well-drained soils[200]. Prefers a damp to wet soil and also succeeds in partial shade[238]. Succeeds in the wild garden though it is invasive[200]. This species is cultivated in parts of Russia for use in the pharmaceutical industry[238]. A polymorphic species, there are many named varieties[43]. *Senecio aureus* L. is a synonym of *Packera aurea* (L.) Á.Löve and *D.Löve* 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].

5 4 tlin

5.1 bwon

5.1.1 Hippophae turkestanica rhamnoides

Sea Buckthorn tfo2n 4 tlin 7 cyuc 5 kcaak 5 tcan 5 dwat 6 m hkuc htut cyuti hgakkyuctcuphja7n hwicli hyhisrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Hippophae rhamnoides turkestanica is a deciduous Shrub growing to 6 m (19ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, 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 Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure.

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

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

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

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

dwatta Astringent Cancer Cardiac Eczema Poulce Tonic Vermifuge Vitamin CThe twigs and leaves contain 4 - 5% tannin[240]. They are astringent and vermifuge[7, 100]. The tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is used as a tonic[9]. The freshly-pressed juice is used in the treatment of colds, febrile conditions, exhaustion etc[9]. The fruit 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 E. Asia - Himalayas in the higher Tibetan plateau. ksacta Uper subalpine to lower alpine zones.

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

nwatta Landscape Uses:Border, Seashore, Specimen. Succeeds in most soils[200], including poor ones[186], so long as they are not too dry[182, 200]. Grows well by water and in fairly wet soils[182]. Established plants are very drought resistant[186]. Requires a sunny position[3], seedlings failing to grow in a shady position and mature shrubs quickly dying if overshadowed by taller plants[186]. Does well in very sandy soils[1, 186]. Plants are very tolerant of maritime exposure[75], though they are fairly slow growing[75]. Although usually found near the coast in the wild, they thrive when grown inland[11] and are hardy to about -25°C[184]. A very ornamental plant[1, 11], it is occasionally cultivated, especially in N. Europe, for its edible fruit[183]. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. 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[113, 186, 200]. Plants produce abundant suckers, especially when grown on sandy soils[186]. Dioecious. Male and female plants must be grown if seed is required. The sexes of plants cannot be distinguished before flowering, but on flowering plants the buds of male plants in winter are conical and conspicuous whilst female buds are smaller and rounded[11]. Plants in this genus are notably resistant to honey fungus[200]. **Special Features:**Not North American native, Naturalizing, Inconspicuous flowers or blooms.

5.1.2 *Alnus viridis crispa*

American Green Alder

tfo2n 4 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli tucpja7n hwicli hysijlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Alnus viridis crispa* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). 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 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 Poultrice 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].

5.1.3 *Lathyrus palustris*

Slenderstem Peavine, Marsh pea

tfo2n 4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.2 m hkuc htut cyutli tucpja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lathyrus palustris* is a PERENNIAL CLIMBER growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

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

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - cooked[105, 161, 179]. The fully grown seeds are shelled and cooked as a vegetable[257]. Some caution is advised, see the notes above on toxicity. Young leaves and stems - cooked[177].

nrakta Europe, including Britain, from Norway south and east to N. Spain, Siberia and Japan. E. N. America ksacta Fens and damp places in grass or bushes[17].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring 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. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta A good plant for the bog or marsh garden, succeeding in wet soils[1, 200]. It is easily grown in any moderately good garden soil, preferring a position in full sun[200]. Plants climb by means of tendrils[188]. 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].

5.1.4 *Alnus japonica*

Japanese Alder

tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 22 m hkuc hmimhtut cyutli kyuctucpja7n hwicli hysijlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Alnus japonica* 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 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

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 out 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 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]. 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].

5.2.20 *Crataegus pedicellata gloriosa*

Scarlet Haw

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattucpja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pedicellata gloriosa* 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: 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 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 - 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].

5.2.21 *Malus coronaria*

Garland Crab, Sweet crab apple

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tucpja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis 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 4 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

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.

ckaakta 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 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 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 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]. Occasion-

ally cultivated for its fruit in America, there are some named varieties[183].

5.2.19 Crataegus monogyna

Hawthorn, Oneesed hawthorn

4 tlin 8 cyuc 3 kcaak 3 tcan 5 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hyishrasjlutnykfrp hpa7tli frusflatprikwissliph 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.

ckaakta Edible Parts: Flowers Fruit Leaves**Edible Uses:** Coffee TeaFruit - 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].

dwatta 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 moist 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

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].

5.1.5 Alnus maximowiczii

tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hyisjlutnykfrp hpa7tli flatprikhwis 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].

5.1.6 Lathyrus pratensis

Meadow Vetchling

tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 1.2 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyk hpa7tli flatprikhwis hpa7tmwatli fyfxre7t hjonli

drutta *Lathyrus pratensis* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

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

tcanta RepellentThe plant is said to repel mice.

dwatta ResolventThe seeds are used as a resolvent in Spain[240].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, Siberia and the Himalayas. **ksacta Grassland, scrub and hedgerows, avoiding acid soils**[17, 50].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring 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. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta An easily grown plant, succeeding in any moderately good garden soil but preferring a position in full sun[200]. Succeeds on wet soils. 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].

5.2 mran

5.2.1 Phragmites australis

Common Reed, American common reed, Hybrid common reed, European common reed, Subtropical common re 4 tlin 10 cyuc 5 kcaak 4 tcan 2 dwat 3.6 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyk hpa7tli flatprikhwis lphsoms hpa7tmwatli xre7t hjonli

drutta *Phragmites australis* is a PERENNIAL growing to 3.6 m (11ft) by 3 m (9ft) 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 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 Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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 or wet soil and can grow in water. The plant can tolerate maritime exposure.

ckaakta Edible Parts: Leaves Root Seed Shoots Stem**Edible Uses:** Condiment Drink SweetenerRoot - raw or cooked like potatoes[2, 13, 74, 102, 106, 183]. It contains up to 5% sugar. The flavour and texture are best when the root is young and still growing[144]. It can be dried, ground coarsely and used as a porridge[12, 46, 62]. In Russia they are harvested and processed into starch[269]. Young shoots - raw or cooked[61, 62, 102, 179]. They are best if used before the leaves form, when they are really delicious[144]. They can be used like bamboo shoots[183]. The partly unfolded leaves can be used as a potherb and the Japanese dry young leaves, grind them into a powder and mix them with cereal flour when making dumplings[183]. The stems are reported to contain 4.8 g protein, 0.8 g fat, 90.0 g total carbohydrate, 41.2 g fiber, and 4.4 g ash[269]. Seed - raw or cooked[257]. It can be ground into a powder and used as a flour[57, 62, 102, 106]. The seed is rather small and difficult to remove from the husk but it is said to be very nutritious[183]. A sugar is extracted from the stalks or wounded stems[2, 5, 62, 95]. A sweet liquorice-like taste[95], it can be eaten raw or cooked[62]. The stems can be boiled in water and then the water boiled off in order to obtain the sugar[178]. A sugary gum that exudes from the stems can be rolled into balls and eaten as sweets[183]. A powder extracted from the dried stems can be moistened and roasted like marshmallow[62, 95, 102, 183].

tcanta Alcohol Basketry Biomass Broom Cork Dye Fencing Fertilizer Fibre Fodder Fuel Furniture Green manure Insulation Miscellany Paper Pencil Soil stabilization String Teeth Thatching WeavingThe common reed can provide a large quantity of biomass and this is used in a wide variety of ways as listed below. Annual yields of 40 - 63 tonnes per hectare have been reported[269]. The plant is also converted into alcohol (for use as a fuel), is burnt as a fuel and is made into fertilizer[238]. The plant is rich in pentosans and may be used for the production of furfural - the nodes and sheaths yield 6.6% whilst the underground parts over 13% of furfural[269]. The pentosan content increases throughout

the growing period and is maximum in the mature reed[269]. The reed can be used also for the preparation of absolute alcohol, feed yeast and lactic acid[269]. The stems are useful in the production of homogeneous boards[269]. They can also be processed into a fine fibrous material suitable as a filler in upholstery[269]. The stems have many uses. They are used for thatching roofs[1, 46, 74, 106]. It can last for 100 years[169]. The stems and leaves are also used for building dwellings, lattices, fences, arrows by Indians, and for weaving mats, carrying nets, basket making, insulation, fuel, as a cork substitute etc[13, 74, 99, 102, 115, 257, 269]. The stem contains over 50 percent cellulose and is useful in the manufacture of pulps for rayon and paper[269]. The fibre from the leaves and stems is used for making paper[189]. The fibre is 0.8 - 3.0 mm long and 5.0 - 30.5µm in diameter. The stems and leaves are harvested in the summer, cut into usable pieces and soaked for 24 hours in clear water. They are then cooked for 2 hours with lye and beaten in a blender. The fibre makes a khaki paper[189]. A fibre obtained from the plant is used for making string[95, 106]. The flowering stalks yield a fibre suitable for rope making[269]. The leaves are used in basket making and for weaving mats etc[169, 238]. A light green dye is obtained from the flowers[6, 115]. Freshly cut shoots are a good green manure[74] (Does this man as a soil mulch?[K]). The inflorescences are used as brooms[74]. The plant can be used as a cork substitute[74]. No further details. The plant is mixed with mud to make a plaster for walls[145]. Pens for writing on parchment were cut and fashioned from the thin stems of this reed[269], whilst the stems were also used as a linear measuring device[269]. The plant has a very vigorous and running rootstock, it is useful for binding the soil along the sides of streams etc[115]. It is planted for flood control since it stabilizes the banks and gradually builds up soil depth, thus raising the level of the bank.

dwatta Antiasthmatic Antidiarrhoeal Antidote Antiemetic Antipyretic Antitussive Cholera Depurative Diuretic Febrifuge Sedative Sialogogue Skin Stomachic Styptic UrinaryThe leaves are used in the treatment of bronchitis and cholera, the ash of the leaves is applied to foul sores[218]. A decoction of the flowers is used in the treatment of cholera and food poisoning[218]. The ashes are styptic[218]. The stem is antidote, antiemetic, antipyretic and refrigerant[218]. The root is antiasthmatic, antiemetic, antipyretic, antitussive, depurative, diuretic, febrifuge, lithontripic, sedative, sialogogue and stomachic[147, 176, 218, 238]. It is taken internally in the treatment of diarrhoea, fevers, vomiting, coughs with thick dark phlegm, lung abscesses, urinary tract infections and food poisoning (especially from sea foods)[238, 257]. Externally, it is mixed with gypsum and used to treat halitosis and toothache[238]. The root is harvested in the autumn and juiced or dried for use in decoctions[238].

nrakta Cosmopolitan, in most regions of the world, including Britain, but absent from the Amazon Basin. ksacta Shallow water and wet soil, avoiding extremely poor soils and very acid habitats[17].

propta Seed - surface sow in spring in a light position. Keep the soil moist by emmersing the pot in 3cm of water. Germination usually takes place quite quickly. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in spring. Very simple, any part of the root that has a growth bud will grow into a new plant. 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 Fodder: Bank Industrial Crop: Biomass Minor Global CropA very easily grown plant that thrives in deep moisture retentive soils such as marshes and swamps, whilst it also grows well along the sides of streams, lakes and ponds, in shallow water, ditches and wet wetlands[162, 200, 269]. Plants are tolerant of moderately saline water[169, 269]. The plant is reported to tolerate an annual precipitation in the range of 31 to 241cm, an annual temperature in the range of 6.6 to 26.6°C and a pH of 4.8 to 8.2[69]. Plants are hardy to about -20°C[200]. This species is very fast growing with a very vigorous and invasive running rootstock that can be 10 metres or more long, it can form very large stands in wetlands[200, 238, 260]. Difficult to eradicate once established, it is unsuitable for planting into small spaces[200, 238, 269].

The flowering heads are often used in dried flower arrangements[238]. There are some named forms, selected for their ornamental value[238].

5.2.2 Allium canadense mobilense

Canadian Garlic

4 tlin 8 cyuc 5 kcaok 0 tcan 2 dwat m hkuc
hmihtut cyuti tucphja7n hwicli hrasljut hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta Allium canadense mobilense is a BULB growing to 0.5 m (1ft 8in) 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 May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) 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.

pista 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].

kcaakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[46, 61, 62, 177]. It can be used as a vegetable, or as a flavouring in soups and stews, and can also be pickled[2]. The bulb is up to 30mm in diameter, it is crisp, mild and with a pleasant flavour[183]. Used as a leek substitute according to one report[22], it is a garlic substitute according to others[55, 159, K]. Leaves - raw or cooked[55, 62, 177]. A delicious mild flavour, they are available from early spring until the autumn[K]. They make a very acceptable salad and can also be used as a greens or as a flavouring in cooked foods[K]. Flowers - raw. A little bit stronger flavour than the leaves, especially as the seeds begin to form, they can be used as a flavouring and garnish on salads[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antiasthmatic Carminative Cathartic Diuretic Expectorant StimulantThe plant is antiasthmatic, carminative, cathartic, diuretic, expectorant and stimulant[257]. A tincture is used to prevent worms and colic in children, and also as a remedy for croup[275]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Southeaster N. America - Texas to North Carolina. ksacta Low woods, thickets and meadows[43]. Woods and prairies in sandy or rocky soils, rarely on limestone or clay[274].

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

nwatta Prefers a sunny position in a light well-drained soil[1]. A moisture loving plant according to another report[42]. The bulbs should be planted fairly deeply[1]. Bulbs grow to a good size under cultivation[183]. Some forms of this species produce many bulbils and are considered to be a pernicious weed in some areas of America[159], there is some risk that they could spread aggressively in Britain. This subspecies, however, is a form that does not produce bulbils and is much better behaved[200]. 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].

tcanta Agroforestry Uses: rehabilitation of the soil. 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. 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]. 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]. The bark has been used as a mordant for fixing dyes[257]. The wood is hard, heavy, strong, tough, very durable, close grained. The wood is a good fuel[82]. J. Acorns are abundant and an excellent source of food for wildlife. Schuette's oak is considered to be a low-maintenance tree with good pest resistance. A medium shade tree for moist landscape areas. Specimen or group. Lawns or parks. Street tree. Well suited to soggy soils. Riverbanks.

nrakta Naturally occurring hybrid scattered through locations where the ranges of the parent trees coincide (southern Ontario and Quebec south to Kentucky, Missouri and Oklahoma). ksacta Native Range: Garden origin

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 Schuette Oak is a hybrid between Quercus bicolor (swamp white oak) and Quercus macrocarpa (bur oak). It grows best in rich, humusy, medium to wet soils, but can tolerate soggy soils to dried upland soils. Great for low and high areas on properties. Tolerates a wide range of moisture, pH, and soil types. Bloom Time: April to May. Bloom Description: Yellowish-green. Leaf: Good Fall color. Fall color is a yellowish-brown, sometimes tinged with red. Fruit: 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 a standard with a non-suckering single trunk [1-2].

5.2.17 Crataegus punctata

Dotted Hawthorn,

4 tlin 8 cyuc 3 kcaok 2 tcan 2 dwat 10 m hkuc
hmihtut cyuti hgattcuphja7n hwicli hrasljutnyikfripr hpa7tli
flatprikliwslip 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 Midgees. 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.

kcaakta 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 men-

strual 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 (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].

5.2.18 Crataegus opaca

Western Mayhaw

4 tlin 8 cyuc 3 kcaok 3 tcan 2 dwat 9 m hkuc
hmihtut cyuti hgattcuphja7n hwicli hrasljutnyikfripr hpa7tli
frusflatprikliw hpa7tmwatli xre7t hjonli

and then gently tapping the stem and brushing the pollen off with a fine brush[9]. This will help to pollinate the plant and thereby ensure that both pollen and seeds can be harvested[K]. Flowering stem - cooked. Tastes like sweet corn.

tcanta Biomass Insulation Miscellany Paper Soil stabilization Stuffing Thatching WeavingThe stems have many uses, gathered in the autumn they make a good thatch, can be used in making paper, can be woven into mats, chairs, hats etc. They are a good source of biomass, making an excellent addition to the compost heap or used as a source of fuel etc. A fibre obtained from the leaves can be used for making paper[189] The leaves are harvested in summer, autumn or winter and are soaked in water for 24 hours prior to cooking. The fibres are cooked for 2 hours with soda ash and then beaten in a ball mill for 1½ hours. They make a green or brown paper[189]. The hairs of the fruits are used for stuffing pillows etc. They have good insulating and buoyancy properties and have also been used as a wound dressing and a lining for babies nappies.. The stems can be used to make rush lights. The outer skin is removed except for a small strip, or spine, running the entire length to give stability. The stem is then soaked in oil. A fibre is obtained from the blossom stem and flowers. The pollen is highly inflammable, it is used in making fireworks etc.

dwatta Astringent Miscellany StypticThe stamens and pollen are used as an astringent and styptic[240].

nrakta S.E. Europe to E. Asia. ksacta Lakes, rivers, ditches and wet places in Turkey[93].

propta Seed - surface sown in a pot and stand it in 3cm of water. Pot up the young seedlings as soon as possible and, as the plants develop, increase the depth of water. Plant out in summer. Division in spring. Very easy, harvest the young shoots when they are about 10 - 30cm tall, making sure there is at least some root attached, and plant them out into their permanent positions.

nwatta Grow in a rich soil in boggy pond margins or shallow water to 15cm deep[1, 200]. Succeeds in sun or part shade[200]. A very invasive plant spreading freely at the roots when in a suitable site, it is not suitable for growing in small areas[200]. Unless restrained by some means, such as a large bottomless container, the plant will soon completely take over a site and will grow into the pond, gradually filling it in. This species will often form an almost complete monoculture in boggy soil. Provides excellent cover for wildlife.

5.2.15 Allium canadense

Canadian Garlic, Meadow garlic, Fraser meadow garlic, Hyacinth meadow garlic

4 tlin 8 cyuc 4 kcaak 2 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjut hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Allium canadense is a BULB growing to 0.5 m (1ft 8in) 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 May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) 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 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].

kcaakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[46, 61, 62, 177]. It can be used as a vegetable, or as a flavouring in soups and stews, and can also be pickled[2]. The bulb is up to 30mm in diameter, it is crisp, mild and with a pleasant flavour[183]. Used as a leaf substitute according to one report[22], it is a garlic substitute according to others[55, 159, K]. Leaves - raw or cooked[55, 62, 177]. A delicious mild flavour, they are available from early spring until the autumn[K]. They make a very acceptable salad and can also be used as a greens or as a flavouring in cooked foods[K]. Flowers - raw. A little bit stronger flavour than the leaves, especially as the seeds begin to form, they can be used as a flavouring and garnish on salads[K]. Some forms of this species produce bulbils. These top-setting bul-

bils make a fine onion flavoured pickle[62, 105, 183]. They are said to have a superior flavour to other pickled onions[2].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]. The plant can be rubbed on exposed parts of the body to protect them from insect bites and the bites of scorpions, lizards etc[257].

dwatta Antiasthmatic Carminative Cathartic Diuretic Expectorant StimulantThe plant is antiasthmatic, carminative, cathartic, diuretic, expectorant and stimulant[257]. A tincture is used to prevent worms and colic in children, and also as a remedy for croup[257]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta N. America - New Brunswick to Minnesota, south to Florida and Colorado ksacta Sandy soils in low woods, thickets and meadows[43, 274].

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

nwatta Prefers a sunny position in a light well-drained soil[1]. A moisture loving plant according to another report[42]. The bulbs should be planted fairly deeply[1]. Bulbs grow to a good size under cultivation[183]. Some forms of this species produce many bulbils and are considered to be a pernicious weed in some areas of America[159], there is some risk that they could spread aggressively in Britain[203]. A. canadense mobilense. (Reg.)F.M.Ownb. is a form that does not produce bulbils and is much better behaved[200]. 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.

5.2.16 Quercus × schuettei

Schuette's oak

4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 18 m hkuc htut cyutli tucphja7n hwicli jutnyk hpa7tli prik hpa7tmwatli hjonli

drutta Quercus × schuettei is a deciduous Tree growing to 18 m (59ft) by 18 m (59ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista None Known

kcaakta Produces large, edible acorns that are low in tannins. Seed - cooked[101, 105, 161, 257]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[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.

5.2.3 Crataegus pedicellata

Scarlet Haw, Scarlet hawthorn

4 tlin 8 cyuc 5 kcaak 2 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattucphja7n hwicli hrasjutnykfrip hpa7tli flatprikliw 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.

kcaakta Edible Parts: FruitEdible 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].

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 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 out 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 -30C.

5.2.4 Crataegus missouriensis

4 tlin 8 cyuc 5 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyutli hgattucphja7n hwicli hrasjutnykfrip hpa7tli flatprikliw 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.

kcaakta Edible Parts: FruitEdible 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 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 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].

5.2.5 Quercus robur

Pedunculate Oak, English oak

4 tin 8 cyuc 4 kcaak 5 tcan 3 dwat 30 m hkuc hmimhtut cyuti hgattcuphja7n hwicli jlutnyikfrip hpa7ti flatprikliw 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].

kcaakta 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 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]. 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 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 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 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]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Quercus robur Pedunculate 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 shal-low 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 side 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 tortix moth[1]. This species is notably resistant to honey fungus[88, 200].

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. chryscarpa*[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].

5.2.13 Crataegus durobrivensis

Caughuawaga Hawthorn

4 tin 8 cyuc 4 kcaak 2 tcan 2 dwat 5 m hkuc hmimhtut cyuti hgattcuphja7n hwicli hrasjlutnyikfrip hpa7ti flatprikliwslip hpa7tmwatli xre7i 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.

kcaakta 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].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles,allets 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]. Scaringify 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].

5.2.14 Typha laxmannii

4 tin 8 cyuc 4 kcaak 0 tcan 1 dwat 1.5 m hkuc htut cyuti hja7nhs6w hwicli hrasjlutnyik hpa7ti flatprikliw hpa7tmwatli hjonli

drutta Typha laxmannii is a PERENNIAL growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcaakta Edible Parts: Flowers Leaves Pollen Root Seed StemEdible Uses: Roots - raw or cooked[2, 105]. They can be boiled and eaten like potatoes or macerated and then boiled to yield a sweet syrup. The roots can also be dried, ground into a powder and then used as a thickener in soups etc or added to cereal flours[183]. Rich in protein, this flour is used to make biscuits, bread, cakes etc. Young shoots in spring - raw or cooked. An asparagus substitute. Base of mature stem - raw or cooked. It is best to remove the outer part of the stem. Young flowering stem - raw, cooked or made into a soup. It tastes like sweet corn. Seed - cooked. The seed is rather small and fiddly to utilize, but has a pleasant nutty taste when roasted. An edible oil is obtained from the seed. Due to the small size of the seed this is probably not a very worthwhile crop[K]. Pollen - raw or cooked. A protein rich additive to flour used in making bread, porridge etc[183]. It can also be eaten with the young flowers, which makes it considerably easier to utilize. The pollen can be harvested by placing the flowering stem over a wide but shallow container

pared to 20 in *C. mollis*][202]. It is considered to be part of *C. mollis* by some botanists[229].

5.2.11 Crataegus succulenta

Fleshy hawthorn
4 tin 8 cyuc 4 kcaak 2 tcan 2 dwat 6 m hkuc
hmmihmtt cyutli hgatkycuctuphja7n hwicli hrasjlutnykfrp
hpa7tli flatprikwlisslp hpa7tmwatli xre7t hjonli
drutta *Crataegus succulenta* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardness. 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 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 - 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.

nvatta 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].

5.2.12 Crataegus mollis

Red Haw, Downy hawthorn
4 tin 8 cyuc 4 kcaak 2 tcan 2 dwat m hkuc
hmmihmtt cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli
flatprikwlisslp hpa7tmwatli xre7t hjonli
drutta *Crataegus mollis* is a deciduous Tree growing to 9 m (29ft) by 12 m (39ft) 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 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: FruitEdible Uses: TeaFruit - 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 HedgeThe 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 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 and Central N. America - Ontario to Alabama, west to Oklahoma. ksakta 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.

nvatta Landscape Uses:Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-

5.2.6 Quercus bicolor

Swamp White Oak
4 tin 8 cyuc 4 kcaak 3 tcan 2 dwat 25 m hkuc
hmmihmtt cyutli tucphja7n hwicli jlutnykfrp hpa7tli flat-
prikwlisslp hpa7tmwatli hjonli

drutta *Quercus bicolor* is a deciduous Tree growing to 25 m (82ft 0in) 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 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.

tcanta 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]. 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].

nrakta Eastern N. America - Quebec to Minnesota, Georgia and Arkansas. ksakta 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.

nvatta 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 lev-

els 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 American 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].

5.2.7 Crataegus holmesiana

Holmes' hawthorn
4 tin 8 cyuc 4 kcaak 0 tcan 2 dwat 10 m hkuc
hmmihmtt cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli
flatprikwlisslp hpa7tmwatli xre7t hjonli

drutta *Crataegus holmesiana* is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). 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 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. ksakta 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].

5.2.8 Crataegus douglasii

Black Hawthorn

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 9 m hkc hmimht cyuti hgattcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikwslip hpa7tmwatli xre7t hjonli

drutta Crataegus douglasii is a deciduous Tree growing to 9 m (29ft 6in). 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 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 bolts, 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 Poultice 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].

5.2.9 Crataegus acclivis

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 8 m hkc

hmimht cyuti hgattcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikwslip hpa7tmwatli xre7t hjonli

drutta Crataegus acclivis is a deciduous Tree growing to 8 m (26ft) by 7 m (23ft). See above for USDA hardness. 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: FruitEdible 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 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 - 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].

5.2.10 Crataegus submollis

Quebec Hawthorn

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 7 m hkc

hmimht cyuti hgattcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikwslip hpa7tmwatli xre7t hjonli

drutta Crataegus submollis is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardness. 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 sprout 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 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 - Quebec to Ontario, Massachusetts and New York. ksacta 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 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]. 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-

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

pista 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 Compost FibreThe hairs of the plant are mixed with wool and are used in making cloth[46, 61]. The roots are the source of 'Osmunda fibre', this was once widely used for potting orchids and other epiphytes[200]. Plants can be grown as a ground cover when spaced about 1 metre apart each way[208].

dwatta Astringent Diuretic Tonic VulneraryThe root is astringent, diuretic, tonic and vulnerary[4, 7, 21]. It is useful in the treatment of jaundice and removing obstructions of the viscera[4]. The fronds are used to make compresses for external application to wounds and rheumatic joints - for which purposes they are fairly effective[7]. An infusion of the fronds, combined with wild ginger roots (Asarum species) has been used in the treatment of children with convulsions caused by intestinal worms[257].

nrakta Europe, including Britain, from Norway south and east to N. Africa, Asia, N. and S. America. ksacta Swampy areas, fens and damp woodland[187].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, 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. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. An easily grown plant[4, 187], it prefers a soil of swamp mud and loamy or fibrous peat, sand and loam[1, 4]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Plants are hardy to at least -20°C, they are ever-green in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Transplants well, even when quite large[4]. Some named forms have been selected for their ornamental value[187]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms.

5.2.124 Salix aurita

Eared Sallow

4 tlin 8 cyuc 0 kcak 3 tcan 2 dwat 2.5 m hkuc
htut cyutli kyucitcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikhwis hpa7tmwatli nyanhjen hjonli

drutta Salix aurita is a deciduous Shrub growing to 2.5 m (8ft 2in). 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 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 Bees. The plant is not 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 and neutral soils. It cannot grow in the shade. It prefers dry moist or wet soil.

tcanta Basketry PioneerPlants have an extensive root system and are used to stabilize waste tips and old slag heaps[199]. 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]. Dynamic accumulator.

dwatta AnodyneFebrifugeThe 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, including Britain, from Norway south and east to Portugal, Black Sea, Crimea and Macedonia. ksacta Damp woods, heaths, rocks by streams and on moors etc, on light acid or slightly basic soils, to 780 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. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame.

nwatta 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]. Rarely thrives on chalk[200]. Thriving in the most adverse conditions, it is a useful plant for populating dry barren sites[199]. Closely related to *S. caprea* and *S. cinerea*[11]. 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]. When inhaled near to, a scent of white jasmine can be discerned from the flowers[245]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.125 Eupatorium cannabinum

Hemp Agrimony

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 1.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikhwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium cannabinum is a PERENNIAL growing to 1.5 m (5ft) 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 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, flies, beetles, 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. 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 Preservative RepellentThe leaves have been laid on bread in order to prevent it from becoming mouldy[4]. The leaf juice has been rubbed onto the coats of animals as an insect repellent[7].

dwatta Alternative Antitumor Chologogue Depurative Diaphoretic Diuretic Emetic Expectorant Febrifuge Homeopathy Laxative Purgative TonicHemp agrimony has been employed chiefly as a detoxifying herb for fevers, colds, flu and other viral conditions. It also stimulates the removal of waste products via the kidneys[254]. Due to its content of alkaloids, the plant should only be used under professional supervision[254]. The leaves and flowering tops are alterative, chologogue, depurative, diuretic, emetic, expectorant, febrifuge, purgative and tonic[4, 7, 9, 21, 46, 238]. The plant has a long history of use as a gentle laxative that does not provoke irritation[7], though excessive doses cause purging and vomiting[238]. A tea made from the dried leaves will give prompt relief if taken at the onset of influenza[4]. Recent research has shown that the plant might have anti-tumour activity, though the plant also contains pyrrolizidine alkaloids that can cause damage or cancer to the liver[238]. The plant is harvested in the summer and dried for later use[7]. The roots are diaphoretic, laxative and tonic[7]. They are

spring when the leaves are just beginning to shoot, and then dried[4]. It is much used, both internally and externally, in the treatment of internal and external bleeding, diarrhoea, dysentery, cholera etc[4, 9, 13, 21, 147, 165, 172]. It is also taken internally in the treatment of a wide range of complaints including catarrh, cystitis, irritable bowel syndrome, peptic ulcers, ulcerative colitis and excessive menstruation[238, 254]. Externally, it makes a good wash for small burns and wounds, and is used to treat pharyngitis, stomatitis, vaginal discharge, anal fissure etc[238, 254]. A mouth wash or gargle is used to treat spongy gums, mouth ulcers and sore throats[254]. The leaves are astringent and have a great reputation in the treatment of wounds[4]. In Chinese medicine the rhizome is used for: epilepsy, fever, tetanus, carbuncles, snake and mosquito bites, scrofula and cramps in hands and feet [301]. Considered useful in diabetes [301].

nrakta Northern and central Europe, including Britain, mountains of S. Europe, western and central Asia. ksacta Damp meadows and by water, especially on acid soils[13, 17].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. 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 Landscape Uses:Container, Ground cover. Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. The plant repays generous treatment[1]. A very cold-hardy plant, tolerating temperatures down to at least -25°C[187]. Bistort was formerly cultivated as a medicinal and edible plant[4], though it has now fallen into virtual disuse. Plants are somewhat spreading, forming quite extensive colonies[187] especially in low-lying pastures[4]. They seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Edible, Not North American native, Invasive, Suitable for cut flowers, Suitable for dried flowers. 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].

5.2.39 Cardamine pratensis

Cuckoo Flower

4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikhwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine pratensis is a 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 flower from April to June, and the seeds ripen from May to July. 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. 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: Flowers LeavesEdible Uses: Leaves and young shoots - raw or cooked[2, 5, 12, 52, 115]. Rich in vitamins and minerals[268], especially vitamin C[238], but with a bitter and pungent flavour[27]. The leaves and young shoots are harvested in the spring and taste rather like water cress[9]. The leaves can be available early in the year[K] and when used in small quantities make a very acceptable addition to salads[183, K]. Flowers and flower buds - raw. A pungent cress-like flavour[183, K]. The white flowers are very attractive, they make a pleasant nibble and also add a delicious flavour to salads[K].

tcanta Attracts wildlife.

dwatta Antirheumatic Antiscorbutic Antispasmodic Carminative Digestive Diuretic Stimulant Vitamin C Cuckoo flower is seldom used in herbalism, though an infusion of the leaves has been used to treat indigestion and promote appetite[268]. The leaves and the flowering plant are antirheumatic, antiscorbutic, antispasmodic, carminative, digestive, diuretic, stimulant[9, 146, 172, 238, 240]. They are used internally in the treatment of chronic skin complaints, asthma and hysteria[238]. The plant is harvested in spring and early summer and is best used when fresh[9, 238].

nrakta Most of Europe, including Britain, N. Asia and N. America. ksacta Moist, slightly shady places in meadows and by streams[13, 31, 187], usually in acid soils[9].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in spring or autumn[238]. The plant produces young plants at the base of its leaflets. When large enough, these can be easily separated from the main plant and grown on as individual plants[K].

nwatta Succeeds in most soils[1, 111] so long as they are moist or wet[187, 188]. Prefers a cool damp soil[111]. Succeeds in full sun or partial shade[238]. Cuckoo flower was at one time much used as a spring salad plant and was often sold in local markets. It has, however, fallen out of favour and is scarcely used at present[268]. A polymorphic species[17]. A very ornamental plant, non-invasive and well suited to the wild garden though it may require protection from wood pigeons who eat out the young buds in spring[187]. It grows well in the spring meadow[24]. A food plant for the orange tip butterfly[24]. There is at least one named variety, selected for its ornamental value. 'Flora Pleno' is a double flowered form[187]. 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]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.40 Lycopus uniflorus

Bugleweed, Northern bugleweed

4 tin 8 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta Lycopus uniflorus is a PERENNIAL growing to 0.3 m (1ft). 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, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: RootEdible Uses: Root - raw or cooked[55, 61, 62, 105, 161]. The roots were a staple food for some native North American Indian tribes[257]. The crisp white tubers can be eaten raw in salads or cooked in soups etc[183]. When boiled for a short time they are said to make an agreeable vegetable, somewhat like Chinese artichokes (*Stachys affinis*)[183].

dwatta Antitussive SedativeThe whole plant is antitussive and sedative[61].

nrakta N. America - Newfoundland to British Columbia, North Carolina, Nebraska and Oregon ksacta Low, wet or boggy ground in the north of its range, wet woodland in the south[43].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238].

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 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 the country. This species might be no more than a synonym for *L. virginicus*, a species known to be hardy in Britain. The following notes are based on the general needs of the genus. Tolerates most soil types so long as they are wet. Succeeds in damp meadows or in wet places by ponds or streams[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 a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.41 *Peltandra virginica*

Green Arrow Arum

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.3 m hkuc htut cyutli hja7nhs6s hwicli hrasljutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta *Peltandra virginica* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. 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. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista The plant is rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of tiny needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant[95].

kaakta Edible Parts: Flowers Root SeedEdible Uses: Seed - cooked. A slightly sweetish flavour, resembling parched corn[183]. A bread can be made from the dried and powdered seeds, it tastes like corncake with a strong flavour of cocoa[183]. Spadix (the flowering stem) and berries - cooked[2, 46, 61, 105]. A great delicacy, but they must be very well cooked otherwise they are poisonous[207]. The Indians would boil them for 9 hours[207]. Root - must be well cooked in order to destroy an acrimonious principle, see the notes above on toxicity[95]. The root is rich in starch[2, 46, 57, 61, 105] and can weigh up to 2.7 kilos[95]. It is highly astringent and has an unpleasant flavour[159]. The root can be dried and ground into a powder for use when making bread, soups etc[207].

nrakta Eastern N. America - Maine to Ontario, Michigan, Florida, Louisiana and Missouri. ksacta Swamps, borders of ponds and slow streams[1, 43].

propta Seed - best sown as soon as it is ripe in late summer in pots of soil that are submerged to their rims in water[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water 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]. 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. Stem cuttings rooted in wet mud in the summer[200].

nwatta Requires a wet lime-free humus-rich soil by the side of water or in shallow still or slowly flowing water in a sunny position[200]. Plants are best grown in clumps[1].

5.2.42 *Glyceria fluitans*

Floating Manna Grass, Water mannagrass

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.5 m hkuc htut cyutli hja7nhs6s hwicli hrasljutnyik hpa7tli frusflatprik-wisslip hpa7tmwatli xre7t hjonli

drutta *Glyceria fluitans* 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 from May to August. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kaakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[43, 57, 100]. A sweetish taste, the seed was considered a delicacy in some parts of Europe and was an article of commerce until well into the 20th century[183]. A flour from the seed is said to make a bread little inferior to wheat bread, the flour can also be used as a thickener in soups etc when it imparts a sweet delicate flavour[183]. Unfortunately, the seed is very small and therefore the plant is relatively unproductive[K].

tcanta IncenseThe leaves have been burnt as an incense[257].

nrakta Europe, including Britain, temperate Asia the Caucasus and N. America. ksacta Shallow water, either stagnant or slow flowing, or in wet soils whether acid or calcareous[17].

propta Seed - sow spring in a greenhouse in a pot standing in 3 - 5cm of water. Surface sow the seed, or only just cover it. Germination should take place within 3 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. If you have sufficient seed then it can be sown outdoors in situ in mid to late spring. Division in spring. 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 Historic Staple Management: Standard Staple Crop: Balanced carbSucceeds in most soils, so long as they are wet, and in shallow water[115]. Dislikes shade. This plant is occasionally cultivated for its edible seed[115], it is not very large and is somewhat fiddly to harvest but is considered to be an epicure's food[183].

5.2.43 *Picea glehnii*

Sakhalin Spruce

4 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 30 m hkuc htut cyutli tcuphja7n hwicli hysihrasljutnyikfrip hpa7tli frusflatprikslip hpa7tmwatli hjonli

drutta *Picea glehnii* is an evergreen Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, 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 and nutritionally poor soils. Suitable pH: mildly acid and neutral soils and can grow in very acid and very 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 cannot tolerate atmospheric pollution.

kaakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta WoodWood - beautifully grained. Used for pianos, violins, interiors of buildings etc[46, 61]. It is also valued for its use in the pulp industry to make paper[171].

nrakta E. Asia - N. Japan. ksacta Bogs in N. and C. Japan[58]. It is also found on very alkaline serpentine rocks.

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably

in the wild[229]. A good bee plant, providing an early source of nectar[11]. Trees are impatient of root disturbance and should be moved regularly before being planted in their permanent positions, which is best done whilst the plants are young[11]. The root system is rather aggressive and can cause problems with drains[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.121 *Chamaecyparis thyoides*

White Cypress, Atlantic white cedar, Coast White Cedar, Southern White Cedar, White Cypress
4 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli kyucutcuphja7n hwicli hrasljutnyikfrip hpa7tli frusflatprikwisslip hpa7tmwatli 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.

5.2.122 *Cephalanthus occidentalis*

Button Bush, Common buttonbush, Button Willow, Honey Bells, Buttonbush
4 tlin 10 cyuc 0 kcaak 0 tcan 2 dwat 7 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta *Cephalanthus occidentalis* is a deciduous Shrub growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The leaves contain glucosides and can be toxic in large doses. Symptoms include vomiting, convulsions, chronic spasms and muscular paralysis[274].

tcanta WoodWood - light, tough. Of no commercial value[229].

dwatta Astringent Diaphoretic Diuretic Dysentery Emetic Febrifuge Laxative Malaria Odontalgic Ophthalmic TonicButton bush was often employed medicinally by native North American Indian tribes who used it to treat a range of ailments[257]. It is little used in modern herbalism. A tea made from the bark is astringent, emetic, febrifuge and tonic[61, 222]. A strong decoction has been used to treat diarrhoea and dysentery, stomach complaints, haemorrhages etc[257]. It has been used as a wash for eye inflammations[222]. A decoction of either the roots or the fruits have been used as a laxative to treat constipation[257] The leaves are astringent, diaphoretic, diuretic and tonic[61, 222]. A tea has been used to check menstrual flow and to treat fevers, kidney stones, pleurisy etc[222]. The plant has a folk reputation for relieving malaria[222]. The inner bark has been chewed in the treatment of toothaches[222].

nrakta Eastern N. America - Nova Scotia to Florida, west to Minnesota and California ksacta A lowland species, growing along the edges of streams, rivers, lakes, swamps and wet floodplains[229].

propta Seed - we have no details on this plant but would suggest sowing the seed as soon as it is ripe in an acid compost in a cold frame. 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 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. Cuttings of soft or semi-ripe wood, July in a frame[200]. Layering.

nwatta Landscape Uses:Border, Massing. An easily grown plant[1], it prefers an open position in a moisture retentive or wet neutral to acid humus-rich soil[200]. Dislikes dryness at the roots[11]. A calcifuge plant, it dislikes alkaline soils[200]. Requires a sunny position[184]. Plants are hardy to about -25°C[184]. A fast-growing but short-lived species in the wild[229]. The flowers, and the dried leaves, have a good sweet fragrance like newly mown hay[245]. A good bee plant[149]. Plants are sometimes evergreen[200]. Special Features:North American native, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms.

5.2.123 *Osmunda regalis*

Royal Fern, Flowering Fern

4 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli frusflatprikwis hpa7tmwatli hjonli

drutta *Osmunda regalis* is a FERN growing to 2 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The seeds ripen from June to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can

kcakta Edible Parts: RootEdible Uses: CoffeeRoot - yields an edible starch[2, 105, 177, 183]. Caution is advised, see the notes above on toxicity. Roasted and ground seed is a coffee substitute[46, 61, 183, 257].

tcanta DyeA dye is obtained from the petals, but the colour is not specified[257].

dwatta LaxativeA decoction of the root is used as a laxative[257].

nrakta Northwestern N. America, coastal regions of E. Asia to Japan. ksacta Wet peaty meadows, riversides and open woods, sometimes also in brackish bogs[187].

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 September after flowering. 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, Massing, Specimen. Prefers a well-drained moist soil[79] but succeeds in most soils[42]. Dislikes lime and dry soils[42, 79]. The form from N. Hokkaido does not require an acid soil[187]. Cultivated for its edible root in Japan[2]. Many named forms have been selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features:Attractive foliage, North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers.

5.2.119 Taxodium distichum

Swamp Cypress, Bald cypress, Common Bald Cypress 4 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikwlwissliphsom hpa7tmwatli hjonli

drutta Taxodium distichum is a deciduous Tree growing to 30 m (98ft) by 8 m (26ft) 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 Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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 or wet soil and can grow in water. It can tolerate atmospheric pollution.

tcanta Fibre WoodThe bark has been used to make cordage[257]. Wood - light, soft, not strong, moderately hard, easily worked, straight grained, very durable in damp soil, takes a good polish. It weighs 28lb per cubic foot[227]. The wood is not given to excessive warping or shrinking[227], it is used for construction, water pipes, vats etc[1, 46, 61, 82, 149, 171, 227].

dwatta AnalgesicThe resin in the cones is used as an analgesic for wounds[149, 227].

nrakta South-eastern N. America - New Jersey to Florida and Texas. ksacta Wet sites that are under water at least part of the year[82], and often overlying calcareous soils[43]. Often found where the water is brackish[200].

propta Seed - sow 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 at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If sowing a lot of seed you could sow it in early spring in an outdoor seedbed[78]. Allow the plants to grow on in the seedbed for two years and then plant them into their permanent positions in late autumn or early spring. Cuttings in the late summer.

nwatta Landscape Uses:Firewood, Pest tolerant, Massing, Screen, Specimen, Street tree. Although this plant can be grown in wet soils and shallow water, it thrives in any soil and trees actually grow faster in normal unflooded soils[81]. Established plants succeed in standing water up to 60cm deep[200] - in such a situation the roots develop 'knees', curious cone-shaped structures that grow above the

ground[227]. Tolerates the high pH of chalk streams[200]. Tolerates atmospheric pollution[200]. Fairly cold-tolerant, but branches can be damaged by temperatures below -10°C[200]. A fairly vigorous tree, it can grow up to 45cm in a year with up to 4cm increase in girth[185]. It has been planted for its timber in S. Europe, especially on alluvial soils[50]. Buds often begin to break in March, but trees do not come properly into leaf until June and growth in height rarely starts before June[185]. A very healthy species in Britain, rarely seen in anything but good health. It seems to be a very long-lived tree in this country with several specimens more than 250 years old[185]. Trees are thought to live for over 1,000 years in the wild[227]. Plants grow best in areas with warm summers[200]. They only produce fertile seeds after long hot summers[200]. The branches are brittle and subject to wind damage, but the tree usually recovers well[81]. Unlike most conifers, this species responds well to coppicing[81]. Special Features:North American native, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms.

5.2.120 Salix amygdaloides

Peach Leaved Willow

4 tlin 8 cyuc 0 kcak 3 tcan 2 dwat 20 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix amygdaloides 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 and is not frost tender. It is in flower in 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry Charcoal Dye Pioneer Soil stabilization Tannin WoodThe bark is a source of tannin[226]. A light brown dye is obtained from the bark[226]. The young stems are very flexible and can be used in basket making[257]. 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 tenacious root system of this tree makes it very useful for preventing soil erosion along the banks of rivers etc[226]. It is also a good pioneer species, readily invading any cleared-out area if there is sufficient moisture[226, 229]. It is short-lived and not very shade tolerant and so, having provided good conditions for other woodland trees to become established, it is eventually out-competed by them[K]. Wood - light, close-grained, soft, weak[82, 226, 229, 235]. It weighs 28lb per cubic foot[235]. It is sometimes cut for timber which is used for fence posts, but its uses are mainly limited to charcoal and firewood[226, 229]. Dynamic accumulator.

dwatta Anodyne Antispasmodic Astrigent FebrifugeAn infusion of the bark shavings has been used in the treatment of diarrhoea and stomach ailments[257]. A poultice of the bark has been applied to bleeding cuts[257]. A decoction of the branch tips has been used as a soak for treating cramps in the legs and feet[257]. 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 N. America - British Columbia to New York, south to Texas. ksacta Along muddy streambanks and in low wet woods bordering rivers, to 2100 metres[229].

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 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]. Rarely thrives on chalk[200]. A fast-growing but relatively short-lived species

best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. 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 winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semi-ripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Another report says that it grows wild on very alkaline soils so it might be suitable for cultivation on alkaline soils. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Fairly fast growing in Britain, able to average 30cm a year for at least the first 50 years[185]. Another report says that it is not a good grower in Britain[1]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Special Features: Inconspicuous flowers or blooms.

5.2.44 Picea omorika

Serbian Spruce

4 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 25 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikwlwisslip hpa7tmwatli hjonli

drutta Picea omorika is an evergreen 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 5 and is not frost tender. It is in leaf all year; in flower in May, 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very 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 cannot tolerate atmospheric pollution.

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

tcanta Shelterbelt WoodModerately wind resistant, it is sometimes planted in shelterbelts. Wood. It is valued for its use in the pulp industry to make paper[171].

nrakta Europe - Serbia. ksacta Plants are confined to a few stands on limestone mountains[11].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. 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 winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They

might need protection from spring frosts. Cuttings of semi-ripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6 but it also succeeds in pure chalk soils[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are a number of named forms selected for their ornamental value, most of these are dwarf cultivars[200]. A fast growing tree from its second year of growth. Two to three years after planting out new shoots 1 metre long may be produced[185]. Growth takes place from mid-May to the end of July. Height increase is moderate over a long term basis, averaging around 50cm a year[185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Occasionally planted as a timber tree in Britain, it produces almost the same bulk of timber as the Norway spruce (*Picea abies*) but is more frost tolerant and can be grown in frosty hollows[185] because it comes into leaf quite late and it is not damaged by late frosts[11]. This species is widely cultivated as a timber tree in regions too dry or liable to late frosts for *P. sitchensis* to do well[200]. This species is notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

5.2.45 Crataegus crus

Cockspur Thorn, Cockspur hawthorn, Dwarf Hawthorn

4 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hगतkyuctcuphja7n hwicli hrasjlutnyikrip hpa7tli flatprikwlwisslip 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 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 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]. 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.

5.2.46 *Crataegus phaenopyrum*

Washington Thorn, Washington Hawthorn
4 tin 8 cyuc 2 kcak 0 tcan 2 dwat 10 m hkuc
hminhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwssip 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 a tea 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.

5.2.47 *Malus florentina*

Hawthorn-leaf crab apple

4 tin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc
hminhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis 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

The spores germinate immediately, the highly developed prothallus remains inside the large seed-like spores. The gametophyte generation is completed in 24 hours and the first roots and shoots appear in 2 - 3 days. Mature plants bearing sporocarps can develop in as little as 3 months[200]. Spore germination in the family occurs after rupture of the sporocarp wall allows the sporocarp contents to be hydrated. A gelatinous structure emerges from the sporocarp, breaking it into valves and carrying the spori into the water. Spore germination (gametophyte growth) and fertilization occur immediately[270]. Division.

nwatta Requires a permanently moist or wet soil, it can be grown by the side of ponds etc or in the shallow edges of the pond[56]. Thrives in a turfy loam or in peat[1]. Hardy to about -15°C[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.115 *Cardamine raphanifolia*

4 tin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc
pcimhmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta *Cardamine raphanifolia* is a PERENNIAL growing to 0.5 m (1ft 8in). 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, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: We have no information on the edibility of this plant but the leaves are almost certainly edible[K].

tcanta Plants can be grown as a ground cover, making a fairly good carpet in a moist position[208].

nrakta Europe - France, Spain and Italy. Occasionally established in Britain. ksacta Damp places and streamsides in mountains.

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in moist soils that are not dry[1]. Plants are closely related to *C. pratensis*[17].

5.2.116 *Polygonum lapathifolium*

Curlytop Knotweed

4 tin 8 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc
hminhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Polygonum lapathifolium* is a ANNUAL growing to 0.8 m (2ft 7in). 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. 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 Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. 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: Leaves SeedEdible Uses: Young leaves - raw or cooked[105, 177]. Seed - raw or cooked. It is rather small and fiddly to utilize.

tcanta SoapThe plant produces a soft white mass, a froth like that of soap. It is used for bathing and washing clothes[272].

dwatta Antiseptic Astringent Febrifuge StomachicThe whole plant is antiseptic and astringent[178]. An infection has been used in the treatment of stomach complaints and fevers[257]. The plant produces a soft white mass, a froth like that of soap. It is applied externally to burns[272].

nrakta Temperate regions of the northern hemisphere, including Britain. S. Africa. ksacta Swampy thickets, shores, damp clearings and cultivated fields in N. America[43].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233].

5.2.117 *Eleocharis palustris*

Common Spike-Rush, Common spikerush

4 tin 8 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc
hminhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Eleocharis palustris* 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. It is in flower from May to July, 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: SapEdible Uses: Sap eaten[257]. No more information is given.

tcanta Bedding StuffingThe plant has been used as bedding, for stuffing pillows and to make a pad for sitting on[257].

nrakta An almost cosmopolitan plant, found in most regions of the world including Britain. ksacta Marshes, ditches and the margins of ponds throughout Britain[17].

propta Seed - surface sow in the spring in pots standing in shallow water. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Prefers slightly acid conditions, growing well in shallow water or muddy ground[200]. A very variable species, it is divided into a number of sub-species by some botanists[257].

5.2.118 *Iris setosa*

Beachhead Iris, Canada beachhead iris, Wild flag

4 tin 8 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc
hminhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatprikhsom hpa7tmwatli fyixre7t hjonli

drutta *Iris setosa* 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 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) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in saline 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: LeavesEdible Uses: The buds and young plants are cooked and used as a famine food[177, 179]. Caution is advised because they contain a toxic alkaloid[179].

nrakta E. Asia - Japan. ksacta Wet places in lowland and mountains all over Japan[58].

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[11]. 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 Requires a wet soil[1].

5.2.112 Lysimachia nummularia

Creeping Jenny, Moneywort, Creeping Charlie
4 tin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasljutnyikfrp
hpa7tli flatprikliwv hpa7tmwatli fyfixre7t 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: TeaA 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 VulneraryThe 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[11] 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.

5.2.113 Astilbe chinensis

Pumila Spirea,Chinese Astilbe
4 tin 8 cyuc 1 kcak 3 tcan 0 dwat 0.7 m hkc
hmim cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatprikliwv
hpa7tmwatli xre7t hjonli

drutta Astilbe chinensis is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots[177]. No more details are given.

tcanta Landscape Uses: Border, Container, Massing, Rock garden, Woodland garden. There are some named varieties, selected for their ornamental value[233]. A first class ground cover plant, the lower-growing cultivar 'Pumila' is particularly recommended[233]. Special Features:Attractive foliage, Suitable for dried flowers. Dynamic accumulator.

nrakta E. Asia - E. China, Japan, Korea. ksacta Damp woods and along shady streams[187]. Open broad-leaved forests, forest edges and amongst shrubs[74]. Forests, forest margins, meadows, valleys and riversides, 400 - 3600 metres[266].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in early spring. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 20cm tall. Plant them out in the summer, or late in the following autumn. Division in spring. This is best done every 3 - 4 years in order to maintain the vigour of the plant[200]. 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 Prefers a rich garden soil, but succeeds in most soils so long as they stay reliably moist in the summer[1, 233]. Requires a wet or moist peaty soil in sun or partial shade[187], growing well under shrubs[233]. Prefers a pH in the range 5.5 to 7[200]. Prefers partial shade[200], especially if the soil is on the dry side[233]. Plants are hardy to about -20°C[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. There are some named varieties, selected for their ornamental value[233].

5.2.114 Marsilea quadrifolia

Water Clover, European waterclover
4 tin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasljut hpa7tli flatprikliwv hpa7tmwatli hjonli

drutta Marsilea quadrifolia is a FERN growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy) and medium (loamy) 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 and can grow in water.

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 SeedEdible Uses: Young stems and leaves[105, 145]. A famine food, only used in times of scarcity[218]. The spores are produced in a sporocarp (like a fairly large container) and in allied species this is ground up and mixed with flour etc and used in making bread etc. It is rich in starch[144].

dwatta Antidote Antiphlogistic Depurative Diuretic Febrifuge SkinA juice made from the leaves is diuretic and febrifuge[218]. It is also used to treat snakebite and applied to abscesses etc[218]. The plant is anti-inflammatory, diuretic, depurative, febrifuge and refrigerant[147, 178, 218].

nrakta C. Europe to Asia. ksacta Ponds and paddy fields all over Japan[58].

propta Spores. The plant produces sporocarps, these need to be lightly abraded and then immersed in water. The sporocarps will then swell and burst to release the spores.

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 bleets 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].

5.2.48 Crataegus sanguinea

4 tin 8 cyuc 2 kcak 0 tcan 2 dwat 6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprikliwv 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: FruitEdible 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 HedgeVery tolerant of trimming, it can even be cut right back into the old wood and will soon recover. 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 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 - 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].

5.2.49 Crataegus jonesiae

Miss jones' hawthorn
4 tin 8 cyuc 2 kcak 0 tcan 2 dwat 6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprikliwv 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 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. 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. chrysocharpa* 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].

5.2.50 *Crataegus canbyi*

Cockspur hawthorn, Dwarf Hawthorn, Cockspur Hawthorn 4 tin 7 cyuc 2 kcaak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli hgatkyuctuphja7n hwicli hrasjlutnyikfrjp hpa7tli flatprikliwslipp 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 to be efficacious[222]. It is normally used either as a tea or a tincture[222].

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.

5.2.51 *Vaccinium amoenum*

Large-Cluster Blueberry 4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcuphja7n hwicli hraslut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta *Vaccinium amoenum* is a deciduous Shrub growing to 4 m (13ft 1in). 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. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid 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.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is about 8mm in diameter[200].

nrakta South-eastern N. America. ksacta Acid bogs, meadows, woods and thickets[72].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their

gins and can be use fresh or dried, in an infusion or as a tincture[4, 238].

nrakta N. America - Newfoundland to British Columbia, south to Florida, Texas, Utah and California. ksacta Low moist or wet places[222, 274].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. 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 damp meadows or in wet places by ponds or streams[200].

5.2.108 *Ranunculus aquatilis*

Water Crowfoot, White water crowfoot 4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Ranunculus aquatilis* is a ANNUAL/PERENNIAL. 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 Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 and can grow in water.

pcista All parts of the plant are poisonous when fresh, the toxins are destroyed by heat or by drying[4, 10, 19, 21, 65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: LeavesEdible Uses: The entire plant has been boiled and eaten[257]. Some caution is advised, see the notes above on toxicity.

dwatta Antiarthmatic Antirheumatic FebrifugeThe subspecies *R. aquatilis capillaceus* is used in India in the treatment of intermittent fevers, rheumatism and asthma[240].

nrakta Most of Europe, including Britain. ksacta Ponds, ditches and streams throughout lowland Britain[17].

propta Seed - sow spring in a tray of water 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. 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 A plant of boggy soils and shallow water, it prefers a loamy soil and a sunny position. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.109 *Veronica beccabunga*

Brooklime, European speedwell 4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Veronica beccabunga* is a PERENNIAL 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 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 Flies, bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 4, 5, 115]. They can be added to salads, mixed with water cress or cooked with other strongly flavoured greens[9, 183]. A pungent flavour, although the leaves are wholesome they are not very palatable[4, 12].

dwatta Alterative Antiscorbutic Diuretic Emmenagogue Febrifuge PouliticeThe whole plant is alterative, antiscorbutic, very mildly diuretic, emmenagogue and febrifuge[4, 9, 13, 21]. It is of little benefit as a medicinal herb, but has a beneficial laxative effect when included in the diet[9]. The leaves are used in the treatment of scurvy, impurity of the blood etc[240]. The plant is bruised and applied externally as a politic on burns, ulcers, whitlows, etc[240].

nrakta Europe, incl Britain, from Norway south and east to N. Africa, temperate Asia to Japan and Himalayas ksacta In streams, ditches, ponds and wet places in meadows, in acid or alkaline soils[9, 17].

propta Seed - sow 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. If you have sufficient, the seed can be sown in situ in the spring or the autumn. Division at almost any time in the growing season. Very easy, even a small part of the plant will root if put in water[K].

nwatta Easily grown in a moderately fertile wet soil, growing best in water up to 15cm deep[24, 200]. Prefers cool summers[200]. Plants do not demand high light levels[200]. A good bee plant[24].

5.2.110 *Mertensia paniculata*

Tall bluebells, Alaska tall bluebells, Northern bluebells, Eastwood's bluebells

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mertensia paniculata* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained 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: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America - Hudson Bay to Alaska, south to Michigan, Nebraska, Idaho and Washington. ksacta Woods, moist meadows, damp thickets, wet cliffs, riverbanks, dry slopes and burn areas from the foothills to high elevations in the mountains[60, 172].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. 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, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111]. Prefers a deep moist but well-drained humus-rich soil in sun or semi-shade[200]. If the plant is cut down after flowering, it will normally produce another flush of flowers[233]. A very ornamental plant[233], it grows well in open woodland[200].

5.2.111 *Lobelia sessilifolia*

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lobelia sessilifolia* is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 plant contains a toxic alkaloid[179]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Antipruritic GalactogogueThe plant is galactogoue[257]. An infusion has been used to increase the milk flow of nursing mothers[257]. An infusion of the powdered root has been used to relieve the itching caused by smallpox and measles[257].

nrakta South-western N. America - Oregon to New Mexico. ksacta Streambanks, wet meadows, damp thickets and wet cliffs from the foothills to high elevations in the mountains[60, 172].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. 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, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111]. Requires a moist peaty soil in full sun or light shade[187]. Plants are hardy to about -20°c[187]. A very ornamental plant[1].

5.2.105 Iris sibirica

Siberian Iris

4 tin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli fyfxre7t 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.

5.2.106 Polygonum coccineum

Water Smartweed

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Polygonum coccineum is a PERENNIAL growing to 0.5 m (1ft 8in). 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. 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: Leaves SeedEdible Uses: Young shoots - cooked[46, 61, 105]. Used in the spring[161]. Seed - raw or cooked. It is rather small and fiddly to utilize.

nrakta Western N. America - Quebec to California. ksacta Ponds and damp ground by streams, lakes etc[43].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. 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 A water plant, succeeding in shallow water or a bog garden[200]. Tolerates most soils but repays generous treatment[1]. The stems of this plant root at the nodes wherever they come into contact with the soil[200]. Plants seem to be immune to the predations of rabbits[233].

5.2.107 Lycopus americanus

Water Horehound, American water horehound

4 tin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Lycopus americanus is a PERENNIAL growing to 0.5 m (1ft 8in). 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 Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: RootEdible Uses: Root - raw or cooked[207]. This contradicts with the report in [200] that the plant does not form tubers on its rhizomes.

tcanta DyeThe juice gives a permanent colour to linen and wool and does not wash out[207]. The colour is not mentioned[K].

dwatta Astringent Narcotic SedativeThe whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 102, 222, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[222, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. It should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering be-

permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. This species is closely related to *V. virgatum*[1]. Plants in this genus are notably resistant to honey fungus[200].

5.2.52 Crataegus rivularis

River Hawthorn

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta 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 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 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[227].

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 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].

5.2.53 Crataegus uniflora

Dwarf hawthorn

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus uniflora 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 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].

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 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].

5.2.54 Crataegus jackii

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikklwissip hpa7tmwatli xre7t hjonli

drutta 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].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen in 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].

5.2.55 Cirsium palustre

Marsh Thistle

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli fyfxre7t hjonli

drutta Cirsium palustre is a BIENNIAL growing to 1.5 m (5ft) by 0.4 m (1ft 4in). 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 August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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.

kcakta Edible Parts: Leaves Oil StemEdible Uses: Oil-Leaves and young shoots - raw or cooked[52, 100, 183]. Stems - raw or cooked like asparagus or rhubarb[4, 5, 12, 52, 105, 115]. The flower stalks are peeled and eaten raw or cooked[183].

tcanta Oil TinderThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta Europe, including Britain, from Scandinavia south and west to N. Africa and W. Asia ksacta Damp soils in meadows and woodland[5, 17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°c[164].

nwatta An easily grown plant, it succeeds in a sunny position in any ordinary garden soil so long as it is moist[200]. Tolerant of light shade, succeeding in woodlands[17]. A good bee and butterfly plant[17].

5.2.56 Sparganium erectum

Bur Reed, Simplestem bur-reed

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc pcmhmimhtut cyutli hja7hns6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Sparganium erectum 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 5 and is not frost tender. It is in flower from June 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in

hmimhtut cyutli tucphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis 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.

5.2.102 Polygonum amphibium

Willow Grass, Water knotweed, Longroot smartweed, Water smartweed

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli hja7hns6s hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Polygonum amphibium is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. 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: Leaves SeedEdible Uses: Leaves - raw or cooked. The young shoots are eaten in the spring[257]. Seed - cooked[178]. It is rather small and fiddly to utilize.

tcanta TanninTannin is obtained from the plant[145]. No more details, but it is likely to be from the root.

dwatta Astringent Depurative Pectoral Poultrice SkinThe whole plant, but especially the root, is astringent, depurative, skin[145, 172, 178, 207]. An infusion of the leaves and stems has been used to treat stomach pains and children with diarrhoea[257]. The root has been eaten raw, or an infusion of the dried, pounded roots used, in the treatment of chest colds[257]. A poultice of the fresh roots has been applied directly to the mouth to treat blisters[257].

nrakta Most of Europe, including Britain, temperate Asia, N. America and S. Africa. ksacta Lakes, ponds, slow-flowing rivers and canals, also on banks by the river[17, 187].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. 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 A water or marsh plant growing in water up to 3 metres deep or in boggy soil[187]. This species is hardy to about -25°c[187]. Plants seem to be immune to the predations of rabbits[233]. The leaves are often attacked by the larvae of the water-lily beetle[187]. Plants can either be aquatic with floating ovate-oblong leaf-blades or a leggy marsh plant with lanceolate leaves[187]. Their stems root at the nodes wherever they come into contact with the soil[200].

5.2.103 Mertensia oblongifolia

Oblongleaf bluebells

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Mertensia oblongifolia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America. ksacta Open slopes and drier meadows, often amongst sagebrush, from the plains and foothills to moderate elevations in the mountains, occasionally to the alpine zone[60].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. 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, with care, in early spring or autumn[200].

nwatta Succeeds in an ordinary garden soil with some shade[1, 111]. A rather difficult plant to grow, it is best in a moist position[1].

5.2.104 Mertensia ciliata

Mountain Bell, Tall fringed bluebells

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Mertensia ciliata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

or partial shade[187, 200]. Hardy to about -20°C[187]. A very ornamental plant[1].

5.2.98 *Salix brachycarpa*

shortfruit willow
4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 1.4 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprk hpa7tmwatli nyanhjen hjonli

drutta *Salix brachycarpa* is a deciduous Shrub growing to 1.4 m (4ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

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 - not very palatable[172].

tcanta ShelterbeltA salt tolerant coastal plant, it can be grown as part of a shelterbelt[200]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 N. America - Canada to Oregon. S. Greenland. ksakta Found in a wide range of habitats, including saline, calcareous and serpentine, from lowland to alpine elevations[204].

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 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]. Rarely thrives on chalk[200]. Very tolerant of maritime exposure[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.99 *Lycopus europaeus*

Gypsywort
4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli fyifxre7t hjonli

drutta *Lycopus europaeus* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is 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, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 and can grow in water.

pcista Known to cause the enlargement of the thyroid gland. Avoid in patients with thyroid disease or given concomitantly with thyroid therapy. Avoid during pregnancy [301].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. A famine food, it is only used when all else fails[179].

tcanta Dye MiscellanyA black dye is obtained from the plant[4, 100]. It is said to give a permanent colour and was also used by gypsies in order to darken the skin[4].

dwatta Astringent Miscellany Poulitice SedativeThe fresh or dried flowering herb is astringent and sedative[4]. It inhibits iodine conversion in the thyroid gland and is used in the treatment of hyperthyroidism and related disorders[9]. The whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[9, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. The leaves are applied as a poultice to cleanse foul wounds[240]. This remedy should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be used fresh or dried, in an infusion or as a tincture[4, 238]. Current uses are predominantly for increased activity of the thyroid gland and for premenstrual syndrome symptoms such as breast pain [301]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Lycopus* for nervousness and premenstrual syndrome (see [302] for critics of commission E).

nrakta Europe, including Britain, to the Mediterranean, north and central Asia. ksakta By rivers, streams and ditches, also in marshes and fens[9, 17].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. 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 Tolerates most soil types so long as they are wet. Grows well in shallow water. Succeeds in sun or shade.

5.2.100 *Carex disticha*

Tworank sedge
4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta *Carex disticha* is a PERENNIAL growing to 0.5 m (1ft 8in). 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 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61]. nrakta Central and northern Europe, including Britain, occasional in S. Europe, east to Siberia. ksakta Damp grassy places, fens, marshes and wet meadows[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[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 summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.101 *Leucojum aestivum*

Summer Snowflake
4 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc

full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Root StemEdible Uses: Root - cooked[22, 46, 61, 105, 257]. A sweetish flavour[161]. Stem base - cooked[105, 161].

dwatta An infusion of the whole plant, mixed with other plant leaves, has been used in the treatment of chills[257].

nrakta Found in most northern temperate regions, including Britain. ksakta Muddy or peaty shores and shallow water to 30cm deep, in ponds, ditches and ungrazed marshland[17, 24].

propta Seed - best sown as soon as it is ripe in a pot in the greenhouse. Stand the pots in 2 - 3cm of water. Prick out the seedlings into individual pots when they are large enough to handle and gradually increase the depth of water as the plants grow until it is about level with the tops of the pots[240]. Plant them out in the summer if they have grown sufficiently, otherwise plant them out in the following spring. 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 Grows in muddy ground or water up to 30cm deep[17, 24]. Requires a rich soil[56]. Tolerates some shade[200]. Tolerates deep shade[188]. An important autumn and winter food source for wild fowl.

5.2.57 *Sanguisorba officinalis*

Great Burnet
4 tlin 8 cyuc 2 kcak 2 tcan 3 dwat 1 m hkuc
hmimhtut cyutli kyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatprklwisliip hpa7tmwatli fyifxre7t hjonli

drutta *Sanguisorba officinalis* 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 4 and is not frost tender. It is in flower from June to September. 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 and can grow in nutritionally poor 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.

pcista Best avoided during pregnancy in view of the lack of information about toxicity. Suggested that the herb may interact with the group of allopathic medications known as fluorquinolones [301].

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[13, 61, 105]. They should be harvested in the spring before the plant comes into flower[9]. A cucumber flavour[7, 46], they can be added to salads or used as a potherb[183]. The fresh or dried leaves are used as a tea substitute[183].

tcanta TanninThe roots contain tannin[7].

dwatta Anodyne Antidiarrhoeal Astringent Contraceptive Diuretic Dysentery Eczema Febrifuge Haemostatic Tonic VulneraryGreat burnet is employed mainly for its astringent action, being used to slow or arrest blood flow. It is taken both internally and externally internally and is a safe and effective treatment. Modern research in China has shown that the whole herb heals burns more effectively than the extracted tannins (the astringent component of the plant)[254]. Patients suffering from eczema showed marked improvement when treated with an ointment made from the root and petroleum jelly[254]. The leaves are astringent, refrigerant, styptic and tonic[7, 218, 222]. They are used in the treatment of fevers and bleeding[218, 222]. The plant is prevented from flowering and then the leaves are harvested in July and dried for later use[4, 238]. The root is anodyne, astringent, diuretic, febrifuge, haemostatic, tonic and vulnerary[4, 7, 9, 21, 147, 165, 176, 178, 218]. It is used in the treatment of peptic ulcers, haematuria, menorrhagia, bloody stool, dysentery, diarrhoea, haemorrhoids and burns[176]. The root is harvested in the autumn as the leaves die down and dried for later use[4, 238]. All parts of the plant are astringent, but the root is most active[4]. Great burnet is an excellent internal treatment for all sorts of abnormal discharges including diarrhoea, dysentery and leucorrhoea[4]. It is used externally in the treatment of burns, scalds, sores and skin

diseases[238]. This species was ranked 19th in a Chinese survey of 250 potential anti-fertility plants[218].

nrakta Europe, including Britain, from celand south and east to Spain, temperate Asia to Iran, China, Japan ksakta Meadows and wet grassy places by streams[187]. Moist shady sites in grassland, on siliceous soils[7, 13, 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 as soon as they have reached a reasonable size. The seed can also be sown in situ in early spring[4]. Division in the spring or in autumn[4].

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Plants grow tolerably well in very poor soils and likes a dry chalky soil[4]. This species is hardy to about -25°C[187]. 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 rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.58 *Petasites hyperboreus*

Arctic Sweet Coltsfoot
4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc
pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli nyanhjen hjonli

drutta *Petasites hyperboreus* 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 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 Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: SaltYoung leaves - cooked. A felt-like texture[172]. Young stalks and flower heads - cooked[172]. The burnt leaves are used as a salt substitute[172, 177]. The stems and leaves, whilst still green, are rolled up into balls, dried and then placed on top of a very small fire on a rock and burned[207]. A very acceptable condiment for piñole[207].

tcanta Containers StuffingThe cotton-like seed heads have been used as a stuffing material in mattresses etc[257]. The leaves have been used to make temporary cone-shaped containers for picking fruit[257]. The leaves have occasionally been used to form makeshift funnels[257].

dwatta Antispasmodic Pectoral Poulitice SalveAntispasmodic, poultice, salve[172]. An infusion of the dried, stored leaves has been used in the treatment of colds, head and chest congestion[257].

nrakta North-western N. America. ksakta Meadows, swampy places and moist woods[60].

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 We have very little information on this species and do not know if it will succeed in Britain, though judging by its native range it should succeed outdoors in most parts of the country. According to one report this species is no more than a synonym of *P. frigidus*[60]. The following notes are based on the general needs of the genus. 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]. 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.

5.2.59 Osmunda cinnamomea

Cinnamon Fern
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta *Osmunda cinnamomea* is a FERN growing to 0.6 m (2ft) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

kcaakta Edible Parts: Root StemEdible Uses: Young stem bases - raw or cooked[172]. Usually cooked and eaten with oil[257]. Root - raw or cooked[257]. The blackish covering should be removed[172].
tcanta Paper Stuffing Tinder Weaving WickThe cottony seed hairs are used to make candle wicks[4, 13, 100, 172]. They are also used for stuffing pillows[4, 74, 141], paper making etc and as a tinder[74]. Experiments have been made in using the hairs as a cotton substitute, but they are more brittle than cotton and do not bear twisting so well[4]. The dried leaves and stems have been woven into soft mats or covers[257].

dwatta AstrigentThe leaves and roots are considerably astrigent and have been used in the past as a treatment for diarrhoea[4]. Some native North American Indian tribes would eat the stems raw in order to restore good health to people in generally poor health[257].
nrakta Arctic and temperate regions of Europe, including Britain, to Siberia and N. America. ksacta Peat bogs, acid meadows and marshes[13].

propta Seed - sow in situ in spring in a moist soil in light shade. Germination usually takes place within 2 - 6 weeks at 15°C[200]. If the seed is in short supply it can be sown in pots in a cold frame. Place the pots in a try of water to keep the compost moist. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be replanted direct into their permanent positions.
nwatta Requires boggy conditions or a pond margin and an acid soil[1, 162]. Grows well in heavy clay soils. Quite invasive.

nrakta Eastern N. America - Newfoundland to Florida, S. America, E. Asia. ksacta Sandy or alluvial soils[159] in swamps low woods and thickets in Eastern N. America[43]. Moist areas, acidic soils, frequently in vernal seeps from sea level to 2300 metres[270].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, 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. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. Easily grown in a damp woodland or by the margins of pools and streams[187]. Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -

20°C, they are evergreen in warm winter areas but deciduous elsewhere[200]. This species is sometimes cultivated for its edible fronds[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1]. The rhizome is large and slowly creeping[187]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms.

5.2.60 Eriophorum angustifolium

Cotton Grass, Tall cottongrass
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyikfrip hpa7tli frusflat hpa7tmwatli hjonli

drutta *Eriophorum angustifolium* 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 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcaakta Edible Parts: Root StemEdible Uses: Young stem bases - raw or cooked[172]. Usually cooked and eaten with oil[257]. Root - raw or cooked[257]. The blackish covering should be removed[172].

tcanta Paper Stuffing Tinder Weaving WickThe cottony seed hairs are used to make candle wicks[4, 13, 100, 172]. They are also used for stuffing pillows[4, 74, 141], paper making etc and as a tinder[74]. Experiments have been made in using the hairs as a cotton substitute, but they are more brittle than cotton and do not bear twisting so well[4]. The dried leaves and stems have been woven into soft mats or covers[257].

dwatta AstrigentThe leaves and roots are considerably astrigent and have been used in the past as a treatment for diarrhoea[4]. Some native North American Indian tribes would eat the stems raw in order to restore good health to people in generally poor health[257].

nrakta Arctic and temperate regions of Europe, including Britain, to Siberia and N. America. ksacta Peat bogs, acid meadows and marshes[13].

propta Seed - sow in situ in spring in a moist soil in light shade. Germination usually takes place within 2 - 6 weeks at 15°C[200]. If the seed is in short supply it can be sown in pots in a cold frame. Place the pots in a try of water to keep the compost moist. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be replanted direct into their permanent positions.

nwatta Requires boggy conditions or a pond margin and an acid soil[1, 162]. Grows well in heavy clay soils. Quite invasive.

5.2.61 Cardamine scutata

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli fyifxre7t hjonli

drutta *Cardamine scutata* is a ANNUAL/BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. 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. 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.

kcaakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105, 177]. A hot peppery flavour.

nrakta E. Asia - Japan ksacta Wet places in lowland and mountains all over Japan[58]. Valleys, shady slopes, damp sites, along ditches, rock crevices, mountain slopes, roadsides, streamsides, sea level to 2100 metres[266].

nrakta E. Asia - China, Japan. ksacta Wet meadows and wet places along streams in lowland and mountain areas all over Japan[58].

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 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 in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Hardy to about -25°C[187]. A polymorphic species[58].

5.2.95 Lysimachia vulgaris

Yellow Loosestrife, Garden yellow loosestrife
4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 1.2 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis 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.

kcaakta Edible Parts: LeavesEdible Uses: Young leaves[105, 177]. No more details are given.

tcanta DyeA 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 Astrigent Demulcent Dysentery ExpectorantAn astrigent herb, yellow loosestrife 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 astrigent, 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].

5.2.96 Juncus effusus

Soft Rush, Common rush, Lamp rush, Pacific rush
4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta *Juncus effusus* 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 4. It is in flower from June to August. 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 and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. The plant can tolerate strong winds but not maritime exposure.

pcista Possibly toxic to mammals[76].

kcaakta Edible Parts: LeavesEdible Uses: Young shoots - raw[118, 257]. Some caution is advised, see the notes above on toxicity.

tcanta Basketry Lighting Paper Strewing String Thatching WeavingStems are used in basket making, thatching, weaving mats etc[23, 46, 66, 99, 115, 171]. The stems can also be dried then twisted or braided into ropes for tying or binding[257]. Stems can be peeled (except for a small spine which is left to keep them upright) and soaked in oil then used as a candle[6, 46, 61, 115]. A fibre obtained from the stems is used for making paper[189]. The stems are harvested in late summer or autumn, they are split and cut into usable pieces and then soaked for 24 hours in clear water. They are then cooked for 2 hours with lye and beaten in a blender. The fibres make an off-white paper[189]. When mixed with mulberry fibres they can be used for making stencil paper[189]. The whole plant was formerly used as a strewing herb[1, 66, 115].

dwatta Antiphlogistic Depurative Diuretic Febrifuge Lenitive Lithontrpic Pectoral Sedative UrinaryThe pith of the stem is antiphlogistic, depurative, discutient, diuretic, febrifuge, lenitive, lithontrpic, pectoral and sedative[147, 176, 178, 218, 240]. It is used in the treatment of sore throats, jaundice, oedema, acute urinary tract infection and morbid crying of babies[176].

nrakta Throughout the northern temperate zone, including Britain, east and south Africa, Australasia. ksacta Wet pastures, bogs, damp woods etc, usually on acid soils[17].

propta Seed - surface sow in pots in a cold frame in early spring and keep the compost moist. 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 sufficiently, otherwise in late spring of the following year. Division in spring. 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 Easily grown in a moist soil, bog garden or shallow water[1, 200]. Prefers a heavy soil in sun or light shade[200].

5.2.97 Sanguisorba obtusa

Japanese burnet
4 tin 9 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta *Sanguisorba obtusa* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a medium rate. 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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.

kcaakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105]. A famine food, they are only used when all else fails[105].

nrakta E. Asia - Japan. ksacta Damp alpine meadows[187, 200].

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. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun

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 TonicThe 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: 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]. 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.

5.2.92 *Salix commutata*

undergreen willow

4 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 3 m hkuc hmihtut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flat-priklwis hpa7tmwatli nyanhjen hjonli

drutta *Salix commutata* 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 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 and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

koakta 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 - raw or cooked. They are not very palatable[172].

tcanta Soil reclamationA pioneer plant for difficult sites[200]. Dynamic accumulator

dwatta Anodyne FebrifugeThe 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 Western N. America - Alaska to California. ksacta Wet places at moderate to rather high elevations[204].

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 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]. Rarely thrives on chalk[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.93 *Sanguisorba stipulata*

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 2 m hkuc hmihtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta *Sanguisorba stipulata* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. 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. 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.

koakta Edible Parts: LeavesEdible Uses: Leaves - cooked. They are not choice[172].

dwatta AstringentBoth the roots and the leaves are astringent[172].

nrakta Western N. America - Alaska to Oregon. ksacta Bogs, swamps and streambanks[60].

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 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 in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Very closely related to *S. canadensis*[60], and considered to be no more than part of that species by some botanists[200].

5.2.94 *Sanguisorba tenuifolia*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.2 m hkuc hmihtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta *Sanguisorba tenuifolia* is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. 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. 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.

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

propta Seed - sow spring or autumn in situ.

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 this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.62 *Hosta longissima*

Swamp Hosta

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flat-priklwis 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.

koakta Edible Parts: Leaves StemEdible 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, KJ]. A polymorphic species, it hybridizes freely with other members of this genus[200].

5.2.63 *Oncoclea sensibilis*

Sensitive Fern

4 tlin 8 cyuc 2 kcaak 2 tcan 2 dwat 0.5 m hkuc pcmhmim cyutli tcuphja7n hwicli hrasljutnyik hpa7tli frusflatprk hpa7tmwatli hjonli

drutta *Oncoclea sensibilis* is a deciduous Fern growing to 0.5 m (1ft 8in) 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. The seeds ripen from June to October. Suitable for:

light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral 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].

koakta Edible Parts: Leaves RootEdible Uses: The young uncurled leaves, often called 'fiddleheads', are used as a vegetable or eaten raw[159, 177, 183]. Remove the brown scales and then steam the leaves in very little water[213]. The young shoots have been sold as delicacies in Asian markets[213]. Root - cooked[105, 161, 177, 183]. A famine food, it is only used in times of scarcity[213].

tcanta HairA decoction of the plant has been used as a hair wash to help prevent baldness[257]. This species has a freely-running rootstock and makes an effective ground cover plant[200, 233]. Although it is deciduous its decomposing ferns make an effective weed suppressing mulch[200]. Plants should be spaced about 1 metre apart each way[208].

dwatta Galactagogue Poulitice Women's complaintsSensitive fern has not been much used medicinally. However, one native North American Indian tribe did employ it quite widely to treat various women's complaints[257]. An infusion of the root has been used to treat the pain following childbirth[257]. A decoction of the roots has been used to treat fertility in women, to give strength after childbirth, to start the menses, and to treat swellings, cramps and a sore abdomen[257]. An infusion of the whole plant, or just the root, has been applied externally to full breasts where the milk will not flow[257]. A poultice of the plant is used in treating deep cuts[257].

nrakta N. America - east of the Rockies to N.E. Asia. ksacta Open swamps, thickets, marshes, or low woods, in sunny or shaded locations, often forming thick stands from sea level to elevations of 1500 metres[270].

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. Pot on small clumps of plantlets as soon as they are large enough to handle and keep them in humid conditions until they are well established. Do not plant outside until the ferns are at least 2 years old. Division of underground rhizomes, October to March.

nwatta Landscape Uses:Container, Foundation, Specimen, Woodland garden. Prefers a moist light soil in partial shade[187]. Requires a damp humus-rich site in partial shade with preferably only 2 - 3 hours of sun daily[200]. Plants require an abundance of water at the roots all year round[1] and they grow well in a bog or woodland garden, or on the water's edge where they may grow out over the water[200]. Requires a pH in the range 5 - 6.5[200]. Plants can colonize most situations that are not too dry and are sheltered from harsh winds[200]. A very hardy plant, the rootstock can tolerate temperatures down to about -30°C[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental[1] and easily grown fern, spreading quite vigorously by means of a slender far-creeping rhizome when it is established[187]. It can become invasive in suitable conditions[200]. The fronds die quickly with the first autumn frosts[187], which is why the plant has gained its common name of the sensitive fern[200]. Special Features:Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies. 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 1 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].

5.2.64 *Triglochin maritima*

Sea Arrow Grass
4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat m hkuc
htut cyutli hja7nh6s hwicli hrasjlutnyik hpa7tli prikl-wissliphsom hpa7tmwatli xre7t hjonli
drutta *Triglochin maritima* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. 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 Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers wet soil and can grow in water. The plant can tolerate strong winds but not maritime exposure.

pcista The green leaves of plants can contain a toxic cyanogenic glycoside, it is especially present during and just after a drought and is particularly toxic to ruminants[76, 85]. Plants growing in Britain are usually perfectly safe, this is probably due to the climate[76].

kcakta Edible Parts: Seed StemEdible Uses: CoffeeThe white base of the leaf stem can be eaten raw or cooked[46, 61, 85, 103]. Best harvested in late spring, the white base has a pleasant mild sweet taste, somewhat like cucumber[256]. An unpleasant odour is produced whilst the plant is being cooked[74]. The green parts of the plant should not be eaten since they can contain a toxin[172]. Only the bases of leaf stems should be used, and not the bases of flowering stems[256]. See notes at top of the page. Seed - parched and ground into a powder[85, 105, 161, 172, 257]. The roasted seed is a coffee substitute[161, 172, 212].

tcanta Soap makingThe ashes of the plant are rich in potassium and can be used in making soap[74].

nrakta Europe, including Britain, from the Arctic south and east to N. Africa, W. and N. Asia. N. America. ksacta Salt marshes and grassy places near the sea[9, 17].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible. Stand the pots in about 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring[200]. 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.

nwatta Succeeds in shallow water or a bog garden[200]. Possibly requires saline conditions[K].

5.2.65 *Chrysosplenium alternifolium*

Golden Saxifrage, Alternate-leaf golden saxifrage, Iowa golden saxifrage

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frus-flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Chrysosplenium alternifolium* is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[2, 46, 61, 66, 105, 177]. Added to salads[183]. The leaves are rather small, and there is a distinct bitterness in the flavour, especially during hot weather[K].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Europe, including Britain, from Scandinavia south to C. France, east to C. Asia and the Himalayas. ksacta Acid soils[200] by the sides of streams, wet rocks and wet ground in woods, usually in shade[17].

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the 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. Division in spring. 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 light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist[200]. Requires a constantly wet but well-drained soil[200]. Prefers a shady position, succeeding in woodland[200].

5.2.66 *Cardamine schinziana*

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Cardamine schinziana* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. 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. 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: LeavesEdible Uses: Leafy stems - raw or cooked[105, 177]. A hot peppery flavour.

nrakta E. Asia - Japan, Korea. ksacta Wet places in N. Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 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 this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.67 *Cardamine pennsylvanica*

Bittercress

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli nyanhjen hjonli

drutta *Cardamine pennsylvanica* is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. 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. 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: LeavesEdible Uses: Condi-mentLeaves - raw or cooked[46, 61, 159, 171]. An excellent water cress substitute[105]. A slightly bitter flavour, but not disagreeable[207]. The grated raw root is used as a condiment[207].

It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Inner bark Leaves RootEdible Uses: Inner bark - raw or cooked[172, 183]. 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]. Rich in vitamin C[183]. Young catkin-bearing shoots - raw or cooked[183]. The growing tips of underground rhizomes are peeled and eaten[183].

tcanta Basketry Shelterbelt Soil stabilization WoodThe stems are very flexible and are used in basket making[1, 61, 74, 131, 158] or for making wattle and daub walls[158]. 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. Trees are fast growing and tolerate maritime exposure so can be grown as a shelterbelt[166]. Plants have extensive root systems and are often used to stabilize sand dunes[11, 200]. Wood - soft, even grained, smooth. Used for construction, pales, tubs etc[146, 158]. Dynamic accumulator.

dwatta Anodyne Febrifuge Vitamin CThe 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 to W. Asia as far as the Himalayas. Scarcely naturalized in Britain[17]. ksacta Moist soils.

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 Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1], but prefers a deep damp, heavy soil in a sunny position[11, 200]. Rarely thrives on chalk[200]. Succeeds in poor strong soils[131]. Succeeds in maritime exposure[166]. The root system is rather aggressive and can cause problems with drains[200]. It is best not to plant this species within 10 metres of buildings. Hybridizes freely with other members of this genus. 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]. A very ornamental and fast growing plant[1, 74]. There are some named varieties. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.90 *Salix viminalis*

Osier. Basket Willow

4 tlin 8 cyuc 1 kcaok 3 tcan 2 dwat 6 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis 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[11].

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 Industri 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.

5.2.91 *Salix purpurea*

Purple Osier. purpleosier willow

4 tlin 8 cyuc 1 kcaok 4 tcan 3 dwat 5 m hkuc
htut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flat-prikliwshsom 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. 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. 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 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 - raw or cooked. They are not very palatable[172].

tcanta Basketry Fodder Hedge Hedge Repellent Soil reclamation Soil stabilization TanninThe 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

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 Leaves MannaEdible 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]. The source of an edible manna[183]. No further details.

tcanta Basketry Charcoal Hedge 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.

5.2.88 Salix acutifolia

Sharp-Leaf Willow

4 tin 8 cyuc 1 kcak 3 tcan 2 dwat 10 m hkuc htut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta *Salix acutifolia* is a deciduous Shrub growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and added to cereal flours for use in making bread etc. A famine food, it is only used when all else fails[172]. Young shoots - cooked. They are not very palatable[172].

tcanta Basketry Shelterbelt Soil stabilizationStems are very flexible and are used in basket making[46, 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. Trees can be planted in shelter-belts for protection against the wind[166]. The extensive root system of this plant is good for binding sandy soils[11]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 N. Europe to E. Asia. *ksacta* Not known

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 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]. Rarely thrives on chalk[200]. Very wind-resistant, tolerating maritime exposure[166]. 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]. Closely related to *S. daphnoides*[200] and considered to be a part of that species by some authorities[11, 17]. Some named forms have been developed for their ornamental value[182]. There are also named forms cultivated for basket making[46, 61]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.89 Salix daphnoides

Violet Willow, Daphne willow

4 tin 8 cyuc 1 kcak 3 tcan 2 dwat 10 m hkuc htut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta *Salix daphnoides* 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 February to March, 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 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 and neutral soils. It cannot grow in the shade.

dwatta Carminative DigestiveThe leaves and the flowering plant are carminative and digestive[172].

nrakta N. America - Newfoundland to Minnesota and Montana, south to Florida, Tennessee and Kansas. *ksacta* Usually found in moist or wet soils[159], it grows in most soils and habitats in eastern N. America[43].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division.

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 this country. A polymorphic species[43], it is closely related to *C. parviflora*[274]. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.68 Primula denticulata

Drumstick Primula

4 tin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrp 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].

5.2.69 Cardamine bulbosa

Bulbous Bittercress

4 tin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Cardamine bulbosa* 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 April to August, and the seeds ripen from May to September. 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. 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: LeavesEdible Uses: CondimentLeaves - raw[105, 177]. Added to salads. The rootstock is grated and used as a condiment[207], it is a horse radish substitute[105, 177]. A hot pungent taste.

nrakta Eastern N. America - Vermont to Ontario and Minnesota, south to Florida and Texas. *ksacta* By springs, bottomland woods and meadows[43].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in spring. 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 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 moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[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 tuberous with swollen potato-like roots [1-2].

5.2.70 Cardamine flexuosa

Wavy Bittercress, Woodland bittercress

4 tin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Cardamine flexuosa* is a ANNUAL/PERENNIAL growing to 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 April to September, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: Leaves RootEdible Uses: Leaves - raw or cooked[8, 52, 105, 183]. A hot cress-like flavour. Nice as a flavouring in salads, it is usually available all year round. Root - raw or cooked[183].

nrakta Much of Europe, including Britain, east through Asia to China and Japan. *ksacta* Moist shady places by streams and occasionally on cultivated ground[17].

propta Seed - sow spring or autumn in situ. This species needs very little encouragement and is quite capable of sowing itself, often too freely.

nwatta Prefers a moist humus rich soil in shade or semi-shade[200] but it succeeds in most soils and positions[1]. A common garden weed, it is found especially in pot-grown plants[8].

5.2.71 Lycopus virginicus

Bugleweed, Virginia water horehound

4 tin 8 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lycopus virginicus* 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 September. 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. 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 Known to cause the enlargement of the thyroid gland. Avoid in patients with thyroid disease or given concomitantly with thyroid therapy. Avoid during pregnancy [301].

kcakta Edible Parts: RootEdible Uses: Root - cooked[46, 61].

dwatta Antianxiety Antidandruff Astringent Cardiac Hypoglycaemic Narcotic SedativeBugleweed has sedative properties and is used in modern herbalism principally to treat an overactive thyroid gland and the racing heartbeat that often accompanies this condition[254]. The whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 102, 222, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[222, 238], it

is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. It should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be used fresh or dried, in an infusion or as a tincture[4, 238]. The root has been chewed, a portion swallowed and the rest applied externally in the treatment of snakebites[257]. Current uses are predominantly for increased activity of the thyroid gland and for premenstrual syndrome symptoms such as breast pain [301]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Lycopus* for nervousness and premenstrual syndrome (see [302] for critics of commission E).

nrakta Eastern N. America - New York and Wisconsin south to Georgia and Texas. ksacta Low damp shady ground in rich moist soils[43].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. 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 Tolerates most soil types so long as they are wet. Succeeds in full sun or in partial shade[238], in damp meadows or in wet places by ponds or streams[200].

5.2.72 Mimulus lewisii

Great Purple Monkey Flower, Purple monkeyflower
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrp hpa7tli flatprikliwis 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.
kcaakta Edible Parts: LeavesEdible Uses: Leaves and stems - raw or cooked[172].

dwatta PoulticePoultice[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.

5.2.73 Cardamine fauriei

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine fauriei is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK

zone 5. It is in flower from May to August, and the seeds ripen from May to September. 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. 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.

kcaakta Edible Parts: Leaves RootEdible Uses: Leaves - raw[105, 177]. Added to salads. A hot, watercress flavour. Root[105, 177]. No further details are given.

nrakta E. Asia - N. Japan. ksacta Streams and ravines in mountains[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 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 this country. The following notes are based on the general needs of the genus. Prefers a moist humid rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.74 Cardamine prorepens

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.4 m hkc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine prorepens is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. 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. 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.

kcaakta Edible Parts: LeavesEdible Uses: Leaves and young plant - cooked[105].

nrakta E. Asia - E. Siberia to Manchuria. ksacta Banks of streams and river beds[74].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 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 this country. The following notes are based on the general needs of the genus. Prefers a moist humid rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.75 Orchis ustulata

Dark-Winged Orchis

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.2 m hkc

htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Orchis ustulata is a BULB growing to 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

kcaakta Edible Parts: SapEdible Uses: SweetenerThe sweet sap is tapped in the spring and used in the preparation of syrup and sugar[105, 177, 183].

tcanta Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - coarse-grained, tough, strong, very durable, difficult to split[46, 61, 171]. Rather weak according to other reports[227, 229]. It weighs 35lb per cubic foot[235], and is used for furniture, chopping boards etc[46, 61, 171, 229]. Trunks of wild trees can be up to 4.5 metres in diameter and these were at one time hollowed out to make barges capable of carrying several tons of goods[226].

dwatta Antirheumatic Astringent Diuretic Dysentery Emetic Laxative Poultice SalveThe inner bark is astringent, diuretic, emetic and laxative[222]. It has been used as a tea in the treatment of dysentery, coughs, colds, lung ailments, haemorrhages, measles, milky and difficult urination etc and also as a blood tonic[222, 257]. Externally, it has been used as a wash on wounds[257]. An infusion of the bark and roots has been used as a foot soak for treating rheumatism[257]. The bark ooze has been used as a wash on infected sores and an infusion has been given in the treatment of infant rash[257]. An infusion of the bark, mixed with honey locust bark (*Gleditsia triacanthos*), has been used as a gargle to treat hoarseness and sore throat[257].

nrakta Eastern N. America - New England to Florida, west to Texas and Nebraska. ksacta Rich soils on the borders of streams and lakes[43, 82]. Often abundant on alluvial soils near streams and lakes and in moist ravines, sometimes on uplands, sometimes on limestone soils[270].

propta Seed - two months cold stratification improves germination[113]. Sow spring in a cold frame in light shade[78, 98]. Home grown seed is often of poor quality and low viability. It is best to harvest the seed in late winter or spring and then sow it immediately in a cold frame[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. Cuttings of mature wood of the current years growth, 20 - 30 cm with a heel, autumn in a cold frame[1]. Easy[200]. Layering of stools in spring or autumn. Takes 12 months[78].

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Seashore, Specimen, Street tree. Prefers a deep moist loam[1], though it tolerates very wet, poorly drained soils[229]. Requires full sun[200]. Tolerates atmospheric pollution and compacted soils[200]. Established plants are drought tolerant[200]. Fairly wind-resistant[200]. A fast-growing and long-lived tree[200, 229], but it is of no value in Britain, being very susceptible to attack by parasitic fungi[11]. Fairly slow-growing according to another report, which also says that the tree is long-lived in the wild[227]. This species does not do well north of Central France, it requires long hot summers to fully ripen its wood[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.86 Salix fragilis

Crack Willow

4 tin 8 cyuc 1 kcaak 3 tcan 3 dwat 15 m hkc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix fragilis 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 and is not frost tender. 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 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

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].

kcaakta Edible Parts: Inner bark LeavesEdible Uses: SweetenerInner 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]. A saccharine exudation is obtained from the leaves and young branches[2, 105]. Used as a food[183].

tcanta Basketry Charcoal Tannin WoodStems are very flexible and are used in basket making[46, 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 contains around 10% tannin[223]. Wood - tough, withstands friction. Used for floors, bases of carts etc[11]. A good quality charcoal is obtained from the wood[61]. Dynamic accumulator:

dwatta Anodyne Astringent Dysentery Febrifuge Poulitice StypticThe 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, astringent and febrifuge[9, 226]. 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]. A poultice of the bark has been applied to sores as a styptic and healing agent[257]. 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]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. 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 Sweden south and east to Spain, Serbia and Iran. ksacta Streamsideis, marshes, fens and wet woods[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. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils,[1] but prefers a deep damp, heavy soil in a sunny position[11, 200]. Rarely thrives on chalk[200]. Succeeds in an exposed position[186]. Closely allied to *S. alba*, with which it freely hybridizes[11], though it tolerates poorer soils than that species[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]. The cultivar 'Basfordiana' is used for basket making[131]. Best if planted into its permanent position as soon as possible. The root system is rather aggressive and can cause problems with drains[200]. Plants in this genus are notably susceptible to honey fungus[200]. Plants are very amenable to coppicing or pollarding and can be cut back annually if required[186]. Dioecious. Male and female plants must be grown if seed is required.

5.2.87 Salix caprea

Goat Willow, Kilmarnock Willow, Pink Pussy Willow, Pussy Willow

4 tin 9 cyuc 1 kcaak 4 tcan 2 dwat 10 m hkc

hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwis 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,

drutta *Cardamine impatiens* is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from May to September. 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. 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: LeavesEdible Uses: Leaves and young shoots - raw or cooked[105, 177]. Used as a vegetable[272].

dwatta Antirheumatic Diuretic StimulantThe plants is antirheumatic, diuretic and stimulant[145, 240].

nrakta Europe, including Britain, from Sweden to C. Spain, eastwards through Asia to Japan. ksacta Very local in shady woods, especially ash, and on moist limestone rocks and cliffs, especially in the west[17].

propta Seed - sow spring or autumn in situ.

nwatta Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200].

5.2.83 Hierochloe odorata

Holy Grass

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Hierochloe odorata* 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 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 Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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.

pcista The plant contains coumarin, this is toxic if taken internally[169] and is sometimes considered to be carcinogenic[222].

kcakta Edible Parts: SeedEdible Uses: Colouring Condi- mentSeed - cooked[105]. Small and fiddly to use. It al- most certainly does not contain coumarin and should be safe to use. An essential oil from the leaves is used as a food flavouring in sweets and soft drinks. It has a strong vanilla-like flavour[183]. The leaves are added to vodka as a flavouring[238]. The plant is said to be used as a colouring agent[183] but no more details are given.

tcanta Basketry Hair Incense Repellent Soil stabilization Strewing StuffingThe dried leaves are used as an incense[46, 61, 99], they were formerly also used as a strewing herb[1, 46, 238] and have been used as a stuffing in pillows and mattresses[257]. They have also been used as an insect repellent in the clothes cupboard where they impart a nice smell to the clothes[99, 238]. The leaves are used to make aromatic baskets[46, 61, 99, 169, 171]. The wet leaves can be sewn to- gether, dried until they are tight and then resin used over the stitches to make a waterproof container[257]. The leaves can be soaked in water to make a tonic hair wash[257]. An essen- tial oil distilled from the leaves is used in perfumery where it acts as an excitant and fixative for other aromas[238]. The plant has a very aggressive root system and has been planted to stabilize banks[74].

dwatta Birthing aid Febrifuge Skin VDA tea made from the leaves is used in the treatment of fevers, coughs, sore throats, chafing and venereal infections[222, 257]. It is also used to stop vaginal bleeding and to expel afterbirth[222]. The stems can be soaked in water and used to treat wind- burn and chapping and as an eyewash[257]. Some caution is advised when using this plant internally, see the notes above on toxicity[222]. The leaves are harvested in the summer and dried for later use[238]. Smoke from the burning leaves has been inhaled in the treatment of colds[257].

nrakta Central and northern Europe, including Britain, to N. Asia and N. America. ksacta Wet banks in only a few sites in Scotland[17].

propta Seed - sow spring in situ and only just cover the seed[162]. Germination usually takes place within 2 weeks. If the seed is in short supply it can be sown in the cold

frame in the spring. When large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring or summer[162]. Very sim- ple, virtually any part of the root will regrow to make a new plant[K].

nwatta Prefers a damp position in a rich soil but suc- ceeds in most soils including quite dry conditions[162]. Grows best in a sunny position[238]. The plants have a run- ning root system and can spread aggressively when grown in suitable conditions[74]. The plant, as it dries, emits a pow- erful scent of newly mown hay[245].

5.2.84 Triglochin palustris

Marsh Arrow Grass

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc

htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikl- wishsom hpa7tmwatli xre7t hjonli

drutta *Triglochin palustris* is a PERENNIAL growing to 0.5 m (1ft 8in). 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 pol- linated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 wet soil and can grow in water.

pcista The green leaves of plants can contain a toxic cyanogenic glycoside, it is especially present during and just after a drought and is particularly toxic to ruminants[172]. Plants growing in Britain are usually perfectly safe, this is probably due to the climate[76].

kcakta Edible Parts: Seed StemEdible Uses: CoffeeThe white base of the leaf stem can be eaten raw or cooked[172]. An unpleasant odour is produced in the cooking process but the flavour of the stems is sweet[172]. The green parts of the plant should not be eaten since they can contain a toxin. See notes at top of the page. Seed - parched and ground into a powder[172]. The roasted seed is a coffee substitute[172].

nrakta Europe, including Britain, from the Arctic south and east to N. Africa, northern Asia. N. America. ksacta Marshes, usually amongst tall grass[17].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible. Stand the pots in about 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring[200]. 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.

nwatta Succeeds in shallow water or a bog garden[200]. This plant does not seem to require high salt levels for its sur- vival[200].

5.2.85 Platanus occidentalis

Buttonwood, American sycamore, American Planetree, Sycamore, American Sycamore

4 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 30 m hkuc

htut cyutli hgattcuphja7n hwicli hrasjlutnyik hpa7tli flatprikl- wis hpa7tmwatli hjonli

drutta *Platanus occidentalis* is a deciduous Tree grow- ing to 30 m (98ft) by 30 m (98ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from October to March. 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. Suit- able pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pol- lution.

pcista In hot dry climates the hairs of the fruits and leaves are believed to cause an effect similar to hay fever[11, 200].

June. The species is hermaphrodite (has both male and fe- male organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of ‘salep’, a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch- like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antifatulent Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and pre- pared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treat- ment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Caucasus and Siberia. ksacta Chalk downs and limestone pastures[17], it is also found in marshy places[42].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around es- tablished plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the re- maining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Divi- sion can also be carried out when the plant has a fully devel- oped rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made to- wards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done with- out digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Prefers a sunny position and a good limey loam soil[42]. Requires a deep rich soil[1]. Orchids are, in gen- eral, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then dis- appear, suggesting that they might be short-lived perenni- als[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233]. The flowers diffuse a powerful almond-like scent[245]. Cultivated plants are very susceptible to the pre-

datation of slugs and snails[230].

5.2.76 Cardamine leucantha

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat- priklwis hpa7tmwatli fyifkre7t hjonli

drutta *Cardamine leucantha* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. 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. Suitable pH: mildly acid, neutral and bas- ic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves - raw or cooked[105, 177]. The seedlings are edible[266]. Dried plants are used as a tea substitute[266].

dwatta The rhizomes are used medicinally[266]. No fur- ther information is given.

nrakta E. Asia - China, Japan. ksacta Wet places by ponds and streams, in mountains all over Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individ- ual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 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 this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.77 Chrysosplenium oppositifolium

Golden Saxifrage

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frus- flatpriklwis hpa7tmwatli fyifkre7t hjonli

drutta *Chrysosplenium oppositifolium* 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 5. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neu- tral 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.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 5, 8, 17, 52, 61, 66]. Added to salads or soups[183]. The leaves are rather small, and there is a dis- tinct bitterness in the flavour, especially in hot weather[K].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Western and central Europe, including Britain, from Norway to Spain, east to Germany and N. Italy. ksacta Acid soils[200] on the banks of springs and wet shady moun- tainsides[5, 17, 52].

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, af- ter the last expected frosts. Division in spring. 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 light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist. Requires a constantly wet but well-drained soil[200]. Prefers a shady position, succeeding in woodland[17, 200].

5.2.78 Calypso bulbosa

Fairy slipper

4 tin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.1 m hkuc

pcimhmim cyuti tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prik hpa7tmwatli xre7t hjonli

drutta Calypso bulbosa is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from October to July, 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. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[22, 46, 61, 105, 155]. Rather small[161]. The corns have a rich, butter-like quality[256]. They were usually boiled by the North American Indians before being eaten, though young maidens would eat them raw as they were believed to increase the size of the bust[256].

dwatta Antispasmodic EpilepsyThe bulbs have been chewed or the flowers sucked in the treatment of mild epilepsy[257].

nrakta N. Europe, N. America - Alaska to California, east to New York. ksacta Soils rich with decaying leaves and wood, in moist pine or spruce woods and by cool shady streams from sea level to the mid-montane zone[60, 155].

propta Seed - we have no information on this species but, like all members of the orchid family, the seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. Surface sow the seed, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division in autumn. Make sure that you keep plenty of soil with each plant. It is also said to be possible to transplant orchids after they have flowered but whilst they are still in leaf. Grow on for at least the first year before potting up and do not plant out until the plants are 2 - 4 years old. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Grows well in half shade in a light moist organic-rich soil[1, 42, 200]. Requires a lime-free soil, doing best in full shade[42]. The plant comes into growth in the autumn and, although fairly hardy, is best grown in a frame or unheated greenhouse[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. Plants can

be naturalized in the woodland or bog garden[200]. Apply a good organic mulch in the winter[1]. Plants do not always grow every year, the bulb can remain dormant in the soil for 2 years[42].

5.2.79 Crataegus maximowiczii

4 tin 8 cyuc 2 kcaok 0 tcan 2 dwat m hkuc
hmimhtut cyuti hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwis 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 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 Midgees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in very 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]. 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 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 - 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].

5.2.80 Orchis laxiflora

Marsh Orchis

4 tin 8 cyuc 2 kcaok 0 tcan 2 dwat 0.8 m hkuc

hpuu cyuti tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Orchis laxiflora is a BULB 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) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Astringent Cancer Demulcent Expectorant NutritiveUsed in the treatment of cancer[148]. Salep (see above for more details) is very nutritive, astringent, expectorant and demulcent[4, 240]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Southern Europe, including Britain, from Belgium south and east to N. Africa and W. Asia. ksacta Wet marshes and wet meadows in the Channel Islands[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1]. Plants can succeed in drier areas of bog gardens[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This

symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

5.2.81 Calla palustris

Water Arum

4 tin 8 cyuc 2 kcaok 0 tcan 2 dwat 0.3 m hkuc

htut cyuti hja7nhs6s hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Calla palustris 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 4. 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 Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista The plant contains calcium oxylate crystals[222]. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten, but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcakta Edible Parts: Fruit Root SeedEdible Uses: Rhizome - cooked. It is usually prepared by drying the root, grinding it into a powder and then thoroughly cooking it to ensure that any acrimonious principle is completely destroyed. The resulting powder is rich in starch and can be used as a flour for making bread etc, especially in conjunction with cereal flours[1, 2, 55, 100, 183]. It is said to be very tasty[65]. Fruit (does this include the seed?) - it should be dried and then thoroughly cooked[172]. The dried fruit and rootstalk can be ground into an unpalatable but nutritious powder[207].

dwatta Antirheumatic PouliticeAntirheumatic. Used in the treatment of colds and flu[172]. A tea made from the dried root has been used in the treatment of flu, shortness of breath, bleeding and as a poultice on swellings and snakebites[222, 257]. The aerial stems have been used in the treatment of sore legs[257].

nrakta Europe. Naturalized in Britain[17]. ksacta Forest swamps, moorland marshes, by ponds and streams[10].

propta Seed - best sown as soon as it is ripe in late summer in a cold frame in pots standing in about 3cm of water[200]. Sow stored seed as early as possible in the year in a greenhouse. The germination rate of stored seed is often poor. When large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Very easy, it is possible to divide this plant at almost any time in the growing season. Any part of the stem, if placed in water or a pot of very wet soil, will quickly root away to form a new plant. Stem cuttings in summer, rooted in wet mud[200].

nwatta Requires a wet lime-free humus rich soil by water or in shallow, still or slowly flowing water in full sun[200]. When grown on the pond margins it creeps in and out of the water[1]. Succeeds in water up to 25cm deep[188].

5.2.82 Cardamine impatiens

Narrowleaf bittercress

4 tin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyuti tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikwis hpa7tmwatli fyfxxre7t hjonli

organs) and is pollinated by Wind. It is noted for attract-ing wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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 and can grow in water.

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: Leaves SeedEdible Uses: Young leaves - cooked[2, 105, 183]. Seed - raw or cooked. It can be ground into a powder and used as a flour[102]. The seed is small and rather fiddly to harvest.

tcanta Dye Tannin TeethThe roots contain tannin. In cultivated plants, those grown on dry land contained 6 - 8% tannin whilst those grown in water contained 12.4 - 21.6%[223]. The dried and powdered root makes a good tooth cleaner[4]. 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 Antiscorbutic Astringent OphthalmicThe root is antiscorbutic and strongly astringent[4]. It is harvested in early spring and dried for later use[4]. The green leaves are said to be an excellent application for ulcers of the eyes[4].

nrakta Western Europe, including Britain, from Scandinavia south and east to Spain, Italy and S. Russia. ksacta Near ponds and streams, also in shallow water, avoiding acid conditions[17].

propta Seed - sow spring in situ. Division in spring. nwatta Requires a moist or wet soil, also succeeding in shallow water. Avoids acid conditions in the wild. A very important food plant for the caterpillars of many species of butterfly[30].

6.2.53 Salix arenaria

5 tin 9 cyuc 1 kcak 3 tcant 2 dwat 1 m hkuc htut cyutli tucphja7n hwicli hrasljutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix arenaria is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

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 - raw or cooked. They are not very palatable[172].

tcanta Soil stabilizationThe plant has a spreading root system and is an effective soil binder on sand dunes[200]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 W. Europe. ksacta Not known

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 Succeeds in moist soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp,

heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.54 Salix x mollissima hippophaefolia

5 tin 9 cyuc 1 kcak 3 tcant 2 dwat m hkuc htut cyutli tucphja7n hwicli hrasljutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix x mollissima hippophaefolia is a deciduous Shrub 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 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

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 BasketryThe stems are very flexible and are used in basket making[131]. 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 up-rights. Succeeds in wet, ill-drained or intermittently flooded soils[1, 11]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 A hybrid of garden origin, S. triandra x S. viminalis. ksacta Not known in a truly wild situation.

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. This is a hybrid species and it will not breed true from seed. 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 Succeeds in moist soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Plants are rarely bisexual[200], but they are usually dioecious and then male and female plants must be grown if seed is required.

6.2.55 Carex riparia

Great Pond Seed

5 tin 9 cyuc 1 kcak 0 tcant 0 dwat 1.5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprikwli hpa7tmwatli hjonli

drutta Carex riparia is an evergreen Perennial growing to 1.5 m (5ft) by 2 m (6ft) 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 May 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in

harvested in the autumn and dried for later use[238]. Recently the plant has been found of use as an immune system stimulant, helping to maintain resistance to acute viral and other infections[254]. A homeopathic remedy is made from the leaves[4]. It is used in the treatment of influenza and feverish chills[4] and also for disorders of the liver, spleen and gall bladder[9].

nrakta Most of Europe, including Britain, to N. Africa, western and central Asia. ksacta By streams, in low damp sites and in woods, avoiding acid soils[7, 13].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. If you have sufficient seed it can be sown outdoors in situ. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta An easily grown plant[233], it succeeds in ordinary garden soil in sun or part shade[200]. Prefers a rich moist soil[187]. Grows well in marshy soils[21]. Plants are hardy to about -25°C[187]. A very ornamental plant[1], it has a pleasant aromatic smell when cut[4]. Often found as a weed in British gardens, it can be allowed to naturalize in short grass in the wild garden[233]. Plants seem to be immune to the predations of rabbits[233]. An excellent bee and butterfly plant[24, 108].

5.2.126 Petasites hybridus

Butterbur, Pestilence wort

4 tin 8 cyuc 0 kcak 0 tcant 3 dwat 1 m hkuc pcmhmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprikwli hpa7tmwatli nyanhjen hjonli

drutta Petasites hybridus is a PERENNIAL growing to 1 m (3ft 3in) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from April to December, in flower from March 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), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

dwatta Analgesic Antispasmodic Appetizer Cardiotonic Diaphoretic Diuretic Homeopathic UrinaryButterbur is widely considered to be an effective cough remedy and recent experiments have shown it to have remarkable antispasmodic and pain-relieving properties[244]. It acts specifically on the bile ducts, stomach and duodenum[254]. The plant contains pyrrolizidine alkaloids, in isolation these are toxic to the liver[254]. The root and the leaves are analgesic, antispasmodic, cardiotonic, diaphoretic and diuretic[4, 9]. A decoction is taken as a remedy for various respiratory problems such as asthma, colds, bronchitis and whooping cough and also other complaints such as fevers and urinary complaints[4, 254]. It is also very effective in the treatment of gastrointestinal complaints and biliary dyskinesia[244, 254]. Externally it can be used as a poultice to speed the healing of wounds and skin eruptions[254]. The leaves are harvested in early summer, the root in late summer to autumn. Both can be dried for later use[9]. Because the plant contains potentially toxic alkaloids its internal use cannot be recommended[254]. A homeopathic remedy is made from the roots[4]. It is used in the treatment of severe and obstinate neuralgia[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, north and west Asia. ksacta Wet meadows and copses by streams to 1500 metres[17]. The female form is rare or absent from much of Britain[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 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]. Requires a moist shady position[187]. 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]. Its roots are very difficult to eradicate[200]. It is best to only grow the male form in the garden to prevent unwanted seedlings popping up all over the place[200]. The growth is so dense and vigorous, with large leaves that can be 75cm or more across, that virtually no other plant is able to grow amongst this species[4]. Plants are a useful early nectar source for bees[200]. Dioecious, male and female plants must be grown if seed is required.

5.2.127 Lobelia spicata

Pale Spike, Palespike lobelia

4 tin 8 cyuc 0 kcak 0 tcant 1 dwat 1 m hkuc hmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprikwli hpa7tmwatli xre7t hjonli

drutta Lobelia spicata 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 4. 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. 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 plant is potentially poisonous[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Emetic MiscellanyA tea made from the leaves is emetic[222]. A wash made from the stalks was used to treat neck and jaw sores[222]. A tea made from the root was used in the treatment of trembling limbs - it was applied to scratches made in the limb[222].

nrakta Eastern N. America - New Brunswick to Minnesota. ksacta Dry mostly sandy soils[235] in fields, meadows, glades and thickets[222].

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 Requires a moist soil, succeeding in full sun or partial shade[111, 187, 200].

5.2.128 Melanthium virginicum

Bunchflower

4 tin 8 cyuc 0 kcak 0 tcant 1.7 m hkuc hmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli frusflatprikwli hpa7tmwatli xre7t hjonli

drutta Melanthium virginicum is a PERENNIAL growing to 1.7 m (5ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. 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. 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.

pcista All parts of the plant are highly toxic[207].

dwatta AnthelminticThe root has been used to kill internal parasites[207].

nrakta Eastern N. America - New York to Florida, Texas and Indiana. ksacta Lowland prairies and moist open woods[228]. Bogs, marshes, wet woods, savannas, meadows, along railroads at elevations of 10 - 800 metres[270].

propta Unless the seed is stored in damp sand at around 4°C it has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in a cold frame as soon as it is ripe[200]. Stored seed needs to be cold stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°C but can be much longer[200]. Sow the seed thinly so that it can be grown on in the pot without disturbance for the first couple of years. Give an occasional liquid feed in the growing season to ensure the plants do not become nutrient deficient. The plant produces just one seed leaf in its first year, this forms an over-wintering bulb. At the end of the second year's growth, put the over-wintering bulbs, placing one or two bulbs in each pot. Grow them on in a lightly shaded position in a cold frame for at least another couple of years before planting them out into their permanent positions. It takes up to 10 years for the plant to reach maturity[200]. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Succeeds in acid soils in a bog garden[200].

5.2.129 *Coreopsis rosea*

Pink tickseed

4 tlin 9 cyuc 0 kcaak 3 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctuphja7n hwicli hrasjlut hpa7tli flat-prik hpa7tmwatli hjonli

drutta *Coreopsis rosea* 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 4. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista None Known
kcaakta None Known

tcanta A good ground cover with medium to high density growing at a fast rate. Plants will spread in the garden by rhizomes and self-seeding to form a dense ground cover, sometimes to the point of being considered aggressive [368-1]. Ornamental: Long summer bloom and airy foliage provide good accent in borders or rock gardens. Good small area ground cover. Also effective as an edger for borders, foundations and walks/paths. Naturalized areas, native plant gardens or cottage gardens [368-1]. Wildlife Food: Attracts birds that eat the seeds. Insectory: Provides for food for pollinators [1-2]. A good cut flower.

nrakta Native to the coastal plain in the northeastern U. S. from Massachusetts and Rhode Island to southeastern New York, New Jersey, Delaware and Maryland. Disjunct populations occur in Nova Scotia, South Carolina and Georgia. ksacta Pine barrens, moist open woods, shores of lakes, rivers or ponds and damp sandy depressions. This species generally occurs in pioneer habitats with changing water levels, low fertility, lack of surface leaf litter and few competing plants.

propta Sow seeds at 55° to 61°F in mid- or late winter, or divide plants in early spring. Basal cuttings can be rooted in spring.

nwatta An herbaceous perennial for temperate areas. USDA Hardiness Zones: 4 - 9. Soil pH: 6.6 - 7.8. Growth Rate: Moderate. Life Span: Long-Lived Perennial. Stand Persistence: Long. Form: Creeping. Texture: Fine. Sun: Full Sun, Partial Shade. Soil Type: Sandy, Loamy, Silty. Soil Moisture: Wet, Moderate. Root Type: Rhizome. Seasonal Interest: Summer-Fall. Spreads via rhizome and seeds, can be aggressive. Seeds resemble ticks, hence the name tickseed. Fruit is a cypsela. Flower Color: Pink, Yellow. Drought: Sensitive. Flood: Sensitive. Salt: Moderate [318-1]. Bloom Time: Early Summer - Early Fall. Fruit Time: Summer - Fall. 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 fibrous

dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.130 *Collinsonia canadensis*

Stone Root - Horse Balm, Richweed

4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat 0.8 m hkuc hmim cyutli tucphja7n hwicli hrasjlut hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Collinsonia canadensis* is a 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 4. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista Minute doses of the fresh leaves can cause vomiting[222], though the root is well-tolerated by the body[238]. Possible blood pressure elevation [301].

dwatta Alternative Antispasmodic Diaphoretic Diuretic Sedative Tonic Urinary Vasodilator VulneraryThe whole plant, but especially the fresh root, is alternative, antispasmodic, diaphoretic, diuretic, sedative, tonic, vasodilator and vulnerary[4, 21, 46, 102, 165]. A tea made from the roots is strongly diuretic, it is valuable in the treatment of all complaints of the urinary system and the rectum and is used in the treatment of piles, indigestion, diarrhoea, kidney complaints etc[4, 222]. It has proved of benefit in the treatment of irritable bowel syndrome, mucous colitis and varicose veins[254]. The root is seldom used on its own but is contained in remedies with other herbs, especially *Aphanes arvensis*, *Eupatorium purpureum* and *Hydrangea arborescens*[238]. The roots contain more than 13,000 parts per million of rosmarinic acid, the same anti-oxidant that is found in rosemary[222]. The fresh leaves are strongly emetic[222]. Some caution is advised, see notes above on toxicity[222]. A poultice of the leaves or roots is applied to burns, bruises, sores, sprains etc[4, 222, 254].

nrakta Eastern N. America - Ontario and Vermont to Florida, west to Wisconsin. ksacta Rich damp woods[43, 222].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can also be sown in the spring, though it might be slower to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a greenhouse or cold frame. Plant them out in spring or early summer of their second year. Division in spring[1].

nwatta Prefers a sandy peat in a moist situation but it is easily grown in ordinary garden soils[1] so long as they are not dry[200]. Prefers dappled shade[200]. The whole plant has a strong disagreeable odour and a pungent spicy taste[4]. Another report says that the foliage is strongly aromatic, with a lemon scent[238].

5.2.131 *Saururus cernuus*

Swamp Lily, Lizard's Tail

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli hjat7nhs6s hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Saururus cernuus* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

dwatta Antirheumatic Poultice Sedative StomachicSedative[61]. An infusion of the roots has been used as a wash in the treatment of rheumatism[257]. The root is roasted then mashed and made into a poultice to treat sore breasts[207, 222, 257]. A boiled extract of the roots is used as a poultice to heal flesh wounds[245]. The dried leaves can be made into a tea and drunk for the treatment of back

large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200].

6.2.50 *Iris pseudacorus*

Yellow Flag, Paleyellow iris

5 tlin 8 cyuc 1 kcaak 2 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tucphja7nhs6s hwicli hrasjlut hpa7tli flat-prikliwis hpa7tmwatli fyikxre7t hjonli

drutta *Iris pseudacorus* is a PERENNIAL growing to 1.5 m (5ft) 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 from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hoverflies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) 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 and can grow in water. The plant can tolerate strong winds but not maritime exposure.

pcista The leaves, and especially the rhizomes, of this species contain an irritating resinous substance called irisin. If ingested this can cause severe gastric disturbances[274]. Plants can cause skin irritations and allergies in some people[238].

kcaakta Edible Parts: Edible Uses: CoffeeThe seed is said to make an excellent coffee substitute as long as it is well roasted[2, 7, 61, 105, 115, 244]. Caution is advised, it might be poisonous[177].

tcanta Dye Essential Ink TanninA beautiful yellow dye is obtained from the flowers[4]. A good black dye is obtained from the root if it is mixed with iron sulphate[4, 115]. It is brown otherwise[141]. The root is a source of tannin[61] and has been used in making ink[4]. A delicately scented essential oil, obtained from the roots, has been used to adulterate the oil of *Acorus calamus*[245].

dwatta Astringent Cathartic Emetic Emmenagogue OdontalgicThe fresh root is astringent, cathartic, emetic, emmenagogue and odontalgic[4, 7, 61]. A slice of the root held against an aching tooth is said to bring immediate relief[244]. It was at one time widely used as a powerful cathartic but is seldom used nowadays because of its extremely acrid nature[4]. It can also cause violent vomiting and diarrhoea[244]. When dried the root loses its acidity and then only acts as an astringent[4].

nrakta Europe, including Britain, from Norway south and east to N. Africa the Caucasus and W. Asia. ksacta Damp marshy areas, swampy woods and in shallow water or wet ground on the edges of rivers and ditches[17]. Often found in shady places[4].

propta Seed - best sown as soon as it is ripe in a cold frame[4]. Stored seed should be sown as early in the year as possible in a cold frame. A period of cold stratification improves germination time and rates. 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 in March or October. Early autumn is best[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:Container, Specimen. Prefers a humus rich soil[79]. Succeeds in water up to 15cm deep[24]. Requires a moist soil, especially in early summer. Prefers a position in semi-shade[188]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A delicately scented essential oil is obtained from the dried roots[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Some named forms have been selected for their ornamental value[187]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, 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].

6.2.51 *Salix hookeriana*

Dune Willow

5 tlin 9 cyuc 1 kcaak 3 tcan 2 dwat 1 m hkuc htut cyutli tucphja7n hwicli hrasjlutnyikfrip hpa7tli flat-prikhso hpa7tmwatli nyanhjen hjonli

drutta *Salix hookeriana* is a deciduous Shrub growing to 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 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in saline soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcaakta 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 - raw or cooked. They are not very palatable[172]. The leaves have been used as a flavouring in cooked foods[257].

tcanta Basketry Fibre Hair Miscellany WoodStems are very flexible and are used in basket making[61, 118]. Tolerates maritime exposure[11, 200]. 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 has been used extensively in basket making[257]. Fibres from the inner bark can be twisted into long ropes[226]. The soft roots have been used as a towel to rub down after bathing[257]. An infusion of the roots has been used as a hair wash[257]. Wood - light, soft, close grained[82]. Dynamic accumulator.

dwatta Anodyne Antidote Febrifuge MiscellanyThe leaves have been used as an antidote to shellfish poisoning[257]. 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 Western N. America - Alaska to California. ksacta Borders of salt marshes and ponds, also on sandy coastal dunes[82]. Streams, ponds and sloughs near the shore[229].

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 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]. Rarely thrives on chalk[200]. Tolerates maritime exposure[11, 200]. A fast-growing but short-lived species[229]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.52 *Rumex hydrolapathum*

Great Water Dock

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tucphja7nhs6s hwicli hrasjlutnyik hpa7tli prikliwis hpa7tmwatli xre7t hjonli

drutta *Rumex hydrolapathum* is a PERENNIAL growing to 1.8 m (6ft). 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 September. The species is hermaphrodite (has both male and female

heart rate and relaxes spasms[238]. It needs to be used under the supervision of a qualified practitioner since the bark readily causes vomiting[238]. In China, the bark is a popular remedy for dysentery and other complaints of the bowels[4]. In one clinical trial, 81 out of 82 patients were cured of dysentery when they were given this herb[254]. A tincture of the root-bark has been used successfully in the treatment of cardiac palpitations, asthma and epilepsy[4]. Tree-of-heaven is a folk remedy for asthma, cancer, diarrhoea, dysentery, dysmenorrhoea, dysuria, ejaculation (premature), epilepsy, eruption, fever, gonorrhoea, haematochezia, leucorrhoea, malaria, metrorrhagia, sores, spasms, spermatorrhoea, stomachic, tumours of the breast (China), and wet dreams[269]. The bark is harvested in the spring and dried for later use[7]. The leaves, bark of the trunk, and roots are put into a wash to treat parasitic ulcers, itch, and eruptions[269]. In Korea, the root bark is used in the treatment of coughs, gastric and intestinal upsets[269]. The stem bark is emmenagogue[218]. The leaves are anthelmintic, astringent and deobstruent[218]. The fruit is used in the treatment of bloody stools and dysentery[218, 269]. They have also been used to treat ophthalmic diseases[269]. Extracts from the plant are bactericidal[218]. The tree is used in homeopathic remedies for cancer[269]. A resin extracted from the roots and leaves is a revulsive or vesicant[269].

nrakta E. Asia - China. Naturalized in Britain[17]. ksacta Uplands[147].

propta Seed - best sown outdoors as soon as it is ripe[78]. If you only have a small quantity of seed it will probably be better to sow it in a cold frame. The germination can be poor[80], averaging about 56%[98], though one kilo of seed will normally produce in the region of 6,500 usable plants[269]. The seed germinates best if given a short cold stratification of 8 weeks[80, 113]. The seed is not usually produced in Britain[80]. Prick out the seedlings into individual pots when they are large enough to handle, keep them in a cold frame for their first winter and plant them out in late spring[K]. Root cuttings in December[113]. Suckers, planted out in late winter.

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible. A very tough and easily grown tree, succeeding under most conditions, the Tree of Heaven is resistant to most diseases and is also reported to be tolerant of alkalinity, drought, frost, heat, high pH, hydrogen fluoride, low pH, pollution, SO₂, poor, dry or wet soils, heavily polluted soils and industrial pollution[200, 269]. The plant prefers a light moist soil and a sheltered position[1, 133]. Prefers a position in full sun or partial shade[238]. The tree is estimated to tolerate an annual precipitation of 30 to 250cm (tolerating a dry season up to 8 months), an annual average temperature of 10° to 20°C, and a pH of 5.5 to 8.0. Growing on the smallest of city plots and rubbish heaps, this species obviously can tolerate a wide array of soils, from acid to alkaline, sand to light clay, well-drained to swampy, poor to rich. It is said to do poorly on chalky soils or compact clay[269]. Plants are hardy to at least -15°C[200]. A very ornamental tree, it has a somewhat tropical appearance and is fast growing when young[1, 7, 14], though it is rather short-lived[229]. The trees send up suckers freely and soon form dense thickets[7, 200, 229]. The plant has become a noxious weed in parts of Australia and is rather weed-like in many other countries[238, 269]. The roots are rather aggressive and can cause damage to drainage systems[226]. The plants thrive even when growing in very polluted cities[11, 229] and so have been used as street trees and as shade-trees in parks[268], they do not do well in the north of Britain, however[98]. Male flowers are malodorous and have potentially allergenic pollen[80, 200]. The crushed leaves are also malodorous[226]. The large leaves have glandular teeth near their base and these release a pungent aroma when pressed[245]. The disagreeable odour of the plant may cause some people to feel sleepy[269]. This tree is occasionally cultivated for its wood[149]. This is brittle however, and branches are very liable to break off in the wind[200]. Trees coppice readily[200]. The leaves were once used as a food for silkworms[2], but were found to be unsuitable[7]. This species is notably resistant to honey fungus[88, 200]. Dioecious. Male and female plants must be grown if seed is required[269]. Special Features:Not North American native, Invasive, Attractive flowers or blooms.

6.2.48 Salix aegyptiaca

5 tlin 9 cyuc 1 kcaak 2 tcan 2 dwat 4 m hkuc
htut cyutli tcuphja7n hwicli hrasljutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix aegyptiaca is a deciduous Shrub growing to 4 m (13ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from January to February. 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers Inner bark LeavesEdible Uses: Drinklnner bark - raw or cooked. It can be dried, ground into a powder and added to cereal flours for use in making bread etc. A famine food, it is only used when all else fails[172]. Young shoots - cooked. They are not very palatable[172]. Male catkins - sugared[11, 177]. A perfumed drink is made from the catkins[11].

tcanta Dynamic accumulator:
dwatta Anodyne FebrifugeThe 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 N. Africa to W. Asia. ksacta Mountains in Asia[50].

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 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]. Rarely thrives on chalk[200]. Closely related to *S. cinerea*[1]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.49 Peucedanum palustre

Marsh Hog's Fennel, Hogfennel

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flat-prikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta Peucedanum palustre is a BIENNIAL 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 species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

kcakta Edible Parts: Edible Uses: CondimentThe root can be used as a ginger substitute[2, 4, 17, 115, 183].

dwatta Antispasmodic Epilepsy StimulantThe root is stimulant[4]. It is used in the treatment of epilepsy[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Altai and Urals. ksacta Fens and marshes, usually on calcareous soils[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 this is possible otherwise in early spring. When they are

and breast pains[207], it is also used in treating stomach ailments[222].

nrakta Eastern N. America - Rhode Island to Florida, west to Texas and Minnesota. ksacta Wet soil, fresh or slightly brackish water to depth of 50cm from sea level to 500 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in early autumn. Sow stored seed in late winter or early spring. Keep the pots moist by standing them in shallow water[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in spring[1, 200]. The plants spread freely and division is possible at almost any time in the growing season. Divisions taken in mid to late summer should be overwintered in pots in a cold frame and then be planted out in late spring. Regular division maintains the vigour of the plant[200].

nwatta This is a plant for a boggy area of the garden, it is able to withstand temporary flooding[56]. It prefers a loamy soil[1] growing well in pond margins though it spreads vigorously[56]. It can succeed in damp sites in the woodland as well as in the bog garden[200]. Prefers a position in full sun but tolerates some shade[188]. Plants are fairly cold tolerant, but are best given a protective mulch in the winter[56]. The flowers are fragrant[245].

5.2.132 Ranunculus flammula

Lesser Spearwort, Greater creeping spearwort
4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta Ranunculus flammula is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 and can grow in water.

pcista All parts of the plant are poisonous when fresh, the toxins are destroyed by heat or by drying[4, 10, 19, 21, 65]. The plant also has a strongly acid juice that can cause blistering to the skin[65, 183].

dwatta The whole plant is strongly rubefacient[4]. A tincture of the plant is used to cure ulcers[4].

nrakta Most of Europe, including Britain, to temperate Asia. ksacta Common in wet places throughout Britain[4].

propta Seed - sow spring in situ. This plant does not really need any encouragement. Division in spring. 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 A plant of boggy soils and shallow water, it prefers a loamy soil and a sunny position. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.133 Sarracenia purpurea

Pitcher Plant, Purple Pitcherplant, Huntsman's Cup, Purple Pitcher Plant, Sweet Pitcher Plant, Cums
4 tin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc
hmimhtut cyutli hja7n hwicli hrasljutnyik hpa7tli frusflat-prikhwisslip hpa7tmwatli xre7t hjonli

drutta Sarracenia purpurea is an evergreen 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 3. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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 wet soil.

dwatta Diuretic Hepatic Kidney Laxative Oxytoxic Stomachic Tonic Women's complaintsThe root and leaves are diuretic, hepatic, laxative, stomachic and tonic[4, 61, 222]. They are used in the treatment of dyspepsia, constipation,

liver and kidney complaints[61]. A cold decoction of the whole plant has been used in the treatment of whooping cough[257]. An infusion of the dried leaves has been used in the treatment of fevers and shakiness[257]. An infusion of the leaves has been used to make childbirth easier and also for sickness associated with an absence of menstrual periods[257]. An infusion of the leaves was at one time considered to be a cure for smallpox[4, 257], Arizona State University reached a positive outcome testing *Saracenia Purpurea* vs. smallpox. Results illustrate conclusively that this herb is able to kill the virus. An infusion of the roots has been used in the treatment of smallpox[207, 213]. A decoction of the root has been given to women to help expel the afterbirth and to prevent sickness after childbirth[257]. A strong decoction of the root has been used in the treatment of spitting blood and pulmonary complaints[257].

nrakta Eastern N. America - Labrador, south to Kentucky, Iowa and Florida. Naturalized in C. Ireland[17]. ksacta Sphagnum bogs and peaty barrens[43].

propta Seed - we have no information for this species but would suggest sowing the seed in light shade in a cold frame as soon as it is ripe if possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them out 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. Consider giving the plants some protection from the cold for their first winter outdoors. Division might be possible.

nwatta Landscape Uses:Container, Specimen, Woodland garden. Grow in sun or partial shade in peat or moss[188]. Requires a moist but well-drained position[4]. Plants require continuously moist conditions in a loose compost of sphagnum peat, live sphagnum and coarse acid sand[260]. They can be grown successfully in a plastic basin or in a pot that is standing in a deep saucer of water[260]. An insectivorous plant[61], it is best grown in a boggy position[1] in a soil that is low in nitrogen. The leaves form cups which become filled with water in which insects become trapped, drown and are digested by the plant[4]. A very ornamental and polymorphic plant[200], it is becoming very rare in the wild and is on the CITES II list of endangered species. Special Features: Attractive foliage, North American native, Naturalizing.

5.2.134 Parnassia palustris

Grass Of Parnassus, Marsh grass of Parnassus, Mountain grass of Parnassus, Alaska grass of Parnass
4 tin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc
hmimhtut cyutli hja7n hwicli hrasljut hpa7tli flatprikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta Parnassia palustris is an evergreen Perennial growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to October. 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) and medium (loamy) 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 wet soil.

dwatta Astringent Diuretic Ophthalmic Sedative Tonic VulneraryThe whole plant is astringent, slightly diuretic, sedative, tonic and vulnerary[7, 9]. A decoction is occasionally used as a mouthwash in the treatment of stomatitis[7]. The dried and powdered plant can be sprinkled onto wounds to aid the healing process[7]. The plant is harvested in the summer or autumn and can be dried for later use[7]. A distilled water made from the plant is an excellent astringent eye lotion[7].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Greece and temperate Asia. ksacta Wet moorland, marshes and raised bogs to quite a high altitude[7, 17].

propta Seed - sow as soon as it is ripe in late autumn in a cold frame in pots of soil that are standing in shallow water. 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.

nwatta Succeeds in moist peaty soils or in spongy bogs[1]. Requires an alkaline soil[200]. Plants can be naturalized in marshy grass[200].

5.2.135 Primula involucrata

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc hmim cyutli tucphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Primula involucrata 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].

5.2.136 Iris versicolor

Blue Flag, Harlequin blueflag

4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlit hpa7tli flatprikwis hpa7tmwatli fyfjxre7t hjonli

drutta Iris versicolor 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. 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) and medium (loamy) 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 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]. Fresh root can cause nausea and vomiting. The volatile oil furfural is irritant to mucous membranes and causes lachrymation (tears) and inflammation of the eyes. Irritation of the throat and headache also reported. The sap can cause dermatitis. Should not be used internally except in small doses. Should not be used by people with allergies or sensitivities [301].

tcanta Litmus Repellent WeavingA fine blue infusion is obtained from the flowers and this can be used as a litmus substitute to test for acids and alkalis[4]. The leaves have been used to weave baskets and mats[257]. Some native North American Indian tribes used the root as a protection against rattlesnakes. It was believed that, so long as the root was handled occasionally to ensure the scent permeated the person and their clothes, rattlesnakes would not bite them. Some tribes even used to chew the root and then hold rattlesnakes with their teeth and were not bitten so long as the scent persisted[257].

dwatta Alterative Antinflammatory Cathartic Cholagogue Diuretic Emetic Sialagogue StimulantBlue flag was one of the most popular medicinal plants amongst various native North American Indian tribes[213]. In modern herbalism it is mainly employed to detoxify the body - it increases urination and bile production and has a mild laxative effect[254]. Some caution should be exercised in its use, however, since there are reports that it is poisonous[222]. The fresh root is quite acrid and when taken internally causes nausea, vomiting, colic and purging[4, 238]. The dried root is much less acrid[4]. This remedy should not be prescribed for pregnant women[238]. The root is alterative, anti-inflammatory, cathartic, cholagogue, diaphoretic, diuretic, emetic and sialagogue[21, 46, 165, 238]. Taken internally as a tea, the root has been used as a strong laxative or emetic that also acts strongly on the liver and promotes the excretion of excess body fluids[4, 213]. It is also stimulant for the circulatory and lymphatic system[165]. Its detoxifying effect make it useful in the treatment of psoriasis, acne, herpes, arthritis, swollen glands, pelvic inflammatory disease etc[238, 254]. Externally, it is applied to skin diseases, wounds and rheumatic joints[238]. The roots are harvested in late summer and early autumn and are usually dried for later use[4, 238]. The roots were boiled in water and then mashed to make a poultice which was used to relieve the pain and swelling associated with sores and bruises[213].

nrakta Eastern N. America - Newfoundland to Manitoba, south to Florida and Arkansas. ksacta Swamps, wet meadows, scrub and by lakes and rivers[187]. Wetlands[21].

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 early autumn after flowering, but can also be done in mid-spring. 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 Prefers growing in marshy conditions[1]. Very easily grown in any damp soil[42]. Prefers a heavy rich moist soil[4] and partial shade[188]. Prefers a sunny position[233]. Plants are hardy to about -25°C[187]. This species has been cultivated by the N. American Indians as a medicinal plant[207, 213]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

5.2.137 Woodwardia areolata

Netted chain fern

4 tlin 9 cyuc 0 kcaak 3 tcan 0 dwat 0.3 m hkuc hmim cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Woodwardia areolata is a deciduous 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 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista None Known

kcaakta None Known

tcanta Groundcover. A medium to high density ground-cover that will work in a wet and shady spot. Garden Uses: Shade gardens, native plant gardens, woodland gardens or naturalized areas. Also effective along streams and ponds [368-1]. Provides shelter for frogs, toads, newts.

nrakta Eastern and southern North America from Nova Scotia, Canada, south to Florida and Texas, USA. It is most abundant on the coastal plain of the eastern United States, scattered in the Ouachita and Boston mountains, Ozark and Cumberland plateaus, and the Piedmont, but not in the high Appalachians, the heavy gumbo soils of the Mississippi Valley, or the limestone regions of the Interior Low Plateaus (Flora of North America Editorial Committee 1993+). ksacta Found in acidic bogs, seeps, wet woods, meadows and fields, swamps, wetland margins; but rarely on rock of siliceous cliffs and ledges on northern edge of range.

propta Propagate by spores or rhizome division.

used as a tinder[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, bows, 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.

6.2.47 Ailanthus altissima

Tree Of Heaven

5 tlin 8 cyuc 1 kcaak 5 tcan 3 dwat 25 m hkuc hmimhtut cyutli hgatkuyctucphja7n hwicli hyishrasjlut hpa7tli flatprikkwis hpa7tmwatli nyanhjen hjonli

drutta Ailanthus altissima is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, 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. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor 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 and can tolerate drought. The plant is not wind tolerant. It can tolerate atmospheric pollution.

pcista The plant is possibly poisonous[7, 20]. Male flowers have potentially allergenic pollen[200]. The leaves are toxic to domestic animals[269]. Gardeners who fell the tree may suffer rashes[269]. The odour of the foliage is intensely disagreeable and can cause headache and nausea, rhinitis and conjunctivitis[269].The pollen can cause hay fever[269].

kcaakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105]. Used as an emergency food in times of scarcity, they have an offensive odour[2, 177, 178]. Some caution is advised, see the notes above on toxicity.

tcanta Dye Hedge Hedge Herbicide Insecticide Repellent Soil reclamation Soil stabilization Tannin WoodA yellow dye is obtained from the leaves[7]. The leaves contain 12% tannin, quercetin, as well as isoquercetin, and the alkaloid linuthine[218, 269]. The leaves and wood are high in cellulose and are used in paper-making[7, 74]. The crushed leaves and flowers are insect-repellent[14]. The plant parts, when steeped in water, are said to yield an insecticidal solution[218, 269]. An aqueous extract of the leaves contains a substance that is toxic to other tree seedlings[240]. When plants are put into marshy areas they drain the soil and thereby remove mosquito breeding sites[254]. The plants have extensive root systems and sucker freely, they can be used in soil-stabilization programmes[149]. Since the plant is tolerant of soil pollution it can also be used in land reclamation schemes on old mine tips etc[200]. Plants can be grown as a tall hedge[14]. Wood - fairly hard, heavy, difficult to split, not durable, coarse grained. Though little used, except in poorer countries, the wood is suitable for cabinetry, cellulose manufacture, furniture, lumber, pulp, and woodwork. It is difficult to split but easy to work and polish. The wood is also used locally for charcoal and firewood[4, 46, 149, 178, 269]. Yields of 20 cubic metres per hectare is possible for this light wood[269].

dwatta Anthelmintic Antibacterial Anticonvulsant Antidiarrhoeal Antispasmodic Astringent Bitter Cardiac Deobstruent Diuretic Dysentery Emetic Emmenagogue Epilepsy Febrifuge Malaria RubefacientThe tree of heaven is not often used in Western herbal medicine, though it is more popular in the Orient. Various parts of the plant are used, though the bark is the part most commonly used - however, it contains a glycoside that has not been fully researched and so should be used with caution[7]. The root and stem bark are antispasmodic, astringent, bitter, cardiac depressant, diuretic, emetic, febrifuge, rubefacient and vermifuge[4, 61, 147, 176, 178, 218, 238]. The vermifuge properties do not act on round worms or earthworms[269]. A nauseatingly bitter herb, it is used internally to treat malaria and fevers, it also slows the

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].

6.2.44 Typha minima

5 tlin 9 cyuc 2 kcaak 0 tcan 3 dwat m hkuc htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Typha minima is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from May to August, and the seeds ripen from June 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Oil Pollen Root SeedEdible Uses: OilThe following notes are for other members of this genus, but they probably also apply to this species:- Roots - raw or cooked. They can be boiled and eaten like potatoes or macerated and then boiled to yield a sweet syrup. The roots can also be dried, ground into a powder and then used as a thickener in soups etc or added to cereal flours. Rich in protein, this flour is used to make biscuits, bread, cakes etc. Seed - cooked. The seed is rather small and fiddly to utilize, but has a pleasant nutty taste when roasted. An edible oil is obtained from the seed. Due to the small size of the seed this is probably not a very worthwhile crop[K]. Pollen - raw or cooked. A protein rich additive to flour used in making bread, porridge etc. It can also be eaten with the young flowers, which makes it considerably easier to utilize. The pollen can be harvested by placing the flowering stem over a wide but shallow container and then gently tapping the stem and brushing the pollen off with a fine brush[9]. This will help to pollinate the plant and thereby ensure that both pollen and seeds can be harvested[K].

dwatta Anticoagulant Diuretic Emmenagogue HaemostaticThe pollen is diuretic, emmenagogue, haemostatic[176]. The dried pollen is said to be anticoagulant, but when roasted with charcoal it becomes haemostatic[238]. It is used internally in the treatment of kidney stones, haemorrhage, painful menstruation, abnormal uterine bleeding, post-partum pains, abscesses and cancer of the lymphatic system[222, 238]. It should not be prescribed for pregnant women[238]. Externally, it is used in the treatment of tape-worms, diarrhoea and injuries[238].

nrakta Europe to eastern Asia. ksacta In shallow water of ponds and rivers in northern China[266].

propta Seed - surface sow in a pot and stand it in 3cm of water. Pot up the young seedlings as soon as possible and, as the plants develop, increase the depth of water. Plant out in summer. Division in spring. Very easy, harvest the young shoots when they are about 10 - 30cm tall, making sure there is at least some root attached, and plant them out into their permanent positions.

nwatta Grows in boggy pond margins or shallow water. Requires a rich soil if it is to do well. Succeeds in sun or part shade.

6.2.45 Phalaris canariensis

Canary Grass, Annual canarygrass

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Phalaris canariensis is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 6. It is in leaf from May to October, in flower from July to September. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - cooked. Widely grown as a food for caged birds, the seed is rather small but can also be used as a cereal for making porridge etc[2]. It can be ground into a flour and used for

making cakes, puddings etc[2, 22, 46, 61, 74, 115]. Leaves - cooked[106]. The young plant is used[177].

nrakta Europe - Mediterranean. ksacta Dry open habitats[50]. A casual of waste places in Britain[17].

propta Seed - sow spring in situ[162].

nwatta An easily grown plant, succeeding in an ordinary garden soil[1]. It is tolerant of most conditions, dry or wet[200]. Cultivated for its seed which is commonly used in wild bird food mixes[1].

6.2.46 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 hrasjlutnyikfrip hpa7tli flatprikliwsslip 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 hardness. 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 fibre, 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

nwatta A deciduous, perennial, colony-forming, waxy green, deciduous fern. Prefers organically rich, medium to wet, well-drained soils in part shade to full shade. Does well in average garden soils and will take considerable sun as long as soils are kept consistently moist[368-1]. Soil pH: Acidic (pH<6.8). Typically occurs in woodland swamps and bogs. Bloom Time: Non-flowering. Bloom Description: Non-flowering. Can be mistaken for *Onclea sensibilis*. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.138 Gentiana saponaria

Harvestbells

4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Gentiana saponaria is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Antidote Appetizer Bitter Digestive Stomachic TonicThe root is said to be an antidote to snakebites[61]. This N. American species has medicinal properties practically identical with the European gentians[4]. The following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is antelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta Eastern N. America - Ontario to Minnesota, Connecticut, Florida and Louisiana. ksacta Wet soils[235] in woodlands[200].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. The compost must be rich in organic matter and should not be allowed to become dry[239]. The seed can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow up very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in

a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species grows well in the woodland garden[200], it requires a lime-free soil[239]. Plants are intolerant of root disturbance[200]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1].

6 5 tlin

6.1 bwon

6.1.1 Alnus tenuifolia

Mountain Alder, Thinleaf alder

tfo2n 5 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli tcuphja7n hwicli hysjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Alnus tenuifolia is a deciduous Tree growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardness. 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: FlowersEdible Uses: Catkins - raw or cooked. A bitter taste[172].

tcanta Pioneer Soil stabilization Tannin WoodThis 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 TonicThe 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.

nwatta 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].

6.1.2 *Alnus cordata*

Italian Alder
tfo2n 5 tlin 9 cyuc 0 kcaak 4 tcan 0 dwat 25 m hkcuc
hmimhtut cyutli kyuctcuphja7n hwicli hysijlutnyikfrip hpa7tli flatprikliwis 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 ShelterbeltAn 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.

nwatta 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 nitrogen. 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].

6.1.3 *Gleditsia aquatica*

Water Locust
tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 0 dwat 12 m hkcuc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Gleditsia aquatica* is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from July to August, and the seeds ripen from October to December. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. It can tolerate atmospheric pollution.

tcanta Soil stabilization WoodHaving an extensive root system, it is planted for stabilizing wet banks and marshes[200]. Wood - heavy, very hard, strong, durable in contact with the soil, coarse-grained[82, 229]. It weighs 46lb per cubic foot[235]. The wood is extremely durable and is used primarily for making fence posts[229].

nrakta South-eastern N. America - N. Carolina to Florida, west to Texas, Indiana and Arkansas. ksacta Rich lands of river valleys that are subject to inundation, often for a considerable part of the year[82, 229].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°C. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200]. Tolerates atmospheric pollution[200]. Rather tender when young, it grows best in S. Britain[11]. A slow-growing tree[11], it is growing well at the Hillier Arboretum in Hampshire where a tree was 7 metres tall and 8 metres wide in 1993[K]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent top storey tree in a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen.

destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves RootEdible Uses: Young fronds - cooked[105, 177]. An edible starch is obtained from the rhizome[105, 177].

nrakta E. Asia - China, Japan. ksacta Moist places all over Japan[58, 200].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, 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. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Plants are hardy to at least -20°C, they are evergreen in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Closely related to *O. regalis*[1].

6.2.42 *Lilium pardalinum*

Panther Lily, Leopard lily, Pitkin Marsh lily, Vollmer's lilyShasta lily, Wiggins' lily
5 tlin 9 cyuc 2 kcaak 2 tcan 0 dwat 2 m hkcuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lilium pardalinum* is a BULB growing to 2 m (6ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained 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: RootEdible Uses: Bulb - cooked[143, 257]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (*Solanum tuberosum*).

tcanta Landscape Uses: Border, Container, Massing, Seashore, Specimen. Ornamental. Hardy bulb. US native to moist meadows and streambeds.

nrakta South-western N. America - California to Oregon. ksacta Stream banks and springy places to 2000 metres, forming large colonies near the coastal range[47, 71].

propta Seed - autumnal hypogaeal germination. Best sown as soon as ripe in a cold frame, it should germinate in spring[163]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division in autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out. Bulbils - gather in late summer when they start to fall off the stems and pot up immediately. Grow on in a greenhouse until large enough to go outside[163].

nwatta Succeeds in almost any soil that is moist but not water-logged[47, 143]. Prefers a wet soil on a slope or a well-drained soil with a high water table[90]. Tolerates

lime[47, 90, 163]. Succeeds in full sun but rapidly deteriorates if grown in deep shade[143]. Fairly wind resistant but is best grown in a sheltered position[47, 143]. Very ornamental and easily grown[1], the plant is rhizomatous, forming clumps[47]. The plant increases rapidly by division, each bulb producing 5 new bulbs per year[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very variable plant, it is divided into a number of sub-species[270]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features: North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers. Heat Zone: 8-5.

6.2.43 *Darmera peltata*

Umbrella Plant, Indian rhubarb, Indian Rubarb, Indian Rubarb

5 tlin 8 cyuc 2 kcaak 3 tcan 0 dwat 1.2 m hkcuc
hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Darmera peltata* is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft 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 leaf from May to October, 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Oil StemEdible Uses: OilLeafstalk - peeled and eaten raw, cooked like asparagus or added to soups and stews[46, 61, 105, 183, 257].

tcanta Oil Soil stabilizationCan be grown as a ground cover plant in a sunny position[188]. Plants should be spaced about 60cm apart each way[208]. Useful as a soil stabilizer for marshy land or muddy banks[200, 233].

nrakta South-western N. America - California to Oregon. ksacta By the banks of mountain streams below 1800 metres[187]. By or in cold mountain streams[60].

propta Seed - surface sow as soon as it is ripe or in early spring in a cold frame[188]. Keep the soil very moist. The seed usually germinates in 1 - 3 months at 15°C. 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 in spring[31]. 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:Erosion control, Specimen. Succeeds in sun or shade[31] in a wet soil or shallow water[60]. Although quite cold-hardy when dormant, 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]. There is at least one named form. 'Nana' is a dwarf form, growing only 30cm tall and so is more suited for the small garden[200]. It also makes a good ground cover[208]. The plant comes into flower before the leaves appear[188]. Individual leaves are up to 30cm across[233]. Special Features: Attractive foliage, North American native, Wetlands plant, 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.

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 WoodAgroforestry Uses: The tree has been used in restoring degraded bottomland hardwood forests of the Southeastern USA[1050]. Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the partially decayed leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc, and these will in time break down to add humus and nutrients to the soil. Fresh leaves should be used with caution, however, since as these decay they utilize some of the nitrogen in the soil and thus can 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 and is also used by many cultures to make ink[4 , 331]. The bark of oak trees is also usually rich in tannins and can be used as a dyestuff and for waterproofing rope[331 , K]. The wood is heavy, hard, very strong, tough, dense, durable, easy to split[82 , 171 , 235]. It weighs 50lb per cubic foot[235]. It machines well, but is subject to checking and warping if not dried properly. It is largely used for flooring, furniture, boxes, barrels, boat making and veneer[229 , 1050]. The wood is a favoured fuel - burning well and giving off a lot of heat[331 , 229]

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].

nrakta South-eastern N. America - Delaware to Indiana, Missouri, Florida and Texas. ksacta Inundated bottoms, stream borders and swamps[43].

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, 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]. Closely related to Q. prinus[11]. This species is often confused with Q. prinus, Q. prinoides and Q. muehlenbergii[200]. 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[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, Wetlands plant, Inconspicuous 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].

6.2.39 Cardamine macrophylla

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine macrophylla is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. 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 Bees, flies,

Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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: LeavesEdible Uses: Leaves and young shoots - cooked[105, 177].

nrakta E. Asia - China, Himalayas, Siberia. ksacta Forests and streamsides, 2100 - 3600 metres from Pakistan to S.W. China, most common in the west of its range[51].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in the spring. 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 Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200]. Best grown in cool places by water[1]. A very ornamental plant[1], it is hardy to about -15°c[187].

6.2.40 Cardamine rotundifolia

American Water Cress, American bittercress 5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine rotundifolia is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to August, and the seeds ripen from May to September. 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. 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[105, 161, 177]. A hot water-cress like flavour[2, K].

nrakta Eastern N. America - New York to Ohio, Missouri, North Carolina and Kentucky. ksacta Cold springs and brooksides[43, 235].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 so long as they are not dry[1]. Grows wild in shallow water[235]. Prefers a moist humus rich soil in shade or semi-shade[200]. A mat-forming stoloniferous species[200].

6.2.41 Osmunda japonica

Zenmai 5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikkwis hpa7tmwatli hjonli

drutta Osmunda japonica is a FERN growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

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

Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.4 Lotus uliginosus

Greater Bird's Foot Trefoil tfo2n 5 tlin 9 cyuc 0 kcaak 3 tcan 0 dwat 0.4 m hkuc hktut cyutli tcuphja7n hwicli hyishrsjlutnyik hpa7tli frusflatprikkwis hpa7tmwatli xre7t hjonli

drutta Lotus uliginosus 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 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. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor 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 or wet soil.

pcista No reports of toxicity have been seen for this species but at least one member of the genus contains toxic cyanogenic glycosides[65, 76].

kcakta None Known tcanta Insecticide Soil reclamationAn insecticide is obtained from the plant[153]. No more details are given. This species is used as a pioneer plant in the reclamation of peat and pumice soils and on other wet acid soils that are unsuitable for the more commonly used Trifolium spp[200]. Nitrogen Fixer.

nrakta S.W. Europe - Portugal, Spain. ksacta Marshes, ditches, freshwater margins and wet grassland[50, 200].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in the spring or autumn. The seed usually germinates in 2 - 4 weeks at 15°c. If seed is in short supply, it can be sown 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 or early summer.

nwatta Succeeds in wet acid soils[200]. Dislikes shade[200]. Does well on poor soils[61]. Suitable for naturalistic and conservation plantings in situations that approximate to its natural habitat[200]. A good bee plant[74]. 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].

6.2 mran

6.2.1 Crataegus pennsylvanica

5 tlin 9 cyuc 5 kcaak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikkwisslip 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].

6.2.2 Crataegus arnoldiana

Arnold Hawthorn 5 tlin 9 cyuc 5 kcaak 0 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikkwisslip 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: FruitEdible 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 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 - 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].

6.2.3 Crataegus schraderana

Blue hawthorn

5 tlin 9 cyuc 5 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjutnytkfrip hpa7tli flatpriklwisslip 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 tolerates 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].

greenhouse until they are large enough to plant out, which might take a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Very easy, single canes of the current years growth can be used. Pot them up in light shade in a greenhouse. Make sure the foliage is not allowed to dry out - misting 2 - 3 times a day for the first couple of weeks following division can be very helpful. Plant out in the summer once they are growing away strongly. Cane layering in May. Detach individual canes and lay them horizontally in trenches 15cm deep. New shoots should arise from each joint. Rhizome cuttings.

nwatta One of the easiest bamboos to grow in Britain, it prefers an open loam of fair quality and a position sheltered from cold drying winds[1, 11, 29] but it tolerates maritime exposure[75, 166]. Succeeds on peaty soils[11]. Succeeds in soils that are half earth and half stone[195]. Requires abundant moisture and plenty of organic matter in the soil[200]. Endures near-saturated soil conditions[200]. Dislikes drought[1]. A very ornamental plant[1], it is said to be the hardiest bamboo[25], tolerating temperatures down to about -15°c[200]. Down to -24°c according to another report. In warmer parts of Britain plants can attain a height of 6 metres or more. The rootstock is running and very invasive[25]. It is fairly easy to control, however, if any new shoots that are not wanted are broken off whilst they are still small and brittle. New shoots appear from April[25]. This species is notably resistant to honey fungus[200]. Plants often flower lightly for a number of years without dying out though they seldom produce viable seed[122]. Occasionally the plants can produce an abundance of flowers and this severely weakens, though does not usually kill, the plants. They can take some years to recover. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Many plants flowered heavily in the late 1980's and are only slowly recovering.

6.2.36 Carex elata

Tufted Sedge, Golden Variegated Sedge, Tufted Sedge
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjutnytk hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Carex elata is an evergreen Perennial growing to 1.2 m (4ft) by 1.5 m (5ft in) at a medium 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 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. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61]. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200].

nrakta Most of Europe, including Britain, south to Algeria and east to the Caucasus. ksacta By fen ditches and in wet places by rivers and lakes in base-rich soils[17, 50].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[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 summer or following spring.

nwatta Landscape Uses: Border, Foundation, Ground cover, Massing, Specimen. Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Wetlands plant, Inconspicuous flowers or blooms.

6.2.37 Bidens tripartita

Burr Marigold, Threelobe beggarticks
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tucphja7n hwicli hrasjutnytk hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bidens tripartita is a ANNUAL growing to 0.6 m (2ft) 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 September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hover-flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177, 183].

tcanta Dye RepellentYields a black dye[178]. The part of the plant that is used is not specified. The burning herb repels insects and flies[268]. The flowers yield a yellow dye of indifferent quality when alum is used as a mordant[4, 115, 268].

dwatta Antiseptic Aperient Astringent Diuretic Emmenagogue Febrifuge Narcotic Sedative StypticBurr marigold is little used as a medicine nowadays, but it was once esteemed for its styptic properties being used to quickly staunch blood flow - it was often used to treat uterine haemorrhage and conditions producing blood in the urine[254]. The whole plant is antiseptic, aperient, astringent, diuretic, emmenagogue, febrifuge, narcotic, sedative, styptic and sudorific[4, 61, 165, 218]. It is an excellent remedy for ruptured blood vessels and bleeding of any kind, and is of benefit to people with consumption[4]. It is used internally to treat bladder and kidney problems, blood in the urine, uterine bleeding, ulcerative colitis and peptic ulcers[238, 254]. Externally, it is used in the treatment of alopecia[238]. It is usually combined with a carminative herb such as ginger when used to treat digestive tract ailments[254]. The plant is harvested as it comes into flower and is dried for later use[238].

nrakta Most of Europe, including Britain, north to 63° , east to W.Asia. ksacta Ditches, pond and lake margins, sides of streams etc[17].

propta Seed - sow in situ during early spring and only just cover the seed. So long as the soil does not dry out, the seed usually germinates in 2 - 3 weeks at 15°c[134].

nwatta Succeeds in any moderately fertile damp to wet soil in full sun[200, 238]. The flowering heads smell like rosin or cedar when they are burnt[4]. The seed coats have reflexed prickles which allow them to adhere to clothing, animal fur etc[4]. When growing on the edge a pond, these seeds have been known to kill goldfish by adhering to their gills[4].

6.2.38 Quercus michauxii

Swamp Chestnut Oak

5 tlin 9 cyuc 2 kcaak 3 tcan 2 dwat m hkuc hmimhtut cyutli tucphja7n hwicli jutnytk hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus michauxii is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 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. 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 tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[2, 46, 161]. The seed is large, up to 35mm long and 30mm wide[82], but contains bitter tannins[183]. Other reports say that the acorns are sweet and edible[82, 235]. The seed can be roasted then dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The bitter tannins 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

7, 13, 46, 66]. An excellent fuel, burning well even when green[6]. There is some doubt over how well the green wood burns with several people claiming that it needs to be properly seasoned[K].

dwatta Antiperiodic Astringent Carmative Cathartic Diaphoretic Diuretic Laxative Purgative TonicThe leaves are astringent, cathartic, diaphoretic, mildly diuretic, laxative and purgative[4, 7, 9, 13, 21, 165, 254]. The have been used as a laxative, making a mild substitute for senna pods[254]. The leaves should be gathered in June, well dried and stored in airtight containers[4]. The bark is antiperiodic, astringent and a bitter tonic[4, 240]. Little used in modern herbalism, it is occasionally taken in the treatment of fevers[254]. The seeds, including their wings, have been used as a carminative[4]. They will store for 12 months if gathered when ripe[4].

nrakta Europe, including Britain south of latitude 64°, to N. Africa and W. Asia. ksacta Forming woods on calcareous soils in the wetter parts of Britain, also in oakwoods, scrub, hedges etc[17]. It is also often found on acid soils[17].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Approximately 5% of stored seed will germinate in the first year, the remainder germinating in the second year[186]. 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. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds. Cuttings of mature wood, placed in a sheltered outdoor bed in the winter, sometimes strike.

nwatta Landscape Uses:Firewood, Pollard, Specimen. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants can succeed in very exposed positions, including maritime exposure, though they can become wind-shaped[49]. Thrives in alkaline soils[11] but not in shallow soils over chalk. Tolerates a pH as low as 4.5, but prefers a base-rich soil above 5.5[186]. Trees are surprisingly tolerant of seasonally water-logged soils[186]. Dislikes dryness at the roots, especially in late spring[186]. Very intolerant of shade, young plants fail to develop properly in such a position and often die. Although the dormant plant is very cold-hardy, 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]. A fast growing tree, it is sometimes cultivated for its valuable timber. Very tolerant of cutting, ash was also at one time frequently coppiced for its wood[186]. However, modern use of plastics have reduced its economic values. There are many named varieties, selected for their ornamental value[11]. Trees have a light canopy and cast little shade[186]. A food plant for many insect species, there are 41 associated insect species[24, 30]. Trees can be male, female, monoecious or hermaphrodite, they can also change sex from year to year[11]. Trees take 30 - 40 years to flower from seed[186]. The flowers are produced on one-year old wood[7]. This species is notably resistant to honey fungus[200]. Special Features: Not 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].

6.2.34 Cardamine kitabelii

5 tlin 9 cyuc 2 kcak 0 tcan 0 tcan 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta Cardamine kitabelii 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 6. It is in flower from April

to May. 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. 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: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. A mild cabbage flavour with a hint of cress[K]. Flowers - raw[K]. A mild cabbage flavour with a hint of cress[K].

nrakta Europe - southern Switzerland, northern Italy and Yugoslavia. ksacta Not known

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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 Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1]. This species was seen growing and thriving in well-drained soil in a lightly shaded position at Kew[K].

6.2.35 Pseudosasa japonica

Metake - Bamboo

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 4.5 m hkuc pcmhmimhtut cyutli tcuphja7n hwicli hyhshrasjltunyk hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta Pseudosasa japonica is an evergreen Bamboo growing to 4.5 m (14ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. 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, prefers well-drained soil and can grow in nutritionally poor 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 or wet soil. The plant can tolerate maritime exposure.

pcista Shoots may contain toxic cyanogens (removed by cooking)[301]. Do not use during pregnancy [301].

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[2, 105, 177]. Harvested in the late spring when about 8 - 10cm above ground level, cutting the stems 5cm or more below soil level. They have a rather bitter flavour[K]. Seed - used as a cereal[105]. Small quantities of seed are produced in many years but it is seldom viable.

tcanta Hedge Hedge Plant support Soil stabilization-Plants can be grown along the river edge to protect the banks from erosion[195]. Canes are fairly thin walled but make very good plant supports[25, 75, 195]. Smaller canes can be plaited together and used as screens or as lathes for walls and ceilings[195]. Tolerant of maritime exposure, it can be grown as a screen or windbreak hedge in very exposed positions[75, 166]. The culms make an excellent wind filter, slowing its speed without creating turbulence. The leaves may look somewhat tattered by the end of the winter but plants will soon produce new leaves[K].

dwatta Abortifacient Anthelmintic Antivinous Aphrodisiac Stimulant TonicAnthelmintic, antivinous, stimulant, tonic[178]. Used orally in Chinese medicine for asthma, coughs and gallbladder disorders. In India leaves are used for spasmodic disorders of the stomach and to arrest bleeding [301]. Leaves used as a aphrodisiac [301].

nrakta E. Asia - Japan. Frequently naturalized in Britain. ksacta Woodland and damp places, forming thickets in open country, C. and S. Japan[162].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°C. Stored seed is best sown as soon as it is obtained. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Prick out the seedlings when they are large enough to handle and grow them on in a lightly shaded place in the

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].

6.2.4 Crataegus ellwangeriana

Scarlet Hawthorn

5 tlin 7 cyuc 5 kcak 2 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikhwisslip 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: FruitEdible 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 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. 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[80]. 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].

6.2.5 Crataegus azarolus

Azarole

5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikhwisslip hpa7tmwatli 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: FruitEdible 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 taste[89]. In warm temperate areas the fruit develops more fruit sugars and has a fragrant sugary pulp with a slightly acid 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 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 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].

6.2.6 Crataegus champlainensis

Quebec hawthorn

5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwattl 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.

kaakta Edible Parts: FruitEdible 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 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 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.

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]. 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].

6.2.7 Crataegus laciniata

5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 6 m hkc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwisslip hpa7tmwattl 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.

kaakta Edible Parts: FruitEdible 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 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 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 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

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.

kaakta 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 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 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].

6.2.32 Mimulus guttatus

Yellow Monkey Flower, Seep monkeyflower
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkc
hmimhtut cyutli tcuphja7nsh6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwattl 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.

kaakta 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.

6.2.33 Fraxinus excelsior

Ash, European ash, Common Ash
5 tlin 8 cyuc 2 kcaak 3 tcan 2 dwat 30 m hkc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwattl nyanhjen hjonli

drutta Fraxinus excelsior 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 4 and is not frost tender. It is in leaf from May to October, in flower from April to May, and the seeds ripen from September to January. 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. 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 or wet soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous to ruminants[76], it has also caused dermatitis in some people[76].

kaakta Edible Parts: Manna Oil SeedEdible Uses: Oil TeaImmature seed - usually pickled by steeping in salt and vinegar, and then used as a condiment for other foods[2, 8, 66, 183]. The leaves are sometimes used as an adulterant for tea[2, 177, 183]. A manna is obtained from the tree[183]. No further details are given. An edible oil similar to sunflower (Helianthus annuus) oil is obtained from the seed[7].

tcanta Dye Fuel Oil Shelterbelt String Tannin WoodA green dye is obtained from the leaves[7]. The bark is a source of tannin[4]. A tying material can be obtained from the wood[6] (does this mean the bark?). Very tolerant of extreme exposure and relatively fast growing, though often windshaped in exposed positions, it can be grown as a shelterbelt tree[49, 200]. However, it is late coming into leaf and also one of the first trees to lose its leaves in the autumn and this makes it less suitable in a shelter belt. Wood - hard, light, flexible, strong, resilient. A very valuable wood, it is much used for tool handles, oars, furniture, posts etc[4, 6,

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].

6.2.29 Samolus valerandi

Brookweed, Seaside brookweed
5 tlin 9 cyuc 2 ckak 0 tcan 1 dwat 0.3 m hkuc
htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli prikwis hpa7tmwatli fyfjre7t hjonli

drutta Samolus valerandi is a PERENNIAL growing to 0.3 m (1ft). 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 July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

ckaakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[46, 61]. A rather bitter flavour[K].

dwatta AntiscorbuticThe leaves are antiscorbutic[46, 61].

nrakta Most regions of the world, including Britain, usually near the sea. ksacta Wet places, especially near the sea[17], also in shallow water, avoiding acid soils and shade[56].

propta Seed - surface sow in a cold frame in the spring, standing the pot in about 3cm of water. Prick out the seedlings when they are large enough to handle and gradually increase the depth of water as the plants grow until it is level with the tops of the pots. Plant out in the summer if there has been sufficient growth, otherwise plant out in late spring of the following year. Division in spring.

nwatta Succeeds in ordinary garden soil in a wet position or in shallow water[1, 200]. Dislikes shade or acid soils.

6.2.30 Quercus petraea

Sessile Oak, Durmast oak

5 tlin 8 cyuc 2 ckak 0 tcan 3 dwat 40 m hkuc
hmimhtut cyutli tcuphja7n hwicli jutnyikfrip hpa7tli frusflat-prikwis 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.

ckaakta 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 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 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]. 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 Antiseptic Astringent 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 side 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 polarded 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.

6.2.31 Crataegus nigra

Hungarian Hawthorn

5 tlin 9 cyuc 2 ckak 0 tcan 2 dwat 6 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Crataegus nigra is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy

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].

6.2.8 Typha domingensis

Southern Cattail

5 tlin 12 cyuc 4 ckak 3 tcan 3 dwat 3 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprik-wishom hpa7tmwatli hjonli

drutta Typha domingensis is a PERENNIAL growing to 3 m (9ft 10in). 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: light (sandy), medium (loamy) and heavy (clay) 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 wet soil and can grow in water.

ckaakta Edible Parts: Flowers Leaves Oil Pooled Root Seed StemEdible Uses: OilRhizomes - raw or cooked[145]. A sweet flavour[105, 277]. Rich in starch, around 30 - 46%, they can be boiled and eaten like potatoes or macerated and then boiled to yield a sweet syrup[172]. The rhizome can also be dried, ground into a powder and then used as a thickener in soups etc or added to cereal flours. Rich in protein, this flour is used to make biscuits, bread, cakes etc[183]. The rhizomes at the base of erect shoots are mostly horizontal, unbranched, up to 70 cm long and 5 - 40mm in diameter. They are starchy, firm and scaly[270]. The root contains a lot of fibre[193]. One way to remove this fibre is to peel lengths of the root that are about 20 - 25cm long, place them by a fire for a short while to dry and then twist and loosen the fibres when the starch of the root can be shaken out[193]. Young shoots in spring - raw or cooked[193]. An asparagus substitute. The inner core is eaten[172]. The young shoots are cut from the underground stems in the spring when they are about 10 - 40cm long[277]. The base of the mature stem - raw or cooked. It is best to remove the outer part of the stem. The base of the stem where it attaches to the rhizome can be boiled or roasted like potatoes[277]. Young flowering stem - raw, cooked or made into a soup. Tastes like sweet corn[172]. Seed - cooked. The seed is rather small and fiddly to utilize, but has a pleasant nutty taste when roasted. Edible oil is obtained from the seed[85]. The seeds contain about 18 - 20% oil, of which 69% is linolenic acid[270]. Due to the small size of the seed, this is probably not a very worthwhile crop. Pollen - raw or cooked. A protein-rich additive to flour used in making bread, porridge etc[105, 183]. It can also be eaten with the young flowers, which makes it considerably easier to utilize. The pollen is a bright yellow or green colour, and turns pancakes, cookies or biscuits a pretty yellow colour[277]. The pollen can be harvested by placing the flowering stem over a wide but shallow container and then gently tapping the stem and brushing the pollen off

with a fine brush[9]. This will help to pollinate the plant and thereby ensure that both pollen and seeds can be harvested[K].

tcanta Biomass Compost Fibre Filter Fuel Insulation Miscellany Oil Paper Roofing Soil stabilization String Stuffing Thatching Tinder Waterproofing WeavingAgroforestry Uses: The plant's extensive root system makes it very good for stabilizing wet banks of rivers, lakes etc[200, 418]. It can be grown in reed beds and other water purification systems in order to remove various kinds of pollutants from the water and soil. The top growth is removed once or twice during the growing season - it can either be used as a fuel or the materials recovered from it[270]. Other Uses: The stems and leaves have many uses, they make a good thatch, being used on roofs, to make walls and floor coverings[13, 46, 57, 61, 94, 145, 257, 270]. They can be used in weaving to make items such as mats, chairs, hats and other handicrafts[13, 46, 57, 61, 94, 270]. They can be used as a caulking material for barrels, boats etc[270]. A fibre obtained from the leaves and stems can be used in making paper[13, 46, 57, 61, 94]. A fibre obtained from the roots can be used for making string[193]. The plant produces large amounts of biomass, comparable to the most productive agricultural crops. This is a potential source of energy - it can, for example, be used for alcohol manufacture[270]. On a domestic level, the stems make an excellent addition to the compost heap or can be dried and used as a source of fuel etc. The hairs of the fruits are used as a stuffing material for pillows, mattresses, toys etc[46, 57, 159]. They have good buoyancy properties and have been used in life preservers. They also have excellent insulation properties and have been used in construction[171, 270]. The female flowers make an excellent tinder and can be lit from the spark of a flint[212]. The pollen is highly inflammable and is used in making fireworks[115].

dwatta Astringent Diuretic Haemostatic Miscellany VulneryThy The leaves are diuretic[218]. The pollen is astringent, desiccant, diuretic, haemostatic and vulnery[176, 218]. It is used in the treatment of nose bleeds, haematemesis, haematuria, uterine bleeding, dysmenorrhoea, postpartum abdominal pain and gastralgia, scrofula and abscesses[176]. It is contraindicated for pregnant women[176]. The seed down is haemostatic[218]. The rootstock is astringent and diuretic[240].

nrakta Widespread in tropical, subtropical and warm temperate regions. ksacta Brackish to fresh marshes and pools in N. America at elevations from sea level to 2000 metres[43, 270].

propta Seed - surface sow in a pot and stand it in 3cm of water. Pot up the young seedlings as soon as possible and, as the plants develop, increase the depth of water. Plant out in summer. Division in spring. Very easy, harvest the young shoots when they are about 10 - 30cm tall, making sure there is at least some root attached, and plant them out into their permanent positions.

nwatta A plant of the warm temperate zone through to the tropics, where it is found at elevations up to 1,500 metres. It grows best in areas where annual daytime temperatures are within the range 16 - 28°C, but can tolerate 14 - 30°C[418]

]. When dormant, the plant can survive temperatures down to about -25°C, but young growth can be severely damaged at 0°C[418]

]. It prefers a mean annual rainfall in the range 400 - 1,400mm, but tolerates 250 - 1,600mm[418]

]. Succeeds in sun or part shade[200

]. Grows in boggy pond margins or shallow water to 15cm deep[1

, 200

]. Requires a rich wet soil if it is to well[200

]. Tolerates moderate levels of salt[418

]. Prefers a pH in the range 6.5 - 7.5, tolerating 6 - 8[418

]. Plants can be very invasive, spreading freely at the roots when in a suitable site[200

]. Typha domingensis aggressively invades and forms nearly pure stands in brackish or nutrient-enriched wetlands in the Florida Everglades and elsewhere. It is established but does not mature fruits on the cold coast of northern California[270

].

6.2.9 Nasturtium x sterile

Brown Watercress

5 tlin 9 cyuc 4 kcaak 0 tcan 3 dwat 0.5 m hkuc

htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwattli fyfcre7t hjonli

drutta Nasturtium x sterile 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 6 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, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista Whilst the plant is very wholesome and nutritious, some care should be taken if harvesting it from the wild. Any plants growing in water that drains from fields where animals, particularly sheep, graze should not be used raw. This is due to the risk of it being infested with the liver fluke parasite[5, 244]. Cooking the leaves, however, will destroy any parasites and render the plant perfectly safe to eat[244].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 5, 7, 9, 16, 27]. Water cress is mainly used as a garnish or as an addition to salads, the flavour is strong with a characteristic hotness[183]. It has a reputation as a spring tonic, and this is its main season of use, though it can be harvested for most of the year and can give 10 pickings annually[238]. Some caution is advised if gathering the plant from the wild, see the notes above on toxicity. The leaves are exceptionally rich in vitamins and minerals, especially iron[200]. A nutritional analysis is available[218].

tcanta Hair MiscellanyThe juice of the plant is a nicotine solvent and is used as such on strong tobaccos[7].

dwatta Antiscorbatic Depurative Diuretic Expectorant Hypoglycaemic Miscellany Odontalgic Purgative Stimulant Stomachic TB Vitamin CWatercress is very rich in vitamins and minerals, and has long been valued as a food and medicinal plant[254]. Considered a cleansing herb, its high content of vitamin C makes it a remedy that is particularly valuable for chronic illnesses[254]. The leaves are antiscorbatic, depurative, diuretic, expectorant, purgative, hypoglycaemic, odontalgic, stimulant and stomachic[4, 7, 9, 21, 46, 222, 238]. The plant has been used as a specific in the treatment of TB[4]. The freshly pressed juice has been used internally and externally in the treatment of chest and kidney complaints, chronic irritations and inflammations of the skin etc[9]. Applied externally, it has a long-standing reputation as an effective hair tonic, helping to promote the growth of thick hair[244]. A poultice of the leaves is said to be an effective treatment for healing glandular tumours or lymphatic swellings[244]. Some caution is advised, excessive use of the plant can lead to stomach upsets[9, 21]. The leaves can be harvested almost throughout the year and are used fresh[238].

nrakta Western Britain in Britain and France. ksacta Stream margins, ditches, flushes etc with moving water[17, 27], usually in chalk or limestone areas[52].

propta Cuttings can be taken at any time in the growing season. Virtually any part of the plant, including a single leaf, will form roots if detached from the parent plant[56]. Just put it in a container of water until the roots are well formed and then plant out in shallow water.

nwatta Watercress is easily grown when given the correct conditions of slowly flowing clean water, preferably coming from chalky or limestone soils[264]. It prefers to grow in water about 5cm deep[37] with an optimum pH 7.2[200]. Plants can be grown in wet soil if the position is somewhat shaded and protection is given in winter, though the flavour may be hotter[27, 37]. Hardy to about -15°C[200]. Brown watercress is often cultivated for its edible leaves, there are some named varieties[16, 183]. The plant is very sensitive to pollution so a clean source of water is required[200]. Plants will often continue to grow all through mild winters. A fast-growing plant, the stems trail along the ground or float in water and produce new roots at the leaf nodes, thus making the plant very easy to propagate vegetatively[238]. Unfortunately, virus diseases have become more common in cultivated plants and so this species is seldom cultivated at present[264]. This is a sterile hybrid, so does not form seed.

It has been produced in the wild by natural hybridisation between the diploid species *N. officinale* and the triploid *N. microphyllum*[264]. The flowers are a rich source of pollen and so are very attractive to bees[7].

6.2.10 Gaultheria hispidula

Creeping Snowberry

5 tlin 9 cyuc 4 kcaak 4 tcan 1 dwat 0.1 m hkuc

hmim cyutli tcuphja7n hwicli hrasjlut hpa7tli frusflatprik hpa7tmwattli xre7t hjonli

drutta Gaultheria hispidula is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) 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 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. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked. Pleasantly acid and refreshing[3, 101], with a delicate flavour of wintergreen[183]. An agreeable sub-acid taste, similar to *G. shallon*[2, 11]. They can be made into delicious preserves[183]. The fruit is about 6mm in diameter[200]. Leaves - raw or cooked[207]. The leaves are used to make a tea[2, 95, 161, 257]. A mild flavour of wintergreen[183]. Said to be superior to china tea[207].

tcanta MiscellanyA useful fast growing ground cover plant for shady positions.

dwatta Cancer Cytostatic MiscellanyThe plant is said to remove the cancerous taint from the body[4]. An infusion of the leaves has been used as a tonic for a person who has overeaten[257].

nrakta Northern N. America. ksacta Coniferous forests and mountains in the alpine and sub-alpine zones[62]. Cold wet woods and bogs[235].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a lime-free compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°C, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping off[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins[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. Layering.

nwatta Prefers a moist but not boggy humus rich soil in shade or semi-shade[11]. A peat and moisture loving species, it requires a lime-free soil[11]. The fruit is sometimes sold in local markets[61]. A fast growing plant[200]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. Plants in this genus are notably resistant to honey fungus[200]. *Gaultheria japonica* bears a close resemblance to *G. hispidula* (L.) Bigelow of N. America and sometimes treated as a variety or subspecies of the latter. *G. japonica*, however, has calyx much longer than the bracteoles, ovate and acute calyx lobes, and shorter anther projections. In *G. hispidula* the calyx is as long as or slightly longer than the bracteoles, the calyx lobes are broadly ovate and obtuse or subacute, and the anthers have distinct projections. 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 mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is flat

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].

6.2.27 Nasturtium microphyllum

Watercress, Onerow yellowcress

5 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat m hkuc

htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwattli fyfcre7t hjonli

drutta Nasturtium microphyllum 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 6 and is not frost tender. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Leaves SeedEdible Uses: ConditionLeaves - raw or cooked[2, 5, 7, 9, 16, 27]. Exceptionally rich in vitamins and minerals, especially iron[200]. The leaves are mainly used as a garnish or as an addition to salads, the flavour is strong with a characteristic hotness[183]. The seed can be sprouted and eaten in salads[183]. A hot flavour. The seed is ground into a powder and used as a mustard[46, 183]. The pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild but bitter mustard[238].

dwatta Antiscorbatic Diuretic Expectorant Purgative Stimulant StomachicAntiscorbatic, diuretic, expectorant, purgative, stimulant, stomachic[4, 9, 21, 46]. Use with caution[21].

nrakta Europe, including Britain, to W. Asia. ksacta Stream margins, ditches, flushes etc with moving water[17, 27], usually in chalk or limestone areas[52].

propta Seed - sow spring in a pot emmersed to half its depth in water. Germination should take place within a couple of weeks. Prick out seedlings into individual pots whilst they are still small and increase the depth of water gradually until they are submerged. Plant out into a pond in the summer. Cuttings can be taken at any time in the growing season. Virtually any part of the plant, including a single leaf, will form roots if detached from the parent plant[56]. Just put it in a container of water until the roots are well formed and then plant out in shallow water.

nwatta Watercress is easily grown when given the correct conditions of slowly flowing clean water, preferably coming from chalky or limestone soils[264]. It prefers to grow in water about 5cm deep[37] with an optimum pH 7.2[200]. Plants can be grown in wet soil if the position is somewhat shaded and protection is given in winter, though the flavour may be hotter[27, 37]. Plants are hardy to about -15°C[200], they tolerate somewhat lower temperatures than the closely related *N. officinale*[200]. Watercress is often cultivated for its edible leaves, there are some named varieties[16, 183]. The plant is very sensitive to pollution so a clean source of water is required[200]. Plants will often continue to grow all through mild winters. A fast-growing plant, the stems trail along the ground or float in water and produce new roots at the leaf nodes, thus making the plant very easy to propagate vegetatively[238]. Unfortunately, virus diseases have become more common in cultivated plants and so most propagation is carried out by seed[264]. This is a triploid species. It has hybridised naturally in the wild with the diploid species *N. officinale* to produce the sterile hybrid *N. x sterilis* which

is also commonly cultivated as a salad crop[264]. The flowers are a rich source of pollen and so are very attractive to bees[7].

6.2.28 Crataegus heterophylla

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 6 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliws hpa7tmwattli 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.

kcakta 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 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 Europe to E. Asia - Spain to China. Rarely self-sown in Britain. ksacta 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]. Scarcifying 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,

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. 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 and can grow in water. The plant can tolerate maritime exposure.

kcakta Edible Parts: Root SeedEdible Uses: Root - raw or cooked. Rich in starch, it is usually dried and ground into a powder[2, 55, 74, 144]. The roots form tubers at intervals along their length and new plants are formed from these tubers. When first formed, the tubers are white and starchy with a sweet coconut-milk flavour, they become black and woody with age[193]. Tubers can be up to 2.5cm in diameter[193]. Seed - cooked[257]. They can be ground into a powder and used as a mush[257].

tcanta Basketry WeavingThe leaves are used in weaving and basketry[74, 257]. The leaves have been used to secure the edges of woven mats, as the warp for sandals, as the warps and twining wefts for clothing, to secure the edges of skirts etc[257]. They have been used to make twined mats for the insides of houses[257].

dwatta Astringent DiureticThe root is astringent and diuretic[240]. It is used in the treatment of amenorrhoea, dysmenorrhoea, abdominal pain or tumours for post-partum females, abdominal distension and indigestion[176].

nrakta Found in most regions of the world, including Britain, but absent from the Arctic. ksacta Along the seashore, in shallow water of tidal rivers, also in ditches and ponds near the sea, avoiding shady positions[1, 17].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, 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 wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200].

6.2.25 Cirsium foliosum

Elk thistle

5 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 0.6 m hkuc htut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli fyfcre7t hjonli

drutta Cirsium foliosum is a PERENNIAL growing to 0.6 m (2ft). 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, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves Oil Root StemEdible Uses: OilRoot - cooked[61, 85, 105, 161]. About the size of a carrot, they are sweet and well-flavoured though require long preparation[207]. The root is likely to be rich in inulin, a starch that cannot be digested by humans. This starch thus passes straight through the digestive system and, in some people, ferments to produce flatulence[K]. Plant crown[85]. No more details are given. Stems - peeled[161]. The peeled stems are a sweet potheb[207]. Tender with a sweet delicate taste[212].

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta N. America - Montana to Saskatchewan. ksacta Swales and other moderately moist and badly drained sites[60]

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C[164]. Division in spring or autumn.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. This species should tolerate wet soils[K].

6.2.26 Petasites japonicus

Sweet Coltsfoot, Japanese sweet coltsfoot, Butterbur
5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 0.6 m hkuc pcmhmmhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli nyahnjen hjonli

drutta Petasites japonicus is a PERENNIAL growing to 0.6 m (2ft) by 1.5 m (5ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in February, and the seeds ripen 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 Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

kcakta Edible Parts: Flowers StemEdible Uses: Leaf stalks - cooked and used like rhubarb[1, 2, 46, 116]. The stems can be up to 1.2 metres long[104]. They can be boiled and seasoned, pickled and used in winter soups or preserved in miso[183]. They can be boiled, dipped in cold water then peeled and baked - they have a pleasant fragrant taste[206]. Flower buds cooked or used as a flavouring[1, 22, 46, 61, 105]. A slightly bitter yet agreeable flavour[116, 206], they are much prized in Japan[183]. They can be eaten whilst still green with miso or boiled down in soy sauce[183]. The young flowering stems can be eaten cooked[206].

tcanta MiscellanyThe leaves of the sub-species *P. japonicus giganteus* are used as umbrellas by Japanese children[187]. The leaf stalks can be used as walking sticks[206]. Plants can be grown as ground cover in damp shady places[206]. They are too invasive for most gardens and should only be used where they have plenty of room[208].

dwatta Antiasthmatic Antispasmodic Expectorant Miscellany PoulticeThe plant (though the exact part of the plant used is not specified) is antiasthmatic, antispasmodic, expectorant and poultice[147]. A decoction is used in the treatment of chronic coughing and pulmonary 'deficiency', laboured or difficult breathing and asthma, constant sputum formation and pulmonary tuberculosis[147].

nrakta E. Asia - China, Japan, Korea. Naturalized in Britain. ksacta Moist woods and thickets[58].

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 Landscape Uses:Container, Ground cover, Massing, Woodland garden. 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]. Requires a moist shady position[187]. 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]. Its roots are very difficult to eradicate[200]. The sub-species *P. japonicus giganteus* has huge leaves up to 1.5 metres across on stems 2 metres tall[187]. It has a poorer flavour than the species type[206]. Sometimes cultivated in E. Asia as a food plant[1, 58]. Dioecious, male and female plants must be grown if seed is required. Special Features:Attractive foliage, Not North American native, Invasive, Wetlands plant, Flower characteristics are unknown. Petasites japonicus giganteus (Petasites japonicus subsp. giganteus F.Schmidt ex Kitam) is a larger version of Petasites japonicus commonly know as giant fuki. It can grow in similar hardiness zones to fuki but can grow in wetter conditions and tolerate more sun. It can grow to 5 ft (1.5m). The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold

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].

6.2.11 Gaultheria japonica

Creeping Snowberry

5 tlin 9 cyuc 4 kcak 3 tcan 1 dwat 0.1 m hkuc hmim cyutli tucphja7n hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Gaultheria japonica is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) 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 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. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked. Pleasantly acid and refreshing[3, 101], with a delicate flavour of wintergreen[183]. An agreeable sub-acid taste, similar to G. shallon[2, 11]. They can be made into delicious preserves[183]. The fruit is about 6mm in diameter[200]. Leaves - raw or cooked[207]. The leaves are used to make a tea[2, 95, 161, 257]. A mild flavour of wintergreen[183]. Said to be superior to china tea[207].

tcanta A useful fast growing ground cover plant for shady positions.

dwatta CancerThe plant is said to remove the cancerous taint from the body[4]. An infusion of the leaves has been used as a tonic for a person who has overeaten[257].

nrakta E. Asia - central and northern Japan. ksacta Mossy grounds under conifers at elevations of 1600 - 2000 metres[275].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a lime-free compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°C, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping off[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins[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. Layering.

nwatta Prefers a moist but not boggy humus rich soil in shade or semi-shade[11]. A peat and moisture loving species, it requires a lime-free soil[11]. A fast growing plant[200]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. Plants in this genus are notably resistant to honey fungus[200]. Gaultheria japonica bears a close resemblance to *G. hispida* (L.) Bigelow of N. America and sometimes treated as a variety or subspecies of the latter. *G. japonica*, however, has calyx much longer than the bracteoles, ovate and acute calyx lobes, and shorter anther projections. In *G. hispida* the calyx is as long as or slightly longer than the bracteoles, the calyx lobes are broadly ovate and obtuse or subacute, and the anthers have distinct projections.

6.2.12 Sagittaria cuneata

Wapato, arumleaf arrowhead

5 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 0.8 m hkuc htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprik-wisslip hpa7tmwatli hjonli

drutta Sagittaria cuneata 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 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 wet soil and can grow in water.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[257]. Slightly bitter raw[212], the roasted tubers are sweet-tasting[159, 161]. Those tubers found at the end of the rootstock are the best[159]. When broken off from the roots the tubers rise to the water surface and are then easily gathered[212].

dwatta Analgesic StomachicThe plant has been used to treat headaches[257]. The corms have been eaten as a treatment for indigestion[257].

nrakta N. America - Nova Scotia to British Columbia, south to Connecticut, Kansas, and California. ksacta Calcareous or muddy shores and shallow waters of rivers, lakes, ponds, pastures, and ditches, occasional in tidal waters, or in deep flowing water with slow current; 100 - 2500 metres[43, 270].

propta Seed - best sown as soon as it is ripe in a pot standing in about 5cm of water. Prick out the seedlings into individual pots when they are large enough to handle, and gradually increase the depth of water as the plants grow until it is about 5cm above the top of the pot. Plant out in late spring or early summer of the following year. Division of the tubers in spring or autumn. Easy. Runners potted up at any time in the growing season.

nwatta A pond or bog garden plant, it requires a moist or wet loamy soil in a sunny position[1, 200]. Succeeds in shallow, still or slowly flowing water. Plants are usually monoecious but dioecious forms are sometimes found[43]. A very polymorphic species[43]. In mud or shallow water the leaves are broad, but in deep water the plant only produces long slender leafstalks[212]. This plant has potential for commercial cultivation as a root crop[212].

6.2.13 Houttuynia cordata

Tsi, Chameleon, Rainbow Plant, Chameleon Plant

5 tlin 10 cyuc 4 kcak 2 tcan 3 dwat 0.6 m hkuc pcmihmm cyutli tucphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Houttuynia cordata 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 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 moist or wet soil and can grow in water.

kcakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: Teder young shoots and leaves - raw or cooked as a potheb[2, 61, 103, 183, 272]. The leaves and young shoots are harvested in the spring when about 8cm long[264]. Strongly aromatic according to one report[183] whilst others say that it is rather smelly and somewhat like rotten fish[105, 178]. Our experience is that the leaves have a delicious orange-like smell and make a marvellous flavouring in salads[K]. One report says that there are two distinct chemotypes of this species. Plants from Japan have an orange scent, whilst those from China have a smell resembling coriander leaves (*Coriandrum sativum*)[238]. Some people seem to really like this leaf, others are indifferent to it or strongly dislike it[K]. It also varies quite considerably according to the time of year. In the spring and summer it has a very acceptable flavour, but by autumn a distinct bitterness has crept in[K]. Root - cooked[177, 183]. Same comments on the smell as for the leaves[105]. Fruit[183]. No further details[K], but the fruit is a capsule that contains many small seeds[200].

tcanta A good ground cover plant[200]. Plants do not form a weed-suppressing cover[K]. A spreading plant, it should be spaced about 45cm apart each way[208].

dwatta Antibacterial Antidote Antiinflammatory Antiplogistic Antiviral Astringent Depurative Diuretic Dysen-

tery Emmenagogue Febrifuge Hypoglycaemic Laxative Ophthalmic Women's complaintsThe whole plant is antibacterial, antiinflammatory, antimicrobial, antiphlogistic, antiviral, depurative, diuretic, emmenagogue, febrifuge, hypoglycaemic, laxative and ophthalmic[103, 116, 147, 174, 176, 218, 238, 240, 279]. A decoction is used internally in the treatment of many ailments including cancer, coughs, dysentery, enteritis and fever[218]. Its use is said to strengthen the immune system[176]. Externally, it is used in the treatment of snake bites and skin disorders[238]. The leaves and stems are harvested during the growing season and used fresh in decoctions[238]. The leaf juice is antidote and astringent[218]. A root extract is diuretic[218, 240]. The root is also said to be used in medicinal preparations for certain diseases of women[240, 243]. The rhizomes yield a steroid, resembling sitosterol, which stimulates the secretion of antibiotic substances from a gram-positive spore-forming bacillus[240]. An active substance, effective in the treatment of stomach ulcers, has been extracted from the plant[240].

nrakta E. Asia - China, Japan, Himalayas. ksacta Shrubberies and damp places to 2400 metres in the Himalayas[51]. Often found as a weed in wet fields[187].

propta Seed - sow spring in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[31, 56]. Very quick and easy, it can be done successfully at almost any time in the growing season[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, Foundation, Ground cover, Massing, Woodland garden. Requires a moist to wet soil or shallow water, partial shade and a sheltered position[1, 31, 56, 238]. Whilst it grows best in a bog garden, it will succeed in moist garden borders[233] and has also grown fairly well in a dry soil in Cornwall[K]. It succeeds in full shade[208]. Plants are hardy to about -15°C[187], the top growth is killed back by frost though the roots are much hardier. Even the roots, though, can be killed in severe winters[56]. A very ornamental plant, there are some named varieties[187]. 'Chameleon' has very attractively variegated leaves with the same flavour as the species[K]. The bruised leaves emit a strong citrus smell rather like orange peel[K]. Plants have a widely spreading root system and are very invasive, though they are easier to control in drier soils[200]. Creeps harmlessly between ferns[187]. Cultivated as a salad crop in Vietnam[103] and in W. China[187]. Plants seem to be immune to the predations of rabbits[233]. Plants growing in an area with a high rabbit population were not eaten by them although other plants growing nearby were attacked[K]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Invasive, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms. 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]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.14 Crataegus pinnatifida major

Chinese Haw

5 tlin 9 cyuc 4 kca2 2 tcan 3 dwat 1 m hkuc hmimhtut cyuti hgattucpghja7n hrasjlnutnykfrp hpa7tli flatprikwlisslp hpa7tmwatl 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: FruitEdible Uses: 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 Cardiotonic Hypotensive Stomachic VasodilatorThe 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, cardiotonic, 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].

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 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 a gargle 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[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].

6.2.23 Oenanthe javanica

Water Dropwort, Java waterdropwort, Stolon waterdropwort 5 tlin 11 cyuc 3 kca2 3 tcan 2 dwat 1 m hkuc htut cyuti hja7nhs6s hwicli hrasjlnutnyk hpa7tli flatprikwlis hpa7tmwatl fyfuxre7t hjonli

drutta Oenanthe javanica is a PERENNIAL growing to 1 m (3ft 3in). 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 insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly

acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus that contains a number of very poisonous plants and so some caution is advised[K]. It is said to contain the alleged 'psychotherap' myristicine[218].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentYoung leaves and stems - raw or cooked[2, 46, 61, 105]. The leaves are also used as a seasoning in soups etc[179, 183]. The flavour is reminiscent of carrots or parsley[206]. The young shoots that sprout from the root in winter are best[116, 206]. A major vegetable in many parts of the Orient, the leaves are a rich source of vitamins and minerals [Analysis available][218]. Root - cooked. Highly esteemed in Japan[116], the roots can grow up to 30cm long in water[183]. Some caution is advised, see the notes above on toxicity. Seed is said to be edible[183].

tcanta EssentialSpreading rapidly by means of suckers, it makes a good ground cover plant for wet situations. The variegated cultivar 'Flamingo' has been especially recommended[200].

dwatta Depurative Febrifuge StypticThe whole plant is depurative, febrifuge and styptic[147, 178]. A decoction is used in the treatment of epidemic influenza, fever and discomfort, jaundice, haematuria and metrorrhagia[147]. The seed contains 3.5% essential oil. This is effective at large dilutions against pathogenic fungi[218].

nrakta E. Asia - China, Japan, Korea to Australia. ksacta Ditches, ponds and wet places in lowland areas all over Japan[58]. Marshlands, lakeshores, muddy stream banks and shallow water at elevations of 600 - 3000 metres in most parts of China[266].

propta Seed - sow spring in a cold frame. Germination is erratic[206]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring[206]. 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. Layering[200]. Stem tip cuttings[200]. Any part of the stem roots easily[206].

nwatta Requires a wet fertile soil or shallow water and a sunny position[200]. This plant is quite possibly not hardy in Britain, [200] gives a hardiness zone of 10, which means that it is not frost tolerant. However [58 and 266] say that it grows in all areas of China and lowland Japan and this should include areas that do experience frosts and snow. Another report says that many forms of this species are not frost-hardy, though some forms have hardy roots[206]. The sub-species *O. javanica rosthornii* is found at elevations up to 4000 metres in China and is sometimes also found in drier habitats such as grassland at forest margins[266] - this form should be harder than the species[K]. There is also a lot of confusion over the correct name for this species. Some reports give *O. stolonifera*. DC. or *O. stolonifera*. Wall as the correct name whilst other reports say that these names are synonyms of *O. javanica*. [200] says that *O. stolonifera japonica*. (Miq.)Maxim. is a synonym of *O. javanica*. The Flora of China treats this as a highly variable single species under the name *O. javanica* and recognizes at least one sub-species[266]. This species is occasionally cultivated for its edible root[183] or for its edible leaves according to another report[179], there are some named varieties[183]. There are two main forms of this species, a red form has edible shoots whilst a white form is grown for its medicinal root[178]. In Japan this plant and six other herbs are customarily boiled in rice gruel on January 7th[183]. The cultivar 'Su Zhou' is medium early and has few fibres plus an excellent taste[183].

6.2.24 Scirpus maritimus

Seaside Bulrush. Cosmopolitan Bulrush

5 tlin 9 cyuc 3 kca2 0 tcan 1 dwat 1 m hkuc htut cyuti tucpghja7nhs6s hwicli hrasjlnutnyk hpa7tli flatprikwlisslp hpa7tmwatl hjonli

drutta *Scirpus maritimus* 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. It is in flower from July to August, and the seeds ripen from August to September. The species

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. ksacta 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].

6.2.21 *Lysichiton americanus*

Yellow Skunk Cabbage, American skunkcabbage

5 tin 9 cyuc 3 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyikr hpa7tli flat-prikwlis hpa7tmwatli xre7t hjonli

drutta *Lysichiton americanus* is a PERENNIAL growing to 1 m (3ft 3in) by 0.8 m (2ft 7in) 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 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

pcista The plant is rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant[172].

ksakta Edible Parts: Leaves RootEdible Uses: Young shoots - these must be thoroughly cooked otherwise they are poisonous[172]. The native North American Indian tribes would cook them in several changes of water, the end result being a tasteless mush[172]. The leaves can be dried then powdered and used as a thickening agent[256]. Older leaves have been used to wrap up food that was being baked. The

leaves would impart a pleasant flavouring to the food[257]. Young flower stalks - cooked[256]. Only used when there was a shortage of other foods, the stalks must be thoroughly cooked or else they are poisonous[256]. It is said that no more than three stalks should be consumed at one meal[257]. Root - cooked. It must be thoroughly cooked or dried before use, otherwise it is poisonous[61, 105, 118, 207]. Rich in starch, a flour can be made from the dried and ground root[212]. The root has a hot flavour, somewhat like ginger[256]. The root is best harvested in the autumn[256].

tcanta Containers Lining Waxed paperThe leaves are large and water repellent, they can be used as a 'waxed paper' and also for lining fruit baskets etc and for wrapping food in for baking[99, 256]. They were also folded and used as containers for collecting berries, as drinking cups and as a covering or mat for food that was being dried[257]. The plants have very large leaves and form a slowly spreading clump. They can be grown as a ground cover, spaced about 1 metre apart each way[208].

dwatta Antispasmodic Blood purifier Poulitce SypticAntispasmodic, syptic[61, 172]. Yellow skunk cabbage was employed medicinally by several native North American Indian tribes who used it mainly as a poultice to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. Caution is advised, especially if using the plant internally, see the notes above on toxicity. A poultice of roots has been applied to swellings, sores, boils, burns and rheumatic joints[257]. A poultice of the heated blossoms has been applied to rheumatic joints[257]. A poultice of the leaves has been applied to scrofulous sores, burns, cuts, swellings and chest pains[257]. Heated leaves have been applied to the body in order to draw out splinters and thorns[257]. The leaves have also been used as a general tonic in a herbal sweat bath[257]. The raw root has been chewed by women in order to secure an abortion[257]. A decoction of the root has been drunk as a blood purifier[257].

nrakta Western N. America. Sometimes naturalized in Britain. ksacta Open swamps and wet woods near the coast[71], rarely flowering if in the shade[99].

propta The seed is best sown as soon as it is ripe in pots in a cold frame[134]. Keep very moist, preferably by emmersing the pot in 2 - 3 cm of water[200]. Germination is usually good, taking place within 1 - 2 months at 15°C[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water 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 the middle of autumn or mid to late winter, but no later than this because the plant will be coming into growth.

nwatta Requires a wet or damp humus-rich soil in full sun or semi-shade[200]. Plants often do not flower when grown in the shade[99]. Grows well by water or in the bog garden[1]. Succeeds in shallow water and also in still or flowing water[188]. Hardy to at least -15°C[200]. Young plants require protection from slugs[187]. Plants are slow to establish at first, taking some years, but can then become naturalized and often self-sow[200]. The flowers have an unpleasant aroma[187] which is rather like a combination of skunk, carion and garlic[245]. This smell attracts flies and midges in great numbers to pollinate the flowers and so spiders tend to like making their webs in the plant so they can catch lots of food[245]. Hybridizes with *L. camtschatscense*[200].

6.2.22 *Mentha aquatica*

Water Mint

5 tin 9 cyuc 3 kcaak 3 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikr hpa7tli flatprikwlis 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.

6.2.15 *Crataegus cuneata*

Sanzashi, Chinese hawthorn

5 tin 9 cyuc 3 kcaak 3 tcan 3 dwat 15 m hkuc hmimhtut cyutli hgatkucuphja7n hwicli hrasjlutnyikr hpa7tli flatprikwlisslip hpa7tmwatli xre7t hjonli

drutta *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.

ksakta Edible Parts: FruitEdible 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].

tcanta 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 CThe 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, antiarrhythmic, antidiabetic, 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 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]. 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].

6.2.16 *Crataegus flava*

Summer Haw, Yellowleaf hawthorn

5 tin 9 cyuc 3 kcaak 3 tcan 2 dwat 8 m hkuc hmimhtut cyutli hgatkucuphja7n hwicli hrasjlutnyikr hpa7tli flatprikwlisslip 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.

ksakta Edible Parts: FruitEdible Uses: 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 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 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.

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]. The fruit is sparsely produced in Britain[11]. A tree at Kew in September 1993 was fruiting heavily[K].

6.2.17 Crataegus pinnatifida

Chinese Haw

5 tlin 9 cyuc 3 kca2 2 tcan 3 dwat 7 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli flatpriklwisslip hpa7tmwattli 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.

ckaakta Edible Parts: FruitEdible Uses: 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 Alternative Antibacterial Anticholesterolemic Antidote Antiscorbutic Cardiotonic Deobstruent Hypotensive Laxative Stimulant Stomachic VasodilatorThe 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].

6.2.18 Crataegus aprica

5 tlin 9 cyuc 3 kca2 0 tcan 2 dwat 6 m hkuc
hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfriphpa7tli flatpriklwisslip hpa7tmwattli 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 seeds 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.

ckaakta Edible Parts: FruitEdible 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 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 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].

6.2.19 Crataegus pentagyna

5 tlin 9 cyuc 3 kca2 0 tcan 2 dwat 6 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli flatpriklwisslip hpa7tmwattli 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.

ckaakta Edible Parts: FruitEdible 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 1 cm 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 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].

6.2.20 Crataegus hupehensis

5 tlin 9 cyuc 3 kca2 0 tcan 2 dwat 5 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfriphpa7tli flatpriklwisslip hpa7tmwattli 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.

ckaakta 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

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

kcakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe straw is used for bedding[61].

nrakta Much of Europe, excluding the north but including Britain, N. Africa, W. Asia and the Caucasus. ksacta By slow flowing rivers, in ditches and ponds and occasionally on drier ground[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[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 summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. A very aggressive and invasive plant[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.56 *Filipendula multijuga*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrrip hpa7tli prikklwis hpa7tmwatli fyifkre7t 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.

kcakta Edible Parts: LeavesEdible Uses: Young shoot tips - cooked[116].

nrakta E. Asia - Japan. ksacta 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].

6.2.57 *Phalaris minor*

Small Canary Grass, Littleseed canarygrass

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Phalaris minor* is an ANNUAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to October, in flower from June to July. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Seed - cooked[257]. The seed can be ground into a flour and used in making bread, cakes etc. It is rather small and fiddly to utilize.

nrakta Europe - Mediterranean to northwest France. Naturalized, or perhaps native, in the Channel Islands. ksacta Sandy soils[17].

propta Seed - sow spring in situ[162].

nwatta An easily grown plant, succeeding in an ordinary garden soil[1]. It is tolerant of most conditions, dry or wet[200].

6.2.58 *Veronica scutellata*

Marsh Speedwell, Skullcap speedwell

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.1 m hkuc htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifkre7t hjonli

drutta *Veronica scutellata* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. A bitter flavour[85].

nrakta Europe, including Britain, from Iceland south and east to Spain and northern Asia to N. Japan. ksacta Ponds, bogs, wet meadows etc. often on acid soils[17].

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. If you have sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. 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.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Dislikes shade.

6.2.59 *Hydrocotyle sibthorpioides*

Water Pennywort, Lawn marshpennywort

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifkre7t hjonli

drutta *Hydrocotyle sibthorpioides* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from June 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. 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: LeavesEdible Uses: The whole plant is eaten raw or cooked as a potherb[61, 105, 183]. It has a parsley-like aroma[183].

dwatta Depurative FebrifugeDepurative, febrifuge. Resolves mucus formation[147]. The juice of the plant is used in the treatment of fevers[272]. A paste made from the plant is applied externally to wounds and boils[272]. The plant is decocted and used in the treatment of abscesses, boils, bruises, cirrhosis, colds, coughs, hepatitis, hepatoma, influenza, itch, jaundice, sinusitis and sore throat[218]. It is a Chinese herbal drug for hepatoma[218].

nrakta E. Asia - China, Japan. ksacta Shady places in lowland areas of C. and S. Japan[58]. Stream banks or forests in wet grassy places at elevations of 400 - 3000 metres in China[266].

propta Seed - we have no information on this species but suggest sowing it in early spring 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 of rooted runners. Probably best done in spring but

can be done at any time in the growing season if the plants are kept moist.

nwatta Requires a permanently moist position in sun or light shade[200]. Plants are occasionally found as weeds in damp lawns[1].

6.2.60 Lysichiton camtschaticense

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwtat 0.8 m hkuc hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Lysichiton camtschaticense is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from February to 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

pcista The plant is rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant.

kcaakta Edible Parts: LeavesEdible Uses: Young shoots - they must be thoroughly cooked otherwise they are poisonous[105].

tcanta The plants have very large leaves and form a slowly spreading clump. They can be grown as a ground cover, spaced about 1 metre apart each way[208].

nrakta E. Asia - Japan. ksacta Bogs and wet places, also by ponds and lakes[187].

propta The seed is best sown as soon as it is ripe in pots in a cold frame[134]. Keep very moist, preferably by emmersing the pot in 2 -3 cm of water[200]. Germination is usually good, taking place within 1 - 2 months at 15°C[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water 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 the middle of autumn or mid to late winter, but no later than this because the plant will be coming into growth.

nwatta Requires a wet or damp humus-rich soil in full sun or semi-shade[200]. Grows well by water or in the bog garden[1]. Succeeds in shallow water. Hardy to about -15°C[200] Young plants require protection from slugs[187]. Plants are slow to establish at first, taking some years, but they can then become naturalized and self-sow[208]. The flowers are sweetly scented according to one report[187], whilst another says that the plant emits an unpleasant animal smell[245]. Hybridizes with *L. americanus*[200].

6.2.61 Alisma plantago

Great Water Plantain, ZE-XIE, European water plantain, American water plantain, Northern water plan
5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwtat 0.9 m hkuc htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Alisma plantago-aquatica is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in). 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 July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista The fresh leaves and roots are toxic but the toxic principal is destroyed by heat or by drying[13, 46]. The seed is said to promote sterility. By contrast it is also said to promote conception [301].

kcaakta Edible Parts: Leaves RootEdible Uses: Root - cooked[13, 46, 61, 74]. Rich in starch[114]. Caution is advised, the root is acrid if it is not dried or well cooked

before use[2, 183]. Leaves and petioles - must be thoroughly cooked. They require long boiling and have a salty flavour[105, 179].

dwatta Antibacterial Anticholesterolemic Astringent Contraceptive Diaphoretic Diuretic Dysentery Hypoglycaemic Hypotensive Leprosy RubefacientThe leaves are antibacterial, anticholesterolemic, diaphoretic, diuretic, hypoglycaemic and hypotensive[4, 147, 176]. They are used in the treatment of cystitis, dysentery, renal calculus, gravel etc[4]. The fresh leaf is rubefacient[222]. It is used in the treatment of leprosy[218] and is also applied locally to bruises and swellings[4]. Dried stem bases eaten, or grated and taken with water in treating digestive disorders such as heartburn, cramps and stomach flu[257]. The powdered seed is an astringent, used in cases of bleeding[4]. The seed is also said to promote sterility[218]. The root contains an essential oil and has a wide range of medicinal uses[176, 218, 283]. It is antibacterial, anticholesterolemic, diuretic and hypotensive[176]. It is said to lower blood pressure, cholesterol and blood sugar levels[238] whilst it also has an antibacterial action on Staphylococcus, Pneumococci and Mycobacterium[176]. The root is used in the treatment of oliguria, oedema, nephritis, acute diarrhoea, cholesterolaemia and fatty liver[176]. It has been thought of as a cure for rabies, though this has not been substantiated[4]. The whole plant is believed to promote conception[218]. The root is harvested before the plant comes into flower and is dried for later use[238]. A homeopathic remedy is obtained from the fresh root[4].

nrakta Northern temperate regions of Europe, including Britain, Asia and America. ksacta Ditches, damp ground and shallow pond margins in water up to 15cm deep[13, 17, 24].

propta Seed - best sown in a cold frame as soon as it is ripe. Place the pot in about 3cm of water to keep the soil wet. Pot up the seedlings when large enough to handle and keep in the cold frame for the first winter, planting out in late spring. Division in spring or autumn. Fairly easy, the divisions can be planted straight out into their permanent positions.

nwatta Succeeds in a sunny position in boggy ground or shallow water up to 25cm deep[200]. Plants often self-sow aggressively when in a suitable position[1, 56]. The subspecies *A. plantago-maritima orientale*. Sam. is the form used medicinally in China[176]. The subspecies *A. plantago-maritima parviflorum* (Syn *A. parviflorum*, *A. subcordatum*) is the form used medicinally in America[222]. Plants are very attractive to slugs[K].

6.2.62 Hydrocotyle vulgaris

Pennywort
5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwtat 0.1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Hydrocotyle vulgaris 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 June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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.

kcaakta Edible Parts: LeavesEdible Uses: Leaves - cooked. A strong carrot taste[183], they cannot be eaten in quantity[144].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, Greece and the Caspian Sea. ksacta Bogs, fens and marshes, usually on acid soils[17].

propta Seed - we have no information on this species but suggest sowing it in early 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 would probably be worthwhile sowing the seed outdoors in situ in the spring. Division of rooted runners. Probably best done in spring but can be done at any time in the growing season if the plants are kept moist.

nwatta Requires a permanently moist position in sun or light shade[200]. Plants can be very invasive, though they are fairly easy to control by pulling out the rooted stems[200].

6.2.63 *Alisma canaliculatum*

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis
hpa7tmwatli xre7t hjonli

drutta *Alisma canaliculatum* 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 July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista Although no mention of toxicity has been seen for this plant, the fresh leaves and roots of the closely related *A. plantago-aquatica* are poisonous, though the toxins are destroyed by thoroughly cooking or drying the plant[[13, 46].

kcakta Edible Parts: LeavesEdible Uses: Young plants - cooked. Used in soups[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - S. China, Japan. ksacta Wet places all over Japan[58]. Margin of lakes, ponds, marshes and streams in China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Place the pot in about 3cm of water to keep the soil wet. Pot up the seedlings when large enough to handle and keep in the cold frame for the first winter, planting out in late spring. Division in spring or autumn. Fairly easy, the divisions can be planted straight out into their permanent positions.

nwatta Succeeds in a sunny position in boggy ground or shallow water up to 25cm deep[1, 200].

6.2.64 *Carex hirta*

Hammer sedge

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta *Carex hirta* 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 May to June, and the seeds ripen from June to July. 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. 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: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61].

dwatta DiureticDiuretic[61].

nrakta Most of Europe, including Britain, south to N. Africa and east to temperate Asia. ksacta Rough grassy places, woods, damp meadows and damp sandy hollows[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[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 summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.65 *Iris ensata*

Japanese Water Iris

5 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc
htut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta *Iris ensata* 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. 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. Suitable pH: mildly acid and neutral soils. It cannot grow in the 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 - the source of an edible starch[2, 105, 177]. Some caution is advised, see the notes above on toxicity.

tcanta Basketry Broom Fibre ThatchingA fibre is obtained from the leaves, a substitute for hemp[42]. It is used for rope and coarse cloth[74]. Also used in thatching and basket making[123]. The root is long and fibrous, it is used for making brooms, brushes etc[178].

dwatta Alterative Anthelmintic Antidote Appetizer Depurative Diuretic Hepatic VermifugeThe root is alterative, anthelmintic, antidote, appetizer, depurative, diuretic, hepatic and vermifuge[61, 178, 218]. It is used with other herbs in the treatment of venereal affections, liver complaints and dropsy[240].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Dry sandy plains near lakes, meadows, clay-solonetz places in steppes and solonetz meadows[74]. Marshes, ditches and wet grassy places[187].

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 in March or October. 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, Massing, Specimen, Woodland garden. Prefers a light well-drained soil and a sunny position[42]. Prefers partial shade[188]. Likes plenty of moisture and a rich loamy slightly acid soil[79, 200]. Requires a lime-free soil[233]. Some cultivars, in particular the 'Higo' strain, tolerate a pH up to 7.4[200]. Plants can be grown in containers in pond margins but are then best kept in drier conditions over winter[200]. This species is hardy to about -20°C[187]. Cultivated for its root in Japan[2]. (for the starch). There are many named varieties, selected for their ornamental value[187, 200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, North American native, All or parts of this plant are poisonous, Wetlands plant, Suitable for cut flowers.

6.2.66 *Sagittaria graminea*

Chinese Arrowhead, Grassy Arrowhead, Weatherby's arrowhead

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc
hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta *Sagittaria graminea* is a ANNUAL/PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked. Contains 4 - 7% protein[183]. Young shoots - cooked[183].

nrakta Eastern N. America - Newfoundland to Ontario, south to Texas and Florida. ksacta Shallow water and muddy or sandy shores[204]. Streams, lakes, and tidal areas from sea level to 700 metres[270].

propta Seed - best sown as soon as it is ripe in a pot standing in about 5cm of water. Prick out the seedlings into individual pots when they are large enough to handle, and

gradually increase the depth of water as the plants grow until it is about 5cm above the top of the pot. Plant out in late spring or early summer of the following year. Division of the tubers in spring or autumn. Easy. Runners potted up at any time in the growing season.

nwatta A pond or bog garden plant, it requires a moist or wet loamy soil in a sunny position[1, 200]. Prefers shallow, still or slowly flowing water up to 30 - 60cm deep. The edible roots are commonly found in Chinese markets[183]. There is some confusion over this name. The report that this plant is edible gives the name as *S. sinensis* and its range as Asia. However, the RHS Dictionary of Gardening says that *S. sinensis* is a synonym of *S. graminea* and that its range is Eastern N. America[200], whilst other reports say that it is a synonym of *S. sagittifolia* or *S. trifolia*[266]. The Flora of N. America says that *S. graminea* does not produce corms but has coarse rhizomes[270], which suggests that the report of edibility does not really belong here[K].

6.2.67 *Drosera rotundifolia*

Sundew, Roundleaf sundew

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 0.1 m hkuc
htut cyutli tcuphja7n hwicli hyishrasjlut hpa7tli frusflatprik-
wis hpa7tmwatli fyifxre7t hjonli

drutta *Drosera rotundifolia* is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in) 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 July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor 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 or wet soil.

kcaakta Edible Parts: Edible Uses: Curdling agentThe juice of the plant is used to curdle plant milks[177, 183]. You heat the milk and the leaves together in order to make the milk curdle[7].

tcanta FungicideSubstances in the plant are used to curb the growth of bacteria[13].

dwatta Antibacterial Antibiotic Antispasmodic Demulcent Expectorant Homeopathy Hypoglycaemic WartsThe sundew has a long history of herbal use, having been popular for its fortifying and aphrodisiac effects[238]. It relaxes the muscles of the respiratory tract, easing breathing and relieving wheezing and so is of great value in the treatment of various chest complaints[254]. The plant has become quite rare and so it should not be harvested from the wild[254]. The flowering plant is antibacterial, antibiotic, antispasmodic, antitussive, demulcent, expectorant and hypoglycaemic[4, 7, 9, 13, 21, 46, 165, 172, 222, 238]. The plant is used with advantage in the treatment of whooping cough, exerting a peculiar action on the respiratory organs[4]. It is also used in the treatment of incipient phthisis, chronic bronchitis and asthma[4]. Externally, it has been used to treat corns, warts and bunions[257].The plant is harvested in the summer and can be dried for later use[7]. Use with caution[21]. Internal use of this herb causes a harmless colouring of the urine[9]. An extract of the plant contains plumbagin, which is antibiotic against a wide range of pathogens[222, 238]. Because of their protein digesting enzymes, the leaf juice has been used in the treatment of warts and corns[4, 222]. The entire fresh plant, harvested when it is starting to flower, is used to make a homeopathic remedy[232]. It is used mainly in the treatment of coughs[232] and is specific for whooping cough[7].

nraakta Europe, including Britain but excluding the Mediterranean, N. Asia, N. America.. ksacta Wet and moist places in poor peaty soils, occasionally forming a floating fringe on small ponds[4, 17].

propta Seed - best sown thinly as soon as it is ripe into pots of a free-draining soil with some charcoal added and with a layer of finely chopped sphagnum moss on top[175]. Surface sow and keep the compost moist. The seed usually germinates in 1 - 2 months at 20°C[175]. Grow the plants on in the pots for their first growing season, making sure that the soil does not become dry. Divide the plants in the autumn, grow them on in the greenhouse for the winter and plant them out into their permanent positions in late spring.

nwatta Prefers a sandy peaty soil, succeeding in poor soils and bogs[1, 200]. Requires a sunny position[238]. An

insectivorous plant, it can survive in nitrogen poor soils because it gets the nutrients it needs from insects[1, 7, 9, 200]. The upper surfaces of leaves are covered with hairs that secrete a sweet sticky substance[7].This attracts insects, which become smeared with it and unable to escape - the plant then exudes a digestive fluid that enables it to absorb most of the insect into its system[7].

6.2.68 *Hedera helix*

Ivy, English ivy, Algerian ivy, Baltic Ivy, Common Ivy

5 tlin 11 cyuc 0 kcaak 4 tcan 3 dwat 15 m hkuc
pcimhmimhtut cyutli hgattcuphja7n hwicli hyishrasjlutnyk-
frip hpa7tli flatpriklwisslip 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 affects. 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].

kcaakta 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 Vermifugelyvy 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, internal parasites and fungal infections[238]. The leaves are antibacterial, antirheumatic, antiseptic, antispasmodic, astringent, cathartic, 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].

6.2.69 *Salix eriocephala*

Missouri Willow, Missouri River willow
5 tlin 9 cyuc 0 kcaak 3 tcan 2 dwat 4 m hkuc
htut cyutli tcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli flat-prik hpa7tmwatli nyanhjen hjonli

drutta *Salix eriocephala* is a deciduous Shrub growing to 4 m (13ft 1in). 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 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 and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

tcanta Basketry Fodder Shelterbelt Soil stabilizationThe stems are tough and very flexible, they are used in basket making[199, 257]. 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 cultivar 'Green USA' is ideal as a windbreak, it tolerates very poor light soils[199]. The plants extensive root system make it effective at binding the soil along the sides of streams[229]. Wood - more durable than that of most willows, it is used for fence posts[82, 229]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 Eastern and Central N. America - Newfoundland to Nebraska, south to Mississippi. ksacta Sandy to rocky soils, near rivers, creeks and swamps[229]. Sand bars along rivers[199].

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 Manage 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]. Rarely thrives on chalk[200]. A fast-growing and relatively long lived species[229]. 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]. Closely related to *S. mackenziana* and *S. lutea*[11]. There are some named varieties[199]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.70 *Lobelia siphilitica*

Great Blue Lobelia, Blue Cardinal Flower, Big Blue Lobelia, Great Lobelia
5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta *Lobelia siphilitica* 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 5. 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. 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 plant is potentially poisonous[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Analgesic Cathartic Diaphoretic Dysentery Emetic Homeopathy Poulitice VDThe root is cathartic, diaphoretic and emetic[4, 46, 103]. It is used in the treatment of dropsy, diarrhoea, stomach complaints, syphilis and dysentery[4, 257]. A poultice of the root has been applied to sores that are hard to heal[257]. The leaves are analgesic and febrifuge[257]. An infusion has been used in the treatment of colds and fevers[257]. A poultice of the crushed leaves has been applied to the head to relieve the pain of headaches[257]. At one time in N. America the root of this plant was believed to be effective in the treatment of VD[103, 222]. When used in Europe, however, it was found to be ineffective[213]. This might have been because the N. American Indians used the fresh root (which still contains the volatile oils) and also used it in conjunction with *Podophyllum peltatum* and *Prunus virginiana*, and then dusted the ulcers with the bark of *Ceanothus americanus*[213]. It was believed by some native North American Indian tribes that if the finely ground roots were secretly added to the food of an arguing couple then this would avert a divorce and they would love each other again[213]. A homeopathic remedy is made from the roots[4].

nrakta Eastern N. America - Maine to S. Dakota, south to Texas and Missouri. ksacta Moist woods and marshes[187].

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, Massing, Woodland garden. Requires a moist soil, succeeding in full sun or partial shade[111, 187, 200]. A very ornamental plant[1], but it is short-lived unless divided frequently[233]. Special Features:Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers.

6.2.71 Xanthorhiza simplicissima

Yellowroot

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc
pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli xre7t hjonli

drutta Xanthorhiza simplicissima is a deciduous Shrub growing to 1 m (3ft 3in) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is 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. Suitable pH: mildly acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The root, when taken in high doses, is potentially toxic[222].

tcanta DyeA yellow dye is obtained from the root[46, 61]. The entire plant can be crushed to yield a yellow dye[257]. A good ground cover for damp semi-shaded positions[11, 200]. Plants should be spaced about 1.2 metres apart each way[208].

dwatta Antihemorrhoidal Astringent Stomachic Tonic The root is astringent and a blood tonic[222]. A tea made from the roots is used to treat mouth ulcers[213], stomach ulcers, colds, jaundice etc[222, 257]. An infusion of the roots has also been used to treat piles, though the report does not specify if it is used internally or externally[257]. Some caution is advised in the use of this plant, see the notes above on toxicity. The root contains the alkaloid 'berberine' which is used for its tonic properties and for digestive disorders[213]. Berberine is anti-inflammatory, astringent, haemostatic, antispasmodic, immuno-stimulant, uterine tonic and antimicrobial[222]. It stimulates the secretion of bile and bilirubin and may be helpful in correcting high tyramine levels in people with liver cirrhosis[222].

nrakta Eastern N. America - New York to West Virginia and south to Florida and Alabama. ksacta Shaded stream banks, moist woods, thickets, and rocky ledges from sea level to 1200 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. Sow stored seed 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 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 the autumn or late winter[11].

nwatta Requires a moist acid soil in sun or part shade[184]. Prefers shade or semi-shade[188]. Succeeds in any moist fertile soil according to other reports[1, 182, 200]. Hardy to about -20°C[184]. Plants can spread considerably by means of suckers[182], especially when they are growing in a light soil[208]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.72 Saururus chinensis

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc
hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Saururus chinensis 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 August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

dwatta Antiperiodic Antiphlogistic Depurative Diuretic Febrifuge Laxative Malaria Parasiticide Poulitice UrinaryAntiperiodic, parasiticide[61, 178]. The flowers are antimalarial, diuretic, eliminative, laxative and parasiticide[218]. The root is antimalarial, depurative, eliminative and parasiticide[218]. The whole plant is antiphlogistic, depurative, diuretic, febrifuge and refrigerant[147, 218]. A decoction is used in the treatment of oedema, nephritis-associated oedema, nutritional oedema, inflammatory conditions and calculus of the urinary system, rheumatoid arthritis, boils and abscesses, rashes and fungal infections of the skin[147]. The leaves are used as a poultice to clean abscesses and boils[147, 218].

nrakta E. Asia - China, Japan. ksacta Low damp places by water[147]. Wet places, ditches, meadows, riverbanks, streamsides, forests, thickets, roadsides and field margins from near sea level to 1700 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in early autumn. Sow stored seed in late winter or early spring. Keep the pots moist by standing them in shallow water[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in spring[1, 200]. The plants spread freely and division is possible at almost any time in the growing season. Divisions taken in mid to late summer should be overwintered in pots in a cold frame and then be planted out in late spring. Regular division maintains the vigour of the plant[200].

nwatta This is a plant for a boggy area of the garden, it is able to withstand temporary flooding[56]. It prefers a loamy soil[1] growing well in pond margins though it spreads vigorously[56]. It can succeed in damp sites in the woodland as well as in the bog garden[200]. Plants are fairly cold tolerant, but are best given a protective mulch in the winter[56].

6.2.73 Coptis chinensis

Huang Lian

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli xre7t hjonli

drutta Coptis chinensis is an evergreen Perennial growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February 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. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

tcanta DyeA bright yellow pigment found in the roots can be used for dyeing[238]. Can be grown as a ground cover plant in the peat garden[200].

dwatta Anaesthetic Analgesic Antibacterial Antidote Antipyretic Antispasmodic Bitter Blood tonic Carminative Cholagogue Digestive Dysentery Sedative Skin Stomachic Tonic VasodilatorHuang Lian is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. The root is a pungent, very bitter, cooling herb that controls bacterial and viral infections, relaxes spasms, lowers fevers and stimulates the circulation[238]. It is one of the most frequently used herbs in prescriptions for the treatment of diabetes mellitus[218]. The root is analgesic, locally anaesthetic, antibacterial, antidote, antipyretic, bitter, blood tonic, carminative, cholagogue, digestive, sedative, stomachic, tonic and vasodilator[46, 61, 147, 176]. It is particularly helpful in the treatment of diarrhoea, acute enteritis and dysentery, whilst it is also used in the treatment of insomnia, fidget, delirium due to high fever, leukaemia and otitis media[176]. Externally it is used to treat various skin problems such as acne, boils, abscesses and burns whilst it

is also used as a gargle for mouth and tongue ulcers, swollen gums and toothache[254]. As an eyewash it is used to treat conjunctivitis[254]. The root is harvested in the autumn and used fresh or dried[238].

nrakta E. Asia - China. ksacta Damp coniferous woods and bogs[238]. Forests, shaded places in valleys at elevations of 500 - 2000 metres[266].

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

nwatta Succeeds in a light moist humus-rich slightly acidic soil with a northerly aspect or light shade[1, 200]. Plants are hardy to at least -15°C[238].

6.2.74 *Salix miyabeana*

5 tlin 9 cyuc 0 kcak 3 tcan 2 dwat m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik
hpa7tmwatli nyanhjen hjonli

drutta *Salix miyabeana* 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. 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry FodderThe stems are very flexible and are occasionally used in basket making[199]. 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. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 E. Asia - N. Japan. ksacta Not known
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 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]. Rarely thrives on chalk[200]. 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]. This species is very closely related to *S. purpurea*[11, 199]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.75 *Filipendula vestita*

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.8 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli
prikkwis 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].

6.2.76 *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 flatprikkwis 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 Scandanavia 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.

6.2.77 *Lysimachia nemorum*

Yellow Pimpernel
5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikkwis 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 *Astringent* An 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].

6.2.78 *Iris sanguinea*

Blood iris

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrp hpa7tli flat-prikliwis 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 *Insecticide* An insecticide is obtained from the plant[218]. (from the root?)

dwatta *Expectorant* Expectorant[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].

7 6 tlin

7.1 bwon

7.1.1 *Alnus rubra*

Red Alder, Oregon Alder
tfo2n 6 tlin 8 cyuc 2 kcaak 4 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcuphja7n hwicli hysijlutnyikfrp hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta *Alnus rubra* 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 6. It is in flower in March, 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 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. The plant can tolerate maritime exposure.

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

kcakta *Edible Parts*: Flowers Inner bark Sap *Edible Uses*: Catkins - raw or cooked. They are rich in protein but have a bitter flavour and are not very palatable[172]. Inner bark - cooked, It must be dried since it is emetic when fresh[105, 161, 177]. 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]. Sap - raw[118]. Harvested in late winter, the flow is best on a warm, sunny day that follows a cold frosty night. A sweet flavour, it was often used to sweeten other foods[257]. Buds[105, 177]. No further information is given, does this refer to the flower buds or leaf buds?[K]

tcanta *Charcoal Dye Fodder Fuel Hedge Pioneer Shelterbelt Soil stabilization Tannin WoodA fast-growing and very wind resistant tree, it is an excellent plant for providing rapidly produced shelterbelts[K]. The trees extensive root system also makes it suitable for controlling erosion along the banks of rivers[226]. 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]. Tannin is obtained from the bark and the strobils[82]. Both the roots and the young shoots have been used in making baskets[257]. A red to brown dye is obtained from the bark[61, 118, 257]. Wood - soft, brittle, not strong, light, close and straight-grained, very durable in water[82]. An important lumber tree, it makes a good imitation mahogany[60, 103] and is used for cheap furniture etc[46, 61, 82, 171, 229]. A good fuel, it does not spark so can be used in the open[60, 118, 172], it also makes a high grade charcoal[103].*

dwatta *Anodyne Appetizer Astringent Cathartic Cytostatic Eczema Febrifuge Skin Stomachic TB Tonic* Red alder was widely employed medicinally by native North American Indians who mainly used the bark to treat a wide range of complaints[257]. The plant is little used in modern herbalism[K]. The bark is appetizer, astringent, cathartic, cytostatic, emetic, stomachic and tonic[61, 172, 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]. An infusion of the bark has been used in the treatment of many complaints such as headaches, rheumatic pains, internal injuries and diarrhoea[226, 257]. Externally, a poultice of the bark has been applied to eczema, sores and aches[257]. The sap is applied externally to cuts[257]. The catkins and young cones are astringent and have been chewed in the treatment of diarrhoea[257].

matic pest confuser that may confuse pests reducing their ability to find and eat crops [1-2].

nrakta Native to the US Nashville Basin of Tennessee, the Bluegrass Region of Kentucky, and two counties in Alabama. ksacta Found only on wet cedar glades and in seeps along limestone creekbeds. Due to its narrow range and specific habitat requirements, this species is considered vulnerable.

propta Seed

nwatta An herbaceous perennial with showy flowers. Flower Color:Lavender. Bloom Size: 1"-2". Suitable Locations: Bog gardening. 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]. An evergreen. The root pattern is fibrous dividing into a large number of fine roots [1-2].

7.2.42 *Lysimachia paridiformis*

6 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Lysimachia paridiformis* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is 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 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 *Anodyne Antitussive Blood tonic Carminative Expectorant* The flowering tops, simmered in water, are carminative and diaphoretic[147, 218]. The whole plant is anodyne, antitussive, blood tonic, carminative and expectorant[147, 218]. A decoction is used in the treatment of pulmonary tuberculosis, 'wind-cold' coughing, rheumatoid arthritis, traumatic injuries, stomach ache, enteritis, snake bites and abscess swelling[147]. The fresh herb is also crushed and applied externally as a poultice[147].

nrakta E. Asia - W. China. ksacta Hillsides, stream edges, damp and wet places beneath forest trees[147]. Damp areas in forests, mountain valleys and wet ravines at elevations of 500 - 1400 metres[266].

propta Seed - sow spring or 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.

nwatta An easily grown plant, succeeding in a moist loamy soil[1]. Judging by its native habitat, it should succeed in shallow water. Grows well in heavy clay soils. Most species in this genus seem to be immune to the predations of rabbits[233].

7.2.43 *Sarracenia flava*

Yellow Trumpet, Yellow pitcherplant, Huntsman's Horn, Yellow Trumpet, Trumpets, Yellow Pitcher Plant
6 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli hja7n hwicli hrasjlutnyik hpa7tli frusflat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Sarracenia flava* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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 wet soil.

dwatta *Hepatic Kidney* The root and leaves are hepatic. They are used in the treatment of dyspepsia, constipation, liver and kidney complaints[61].

nrakta South-eastern N. America - Virginia and North Carolina to Florida and Louisiana. ksacta Wet pinelands and bogs[43].

propta Seed - we have no information for this species but would suggest sowing the seed in light shade in a cold frame as soon as it is ripe if possible otherwise in early spring. 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. Consider giving the plants some protection from the cold for their first winter outdoors. Division might be possible.

nwatta *Landscape Uses*: Container, Specimen, Woodland garden. Grow in sun or partial shade in peat or moss[188]. An insectivorous plant[61], it is best grown in a boggy position[1] and prefers a soil low in nitrogen. Plants require continuously moist conditions in a loose compost of sphagnum peat, live sphagnum and coarse acid sand[260]. They can be grown successfully in a plastic basin or in a pot that is standing in a deep saucer of water[260]. Plants are not hardy in Britain, requiring a minimum temperature of 5°C[188]. This conflicts with the hardiness rating of 7 (temperatures down to between -5 and -10°C) given in [200]. Plants can tolerate temperatures down to about -10°C[260]. A polymorphic species[200], it is becoming very rare in the wild and is on the CITES II list of endangered species. Special Features: Attractive foliage, North American native, Naturalizing.

thus making them more cold resistant. A deep mulch around the roots to prevent the soil from freezing also helps the trees to survive cold conditions. The members of this genus are remarkably adaptable however, there can be a dramatic increase in the hardiness of subsequent generations from the seed of survivors growing in temperate zones[200]. Eucalyptus monocultures are an environmental disaster, they are voracious, allelopathic and encourage the worst possible attitudes to land use and conservation[200]. A very ornamental tree[1], it grows very slowly in its first 2 or 3 years but is then capable of growing 1 metre or more a year[11]. Plants self-sow in Devon[1]. Plants are shallow-rooting and, especially in windy areas, should be planted out into their permanent positions when small to ensure that they do not suffer from wind-rock[245]. They strongly resent root disturbance and should be container grown before planting out into their permanent position[11]. In Australia this species usually regenerates from the base after forest fires[167]. The flowers are rich in nectar and are a good bee crop[200].

7.2.38 Swertia chirayita

Chiretta
6 tin 9 cyuc 0 kcaok 0 tcan 3 dwat 1 m hkuc
hmim cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli
drutta Swertia chirayita is a ANNUAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista Do not exceed recommended dose.
dwatta Digestive Hepatic Malaria StimulantChiretta is a traditional Ayurvedic herb. A strongly bitter tonic it is an excellent remedy for a weak stomach, especially when this gives rise to nausea, indigestion and bloating, and it has also been shown to protect the liver[254]. It is perhaps best known in India as the main ingredient in mahasudarshana churna, a remedy containing more than 50 herbs[254]. The plant has an interesting chemistry, similar in many respects to Gentiana lutea, a widely used restorative tonic of the digestive system[238]. It also contains xanthenes, which are reputedly effective against malaria and tuberculosis, and also amarogentin, a glycoside that may protect the liver against carbon tetrachloride poisoning[238]. The whole plant is an extremely bitter tonic digestive herb that lowers fevers and is stimulant[165, 238]. The herb has a beneficial effect on the liver, promoting the flow of bile, it also cures constipation and is useful for treating dyspepsia[4, 238]. The plant is harvested when the seed is setting and then dried for later use[4].

nrakta E. Asia - Himalayas. ksacta Pastures and slopes in the Himalayas to 3,000 metres[238, 240].
propta Seed - sow spring in temperatures not exceeding 10°c in a humus-rich medium[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer.
nwatta Succeeds in a moist humus-rich soil in damp light woodlands, streambanks or the bog garden[200]. Grows best in areas with cool summers[200]. Succeeds in full sun or partial shade[238]. Plants are hardy to at least -15°c[238].

7.2.39 Inula britannica

Xuan Fu Hua, British yellowhead
6 tin 9 cyuc 0 kcaok 0 tcan 3 dwat 0.8 m hkuc
hmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprklwis hpa7tmwatli fyifxre7t hjonli
drutta Inula britannica is a 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 7. 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 or wet soil.

dwatta Antibacterial Antiemetic Cancer Carminative Cholagogue Deobstruent Depurative Diuretic Expectorant Laxative Resolvent Stomachic Tonic VulneraryXuan Fu Hua is used in Chinese herbalism as a mildly warming expectorant remedy and it is especially suitable where phlegm has accumulated in the chest[254]. The flowers are more commonly used, but the leaves are also used, generally for less serious conditions[254]. The leaf is discutient and vulnerary[218]. The flowers are antibacterial, carminative, cholagogue, deobstruent, depurative, diuretic, expectorant, laxative, stomachic and tonic[218]. They are used internally in the treatment of bronchial complaints with profuse phlegm, nausea and vomiting, hiccupps and flatulence[176, 238]. The flowers have an antibacterial action, but this can be destroyed by proteins in the body[176]. The plant is harvested when in flower and can be dried for later use[254]. The root is discutient, resolvent and vulnerary[218]. The plant has been mentioned as a possible treatment for cancer of the oesophagus[218].

nrakta Europe to E. Asia. Formerly naturalized in Britain, but probably now extinct there[17]. ksacta Moist meadows, streambanks, ditches, wet woods etc[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. If you have sufficient seed, it is worthwhile trying a sowing in situ in the spring or the autumn. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in any moderately fertile well-drained soil[200]. Grows well in heavy clay soils. Plants are hardy to at least -15°c[238]. The sub-species I. britannica chinensis is the form used medicinally[238].

7.2.40 Swertia petiolata

6 tin 9 cyuc 0 kcaok 0 tcan 2 dwat 0.6 m hkuc
hmim cyutli tucphja7n hwicli hrasljutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Swertia petiolata 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 7. 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. 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 Antiinflammatory Febrifuge HepaticThe entire plant is used in Tibetan medicine, it is considered to have a bitter taste and extremely cooling potency[241]. It is anti-inflammatory, febrifuge and liver tonic[241]. It is used in the treatment of scleritis, inflammation of the liver and high blood pressure, inflammation of the stomach and liver[241].

nrakta E. Asia - Afghanistan to W. Nepal and S.E. Tibet. ksacta Montane to the alpine zone.

propta Seed - sow spring in temperatures not exceeding 10°c in a humus-rich medium[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them Tu in early summer.

nwatta Succeeds in a moist humus-rich soil in damp light woodlands, streambanks or the bog garden[200]. Grows best in areas with cool summers[200].

7.2.41 Clinopodium glabellum

Glade calamint
6 tin 7 cyuc 0 kcaok 3 tcan 0 dwat 0.6 m hkuc
hmimhtut cyutli tucphja7n hwicli hrasljutnyik hpa7tli flat hpa7tmwatli hjonli

drutta Clinopodium glabellum is an evergreen Perennial growing to 0.6 m (2ft) by 1.5 m (5ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta None Known
tcanta Bog gardens. A good fast growing, medium density ground cover. Can withstand some foot-traffic. An aro-

nrakta Western N. America - Alaska to California. ksacta Moist rich soils in woods, usually below 600 metres and within 50 km of the coast[60, 82, 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 Agroforestry Services: Alley crop Agroforestry Services: Nitrogen Fodder: Bank Management: Coppice Management: Standard Regional CropLandscape Uses:Border, Erosion control, Woodland garden. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A very wind resistant tree with excellent establishment in severely exposed sites, it tolerates severe maritime exposure[75, K]. The red alder is a very fast growing tree, even when planted in severe exposure[75, 229, K], but it is short-lived, dying when 60 - 80 years old[229]. Trees that are 5 years old from seed have reached 6 metres in height on a very exposed site in Cornwall, they are showing no signs of wind-shaping[K]. This is an important pioneer tree, quickly invading logged or burnt over sites, and providing ideal conditions for other trees to become established[229, K]. A very ornamental tree[1]. 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]. Red alder has been estimated to fix as much as 300 kg of nitrogen per hectare[269]. Special Features: Attracts birds, 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].

7.2 mran

7.2.1 Crataegus tanacetifolia

Tansy-Leaved Thorn
6 tin 8 cyuc 5 kcaok 3 tcan 2 dwat 10 m hkuc
hmimhtut cyutli hgatkyuctucphja7n hwicli hrasljutnyikfrip hpa7tli flatprklwisli hpa7tmwatli xre7t hjonli

drutta Crataegus tanacetifolia 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 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 Midgees. 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[2, 3, 105]. A good size with a soft juicy texture and an acid/sweet apple-like flavour that is very nice raw when fully ripe[11, 183, K]. The fruit can also be used in making pies, preserves, etc, and can be dried for later use. The fruit 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 WoodWood - heavy, hard, tough, close-grained.

Useful for making tool handles, mallets and other small items[74, 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 W. Asia. ksacta Dry 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]. Unlike most members of this genus, the flowers are sweetly scented and free from the smell of decaying fish[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species has an excellent potential as a fruit crop in Britain. The fruit is of a reasonable size, it is usually very freely borne and the quality is very acceptable for dessert[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]. A tree at Cambridge Botanical Gardens was about 6 metres tall and 4 metres wide in September 1993. It usually carries a very good crop of fruit[K]. A very ornamental plant[1], it is closely related to C. laciniata[11].

7.2.2 Crataegus festiva

6 tin 9 cyuc 5 kcaok 2 tcan 2 dwat 3 m hkuc
hmimhtut cyutli hgattucphja7n hwicli hrasljutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Crataegus festiva is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. 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. About 15mm in diameter with a delicious sweet flavour and juicy though slightly mealy texture[K]. This is a very acceptable dessert fruit that makes very enjoyable eating[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 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. 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 We have very little information on this species and do not know how hardy it will be in Britain. However, a tree growing in an open sunny position at Kew Botanical Gardens is healthy and bears a very good crop of fruit every year[K]. 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].

7.2.3 Sagittaria latifolia

Duck Potato, Broadleaf Arrowhead
6 tlin 9 cyuc 5 kcaak 0 tcan 1 dwat 1.2 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Sagittaria latifolia 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 7 and is not frost tender. It is in flower from July to September, 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 Insects. Suitable for:

light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[62, 105]. Excellent when roasted, the texture is somewhat like potatoes with a taste like sweet chestnuts[85, 92, 94, 159, 256]. The tubers can be eaten raw but they are rather bitter (especially the skin)[85, 102, 159]. It is best to remove this skin after the tubers have been cooked[183]. The tubers can also be dried and ground into a powder, this powder can be used as a gruel or mixed with cereal flours and used to make bread[85, 94]. The N. American Indians would slice the boiled roots into thin sections and then string them on ropes to dry in much the same way as apples[183]. The egg-shaped tubers are 4 - 5cm long and are borne on the ends of slender roots, often 30cm deep in the soil and some distance from the parent plant[85, 92, 94]. The tubers are best harvested in the late summer as the leaves die down[92, 95]. They cannot be harvested by pulling out the plant since the tops break off easily, leaving the tubers in the ground[213].

dwatta Digestive PoulticeA poultice of the leaves has been used to stop milk production[222]. A tea made from the roots is used as a digestive[222, 257]. A poultice of the roots is used in the treatment of wounds and sores[222, 257].

nrakta N. America - all areas except the far north. Naturalized in various parts of Europe[50]. ksacta Ditches, ponds, lakes and swampy areas in most parts of N. America[60].

propta Seed - best sown as soon as it is ripe in a pot standing in about 5cm of water. Prick out the seedlings into individual pots when they are large enough to handle, and gradually increase the depth of water as the plants grow until it is about 5cm above the top of the pot. Plant out in late spring or early summer of the following year. Division of the tubers in spring or autumn. Easy. Runners potted up at any time in the growing season.

nwatta A pond or bog garden plant, it requires a moist or wet loamy soil in a sunny position[1]. Prefers shallow, still or slowly flowing water up to 12cm deep[1, 56]. Hardy to at least -20°c[187]. A polymorphic species[92].

7.2.4 Sagittaria sagittifolia

Arrow Head, Hawaii arrowhead
6 tlin 9 cyuc 5 kcaak 0 tcan 1 dwat 1 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Sagittaria sagittifolia 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 7 and is not frost tender. It is in flower from July to August, 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[2, 4, 13, 56]. Excellent when roasted, the taste is somewhat like potatoes. The tubers are starchy with a distinct flavour[116]. The tubers should not be eaten raw[200].The skin is rather bitter and is best removed after the tubers have been cooked[183]. Tubers can also be dried and ground into a powder, this powder can be used as a gruel etc or be added to cereal flours and used in making bread[55, 94].The roots (tubers really) are borne on the ends of slender roots, often 30cm deep in the soil and some distance from the parent plant. The tubers of wild plants are about 15cm in diameter and are best harvested in the late summer as the leaves die down. The dried root contains (per 100g) 364 calories, 17g protein, 1g fat, 76.2g carbohydrate, 3.1g fibre, 5.8g ash, 44mg calcium, 561mg phosphorus, 8.8mg iron, 2,480mg potassium, 0.54mg thiamine, 0.14mg riboflavin, 4.76mg niacin and 17mg ascorbic acid. They contain no carotene[218]. Leaves and young stems - cooked[183]. Somewhat acid.

dwatta Antiscorbutic Diuretic GalactofugeThe plant is antiscorbutic, diuretic[4]. The leaf is used to treat a variety of skin problems[218]. The tuber is discutient, galactofuge and may induce premature birth[218].

usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[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 summer or following spring.

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 this country. It is likely to tolerate maritime exposure[K]. The following notes are based on the general needs of the genus. Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

7.2.35 Lysimachia fortunei

6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikrip hpa7tli flatpriklwis hpa7tmwatli fyifkre7t hjonli

drutta Lysimachia fortunei is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June 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 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: CondimentThe young plant is edible[177, 179]. No more details are given. The leaves are also used as a condiment[46, 61, 177].

nrakta E. Asia - China, Japan. ksacta Wet margins of rivers and ponds in the lowland of C. and S. Japan[58]. Wet areas, ditches, banks of rice paddies and roadsides from sea level to 1500 metres[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.

nwatta An easily grown plant, succeeding in a moist loamy soil[1]. Judging by its native habitat, it should succeed in shallow water. Grows well in heavy clay soils. Most species in this genus seem to be immune to the predations of rabbits[233].

7.2.36 Damasonium alisma

Thrumwort
6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Damasonium alisma is an ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers wet soil and can grow in water.

kcakta Edible Parts: RootEdible Uses: Root[177]. No further details are given.

nrakta Central and southern Europe, from Britain and France to Italy and S. Russia, south to N. Africa. ksacta Gravely ditches and ponds. Very local and apparently decreasing in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame in trays standing in shallow water[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of shallow water, planting them out in the summer. Division in spring. 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 an open sunny position in boggy soils or in still water up to 25cm deep[200].

7.2.37 Eucalyptus pauciflora niphoph

Snw Gum
6 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 6 m hkuc
htut cyutli hgatkycutcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eucalyptus pauciflora niphophila is an evergreen Tree growing to 6 m (19ft) by 3.5 m (11ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May 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, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Citronellal, an essential oil found in most Eucalyptus species is reported to be mutagenic when used in isolation[269]. In large doses, oil of eucalyptus, like so many essential oils has caused fatalities from intestinal irritation[269]. Death is reported from ingestion of 4 - 24 ml of essential oils, but recoveries are also reported for the same amount[269]. Symptoms include gastroenteric burning and irritation, nausea, vomiting, diarrhoea, oxygen deficiency, weakness, dizziness, stupor, difficult respiration, delirium, paralysis, convulsions, and death, usually due to respiratory failure[269].

tcanta Essential Fuel ShelterbeltThe leaves yield between 0.7 and 0.8% essential oil. It is a good antiseptic[154]. Fairly tolerant of maritime exposure, it can be grown as part of a shelterbelt in maritime areas[75]. Wood is a good source of fuel[154].

dwatta AntisepticEucalyptus leaves are a traditional Aboriginal herbal remedy. The essential oil found in the leaves is a powerful antiseptic and is used all over the world for relieving coughs and colds, sore throats and other infections[254]. The essential oil is a common ingredient in many over-the-counter cold remedies[254]. An essential oil obtained from the leaves is antiseptic[154]. The essential oil obtained from various species of eucalyptus is a very powerful antiseptic, especially when it is old, because ozone is formed in it on exposure to air. It has a decided disinfectant action, destroying the lower forms of life[4]. The oil can be used externally, applied to cuts, skin infections etc, it can also be inhaled for treating blocked nasal passages, it can be gargled for sore throat and can also be taken internally for a wide range of complaints[4]. Some caution is advised, however, because like all essential oils, it can have a deleterious effect on the body in larger doses[4].

nrakta Australia - New South Wales, Victoria. ksacta Forms extensive forests in mountainous areas to 2000 metres[77, 154].

propta Seed - surface sow February/March in a sunny position in a greenhouse[11, 78, 134]. Species that come from high altitudes appreciate 6 - 8 weeks cold stratification at 2°c[200]. Pot up the seedlings into individual pots as soon as the second set of seed leaves has developed, if left longer than this they might not move well. Plant out into their permanent positions in early summer and give them some protection from the cold in their first winter. The seed can also be sown in June, the young trees being planted in their final positions in late spring of the following year. The seed has a long viability[200].

nwatta Prefers a sunny position in a moderately fertile well-drained moisture retentive circum-neutral soil[200]. Succeeds in most soils but dislikes chalk or clay soils[98]. Tolerates poor soils, especially those low in mineral elements[200]. Tolerant of drought, dry soils[200] and exposed positions[75]. This is perhaps the hardest species in this genus, it tolerates long periods down to -14°c and short periods as low as -20°c[107, 200]. Eucalyptus species have not adopted a deciduous habit and continue to grow until it is too cold for them to do so. This makes them more susceptible to damage from sudden cold snaps. If temperature fluctuations are more gradual, as in a woodland for example, the plants have the opportunity to stop growing and become dormant,

hpa7tmwatli xre7t hjonli

drutta Saxifraga cortusifolia is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[177].

nrakta E. Asia - Japan. ksacta Wet shaded places, especially on rocks and along streams in mountains, C. and S. Japan[58].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. 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 winter. Plant them out in late spring after the last expected frosts. Division in spring. 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 Prefers a cool position in a moist humus-rich soil[1]. Prefers an acid soil[200]. Grows well in light woodland[200] or in a shady position in the rock garden. This species is not very hardy in Britain according to one report[1], whilst another says that it is in climatic zone 7 and should therefore succeed outdoors in most parts of this country[200]. However, the leaves and the flowers are liable to be frost-damaged by autumn frosts[200]. A polymorphic species[1], it is closely related to *S. stolonifera*, differing in not having runners[200].

7.2.32 Mimulus moschatus

Musk Monkey Flower, Muskflower

6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnykfrp hpa7tli flat-prikwiw hpa7tmwatli hjonli

drutta Mimulus moschatus is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. 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 Young plant - boiled and used for food[257].

nrakta Western N. America - British Columbia to Montana and California. Naturalized in Britain[17]. ksacta Naturalized in wet places in England and Eastern Ireland[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 -15°C[200]. There are some named varieties, selected for their ornamental value[200]. All parts of the plant have a musky scent, though the form naturalized in Britain, and most cultivars, appear to be scentless[17, 200].

7.2.33 Athyrium yokoscense

6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc pcmhmim cyutli tcuphja7n hwicli hrasjlutnykfrp hpa7tli frusflatprikwiw hpa7tmwatli hjonli

drutta Athyrium yokoscense is a FERN growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. 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: LeavesEdible Uses: Very young fronds (croziers) - boiled[177]. Some caution is advised. See the notes above on toxicity.

nrakta E. Asia - China, Japan, Korea. ksacta Woods in lowland and mountains all over Japan[58]. Thin deciduous woods and thickets[74].

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 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]. This species is very variable, partly according to altitudes and habitats[275]. Plants growing on sunny rocks and in high mountains look like *Athyrium rupestre* and may be distinguished as var. *alpicola*[275]. Lowland plants with deeply tripinatifid leaves may be called var. *dilatatum*[275]. Members of this genus are rarely if ever troubled by browsing deer[233].

7.2.34 Carex kobomugi

Japanese sedge

6 tlin 8 cyuc 1 kcaak 2 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyk hpa7tli flat-prikwiw hpa7tmwatli hjonli

drutta Carex kobomugi is a PERENNIAL growing to 0.2 m (0ft 8in). 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: light (sandy), medium (loamy) and heavy (clay) 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.

kcakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. An emergency food, used when all else fails[177]. The seed is very small and would be fiddly to use[K].

tcanta Environmental Uses: Land reclamation; Landscape improvement; Soil conservation. Possible benefits in using *C. kobomugi* for dune stabilization in its native range, but there are considerable doubts raised about its relative effectiveness compared to native species outside of this range.

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Sand dunes along the seacoast all over Japan[58].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed

nrakta Most of Europe, including Britain, temperate Asia and N. America. ksacta Ponds, canals and slow flowing water on muddy sub-strata in water up to 45cm deep, in acid or calcareous conditions[17].

propta Seed - best sown as soon as it is ripe in a pot standing in about 5cm of water. Prick out the seedlings into individual pots when they are large enough to handle, and gradually increase the depth of water as the plants grow until it is about 5cm above the top of the pot. Plant out in late spring or early summer of the following year. Division of the tubers in spring or autumn. Easy. Runners potted up at any time in the growing season.

nwatta A pond or bog garden plant, it requires a moist or wet loamy soil in a sunny position[1]. Prefers shallow, still or slowly flowing water up to 30 - 60cm deep[200]. Plants are fairly cold tolerant, surviving temperatures down to at least -10°C, though the top growth is damaged once temperatures fall below zero. They grow best in warm weather and require at least a six month growing season in order to produce a crop[206]. A polymorphic species, the sub-species *S. sagittifolia leucopetala* is extensively cultivated for its edible bulb in China where there are many named varieties[2, 56, 61].

7.2.5 Crataegus caesa

6 tlin 9 cyuc 4 kcaak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta Crataegus caesa is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 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 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. A good size fruit, about 20mm in diameter, with a sweet taste and a fair fruit to seed ratio, it has a mealy texture, is fairly juicy and makes very pleasant eating[K]. It ripens in mid to late September and can hang on the tree for several weeks[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. 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 We have very little information on this species, and do not know how hardy it will be in this country, or even its country of origin. However, a specimen growing in an open position at Kew Botanical Gardens is about 3 metres tall and wide and regularly carries a heavy crop of fruit[K]. 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[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].

7.2.6 Crataegus pubescens

Manzanilla

6 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta Crataegus pubescens 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 7 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: FruitEdible Uses: Fruit - raw or cooked[177, 200]. A mealy texture, it is often used in preserves[183]. For stewing, they are first boiled with wood ashes to remove the skin, then boiled in hot syrup with red colouring for a short time and hung on nails stuck into poles, much like candied apples[183]. 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 Southern N. America - Mexico. 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]. 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].

7.2.7 Crataegus aestivalis

Eastern Mayhaw, May hawthorn, Mayhaw, Apple Hawthorn 6 tlin 11 cyuc 3 kcaak 5 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattucphja7n hwicli hrasjlutnyikfrip hpa7tli frusatprikliwis hpa7tmwatli xre7t hjonli

drutta Crataegus aestivalis is a deciduous Shrub growing to 9 m (29ft) by 8 m (26ft) 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: FruitEdible 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 Shelterbelt Soil stabilization WoodBecause it tolerates a wide variety of sites, this species can be used to stabilize banks, for shelterbelts, and to give protection from wind and water erosion[277]. 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 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 - North Carolina to Mississippi. ksacta Found on the outer coastal plain in seasonally flooded depressions, in floodplains or in uplands. It is commonly found in river swamps, pond areas, and along stream banks[277].

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, 277]. Once established, it succeeds in excessively moist soils and also tolerates drought[200, 277]. 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]. It succeeds well in exposed positions and tolerates atmospheric pollution[200, 277]. A very hardy species, tolerating temperatures down to about -30°C[160]. This species is closely related to *C. opaca* and is included in that species by some botanists. 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]. Occasionally cultivated for its fruit in America, there are some named varieties[183]. Special Features: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].

7.2.8 Arundo donax

Giant Reed, Giant Reed Grass 6 tlin 10 cyuc 3 kcaak 4 tcan 2 dwat 6 m hkuc htut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Arundo donax is a PERENNIAL growing to 6 m (19ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September, and the seeds ripen in October. 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 prefers well-drained 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 or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Rhizome - raw or cooked[84]. The rhizome can be dried and ground into a powder to make bread, usually in conjunction with cereal flours[7, K]. It can also be roasted or boiled[84]. Leaves - cooked as a potherb[84]. They are very bitter[177]. The young shoots are used[177].

tcanta Basketry Biomass Broom Dye Fodder Hedge Hedge Musical Paper Pipes Plant support Shelterbelt Soil stabilization Thatching WeavingBrooms are made from the terminal panicles[7]. Plants are grown alongside irrigation

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 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]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

7.2.28 Scrophularia umbrosa

Water Betony, Water figwort 6 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Scrophularia umbrosa is a PERENNIAL growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June 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, wasps. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 plant is probably poisonous to cows[76].

kcakta Edible Parts: RootEdible Uses: Root - cooked[2, 105]. There must be some doubts about the edibility of this root[K].

dwatta Detergent Eczema VulneraryThe leaves are detergent and vulnerary[4]. They are harvested as the plant comes into flower and can be used fresh or dried for later use[4]. The plant has a good reputation as a wound herb, either applied externally as a poultice or taken as a decoction[4]. Water betony is said to have similar medicinal properties to the knotted figwort, *S. nodosa*[254]. These properties are as follows:- Knotted figwort is a plant that supports detoxification of the body and it may be used as a treatment for various kinds of skin disorders[254]. The whole plant is alterative, anodyne, anti-inflammatory, diuretic, mildly purgative and stimulant[4, 9, 21, 165]. It is harvested as the plant comes into flower in the summer and can be dried for later use[4]. A decoction is applied externally to sprains, swellings, burns, inflammations etc, and is said to be useful in treating chronic skin diseases, scrofulous sores and gangrene[4, 254]. The leaves can also be applied fresh or be made into an ointment[4]. Internally, the plant is used in the treatment of chronic skin diseases (such as eczema, psoriasis and pruritis), mastitis, swollen lymph nodes and poor circulation[238]. It should not be prescribed for patients with heart conditions[238]. The root is anthelmintic[9].

nrakta Europe, including Britain, south and east from S. Sweden to France, Palestine and Asia to Tibet. ksacta Damp shady ground, usually near water[4, 17]. An occasional garden weed[1].

propta Seed - sow spring or autumn in a cold frame[238]. 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 then it can be sown outdoors in situ in the autumn or the spring. Division in spring. 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 most moist soils. A good bee plant[4].

7.2.29 Carex paniculata

6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Carex paniculata is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June, and the seeds ripen from June to July. 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. 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: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe straw is used for bedding[61].

nrakta Most of Europe, including Britain, north to 62° N., W. Asia and N. America. ksacta Wet, often shady places, on peaty base-rich soils[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[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 summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

7.2.30 Scirpus cyperinus

Woolly Grass Bulrush, Woolgrass 6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tucphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Scirpus cyperinus is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September, 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: light (sandy), medium (loamy) and heavy (clay) 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 and can grow in water.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Used as a rice substitute[178].

tcanta Stuffing WeavingThe stems are woven to make matting and ropes[178]. The small rushes have been used in making woven mats and storage bags[257]. The fruiting tops of the plant have been used as a resilient material for stuffing and making pillows[257].

nrakta Eastern N. America - Newfoundland to Saskatchewan, south to Florida and Louisiana. ksacta Wet low ground[60]. Swamps[235]. Marshes, moist meadows, ditches, shallow ponds, frequently growing in disturbed areas from sea level to 800 metres[270].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, 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 wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200]. A polymorphic species[60].

7.2.31 Saxifraga cortusifolia

6 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.4 m hkuc hmim cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis

7.2.25 Salix babylonica

Weeping Willow, Babylon Weeping Willow
6 tlin 9 cyuc 1 kcaak 4 tcan 3 dwat 12 m hkuc

htut cyutli tucphja7n hwicli hrasjlutnyikfripr hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix babylonica is a deciduous Tree growing to 12 m (39ft) by 12 m (39ft) 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 in 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Inner bark Leaves MannaEdible Uses: Tealnrnner 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 and flower buds - cooked[105, 177, 183]. Not very palatable[172]. Older leaves are used to adulterate tea[183]. A source of a mannalike substance[183].

tcanta Basketry Hair Soil stabilizationLandscape Uses: Erosion control, Aggressive surface roots possible, Pollard, Specimen. The stems are very flexible and are used in basket making[146, 272]. 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 extensive root system makes this species useful for binding soils[146, 272]. A decoction or infusion of the bark has been used as a wash to make the hair grow[257]. Dynamic accumulator.

dwatta Anodyne Antirheumatic Astringent Febrifuge Poultice SkinThe leaves and bark are antirheumatic, astringent and tonic[178, 240]. A decoction of the leaves is used in the treatment of abscesses, carbuncle, fever, rheumatism, skin diseases, ulcers etc[218]. An infusion of the bark has been used to treat diarrhoea and fevers[257]. The bark can be used as a poultice[257]. The stem bark is used in the treatment of skin eruptions due to parasites[218]. The root bark is used in a bath for the treatment of parasitic skin diseases[218]. A gum from the stems is used in the treatment of foul sores[218]. The down of the seeds is used in the treatment of fevers, haemorrhages, jaundice, rheumatism etc[218]. 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 The origin of this species is obscure. ksakta Not known in a truly wild situation.

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 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]. Rarely thrives on chalk[200]. This species rarely thrives in Britain[11], it is very subject to canker and has been largely replaced in cultivation by S. 'Chrysocoma'[188]. The root system is rather aggressive and can cause problems with drains[200]. 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]. 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, Inconspicuous flowers or blooms.

7.2.26 Salix chaenomeloides

Japanese Pussy Willow

6 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 6 m hkuc

htut cyutli tucphja7n hwicli hrasjlutnyikfripr hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix chaenomeloides is a deciduous Tree growing to 6 m (19ft 8in) at a fast rate. It is not frost tender. 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 and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

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 - raw or cooked. They are not very palatable[172].

tcanta Landscape Uses:Border, Massing, Specimen, Winter interest. Special Features: Not North American native, Attractive flowers or blooms. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 E. Asia - China, Japan, Korea. ksakta About 1000 m. Hebei, Jiangsu, Liaoning, Shaanxi, Sichuan[266].

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 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]. Rarely thrives on chalk[200]. 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]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

7.2.27 Salix appendiculata

6 tlin 9 cyuc 1 kcaak 3 tcan 2 dwat 6 m hkuc

htut cyutli tucphja7n hwicli hrasjlutnyikfripr hpa7tli flatprikhwis hpa7tmwatli nyanhjen hjonli

drutta Salix appendiculata is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. 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), 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.

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 - not very palatable[172].

tcanta Soil reclamationA pioneer plant for difficult sites[200]. It is often found in the wild as a pioneer on landslides etc, especially on calcareous formations[11]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe 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 C. Europe - Balkans. ksakta A pioneer of difficult sites, including landslides on calcareous formations[11].

canals to check soil erosion[169]. The plant can be grown as a windbreak screen[1, 169]. If cut down, the culms branch and in this form the plants can be used as a hedge[236]. The leaves can be woven into mats etc, whilst the split and flattened stems are used to make screens, walls of houses etc[46, 50, 61, 84]. A yellow dye is obtained from the pollen[257]. The stems of the plant have a multitude of applications. They are used as plant supports for vines and other climbing plants[7, 169, 269] and to make clarinets, bag-pipes etc[46, 61, 103]. They are also used as pipe stems[84], for roofing[46], to make screens, walking sticks and in basketry[100, 195]. They are used to make the reeds of clarinets and organ pipes[236]. The stems can be harvested as desired at any time of the year[269]. The fibre from the stems can be used to make a good quality paper[269]. This plant is currently (1995) under investigation at Rosewarne in Cornwall as a potential commercial paper crop for small-scale industries in SW. England[K]. Because of rather high yields from natural stands, the plant has been suggested as a source of biomass for energy production[7, 269]. Dry cane yields of ca 10, 15, and 20 tonnes per hectare were reported respectively from infertile, partly fertile and fertile soils[269]. According to the phytomass files annual productivity ranges from 10 to 59 tonnes per hectare, the latter figure from Westlake's (1963) estimate of 57 - 59 tonnes[269]. In addendum, Westlake cites evidence that Arundo donax can produce 40-75 MT/ha/yr. in warm temperate and tropical regions. Early vegetative growth has ME (metabolizable energy) of 2.22 megacalories/kg DM, while hay has an ME of only 1.37 (Gohl, 1981). Such annual productivity, if sustainable, makes this a notable energy candidate, especially when one considers the energy as a by-product, with leaf protein and potential pharmaceutical as primary products[269]. A particular type of cellulose is obtained from the plant[7]. In Italy, the plant is used in the manufacture of rayon[269]. Bio-fuel crop.

dwatta Diaphoretic Diuretic Emollient Galactofuge HypotensiveThe root is diaphoretic, diuretic, emollient and galactofuge[7]. An infusion is said to stimulate menstrual discharge and diminish milk flow[240, 272]. A paste of the root is applied to the forehead to treat headaches[272]. Isolated alkaloids have been experimentally shown to raise the blood pressure and contract the intestine and uterus[240]. The rhizome or rootstock is used in the treatment of dropsy. Boiled in wine with honey, the root or rhizome has been used for treating cancer[269]. The plant contains the alkaloid gramine. This is said to be a vasopressor, raising the blood pressure in dogs after small doses, causing a fall in larger doses[269]. The stems have been used as splints for broken limbs[257].

nrakta S. Europe ksakta Ditches, riversides and marshland[7, 200].

propta Seed - surface sow in a greenhouse in February to April. Stand the pots in about 3cm of water to keep the soil moist until the seed germinates. It usually germinates in 1 - 3 months at 15°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Once they are 20cm or more tall, plant them out into their permanent positions in late spring or early summer. Division in spring[1]. Whilst large divisions can be planted out direct into their permanent positions, we have found that it is best to pot the divisions up and keep them in light shade in a greenhouse until they are rooting away well. Stem cuttings, placed in water, root easily[1].

nwatta Fodder: Bank Industrial Crop: Biomass Management Hay Minor Global CropLandscape Uses:Container, Screen, Specimen, Winter interest. Prefers a moist fertile soil in a sunny sheltered position, preferably by water[1, 134, 200]. Tolerates a pH in the range 5.5 to 8.3. Plants can be grown as a specimen in lawns etc, succeeding in quite coarse grass[233]. Plants are succeeding in a site that is very exposed to maritime winds at Rosewarne in Cornwall[K]. Adapted to tropical, subtropical and warm temperate climates of the World, Giant reed is often found on sand dunes near seashores. It tolerates some salt. It grows best along river banks and in other wet places, and is best developed in poor sandy soil and in sunny situations. Said to tolerate all types of soils, from heavy clays to loose sands and gravelly soils. Ranging from Cool Temperate Wet through Tropical Dry to Wet Forest Life Zones, giant reed is reported to tolerate annual precipitation of 30 to 400cm, an average annual temperature range of 9 to 28.5°C and a pH in the

range of 5.0 to 8.7[269]. One report says that this plant is only hardy in the milder areas of Britain[1] whilst another report says that it is hardy to between -5 and -10°C[200]. This contradicts with the hardiness zone rating of 6 which would make the plant hardy in most areas of Britain[200]. Plants thrive outdoors at Oxford Botanical Gardens[233] as well as at Hilliers Arboretum in Hampshire and the RHS Gardens in Surrey[K]. Extensively cultivated in S. Europe for basket making etc[50]. Plants rarely if ever flower in British gardens[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

7.2.9 Alliaria petiolata

Garlic Mustard

6 tlin 8 cyuc 3 kcaak 1 tcan 2 dwat 1 m hkuc

pcimhmim cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikhwis hpa7tmwatli fyfjkrx7e hjonli

drutta Alliaria petiolata is a BIENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to June, 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: light (sandy), medium (loamy) and heavy (clay) 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 moist or wet soil.

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Young leaves - raw or cooked as a potherb or as a flavoured in cooked foods[4, 5, 9, 12, 62, 115, 244]. A mild garlic and mustard flavour, the leaves are also believed to strengthen the digestive system[244]. They can be finely chopped and added to salads[7, 183]. The leaves are available very early in the year and provide a very acceptable flavouring for salads in the winter[K]. Flowers and young seed pods - raw[62]. A mild, garlic-like flavour[K].

tcanta DyeA yellow dye is obtained from the whole plant[7].

dwatta Antiasthmatic Antiscorbutic Antiseptic Deobstruent Diaphoretic Eczema Sternutatory Vermifuge VulneraryGarlic mustard has been little used in herbal medicine[268]. The leaves and stems are antiasthmatic, antiscorbutic, antiseptic, deobstruent, diaphoretic, vermifuge and vulnerary[4, 7]. The leaves have been taken internally to promote sweating and to treat bronchitis, asthma and eczema[4]. Externally, they have been used as an antiseptic poultice on ulcers etc[4], and are effective in relieving the itching caused by bites and stings[244]. The leaves and stems are harvested before the plant comes into flower and they can be dried for later use[238]. The roots are chopped up small and then heated in oil to make an ointment to rub on the chest in order to bring relief from bronchitis[245]. The juice of the plant has an inhibitory effect on Bacillus pyocyaneum and on gram-negative bacteria of the typhoid-paratyphoid-enteritis group[240]. The seeds have been used as a snuff to excite sneezing[4].

nrakta Most of Europe, including Britain, south to N. America and east to W. Asia and the Himalayas. ksakta Damp hedgerows, edges of woods and other shady places, preferring basic soils[7, 13, 17, 244].

propta Seed - sow outdoors in situ either in spring or autumn.

nwatta Prefers a damp rich alluvial soil[7, 53]. Succeeds in damp shady places where few other herbs will grow[238]. A good woodland edge plant, it also grows well in the bottom of hedgerows[24] and will self-sow freely in suitable conditions[238]. On a calm day the plant emits a strong smell of garlic. This is especially pronounced if the leaves are bruised[245]. This species is an important food source for the orange-tip butterfly[238]. 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].

7.2.10 *Orontium aquaticum*

Golden Club

6 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 0.5 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Orontium aquaticum* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista The plant is rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant.

kcakta Edible Parts: RootSeedEdible Uses: Root - cooked. It must be soaked in cold water for some hours in order to remove an acrid taste[46, 161]. The fresh root contains calcium oxalate and, when eaten raw, will produce an effect on the mouth similar to being pricked with hundreds of small needles. As long as the root is well cooked the calcium oxalate is broken down and the root is perfectly safe to eat[2, 55]. Drying the root also breaks down the calcium oxalate and makes the root safe to eat[105]. The dried roots can also be ground into a powder and used with flour in making bread, biscuits etc[207]. The root is deep seated in the mud and difficult to extract[95]. Seed - dried[1, 95]. The seed must be soaked first in order to remove an acrid taste[46, 55, 161]. Repeated boiling in changes of water are necessary to render the seeds edible[2]. They have a taste like peas[207].

nrakta Eastern N. America - Massachusetts to Kentucky, south to Florida and Louisiana. ksacta Sandy, muddy or peaty shores and in shallow water[43].

propta Seed - best sown as soon as ripe in submerged containers in a cold frame[188]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water 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 develops on the plant underwater in small green berries[200]. Division in spring[200]. Very easy, the divisions can be planted out direct into their permanent positions.

nwatta Succeeds in the bog garden or pond margins up to 45cm deep[56, 200], but plants do less well if they are not grown in water[188]. Requires a fertile loamy soil in full sun[200]. Plant the rootstock in at least 30cm of soil[1]. Another report says that the plant should be under at least 15cm of water[245]. Plants are hardy to -15°C[200] in one report, to -20°C in another[187], though another says they may require protection in harsh winters[56]. A most unpleasant animal smell is emitted from the flowers[245].

7.2.11 *Sagittaria rigida*

Sessile-Fruited Arrowhead

6 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 0.8 m hkuc
htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwishom hpa7tmwatli hjonli

drutta *Sagittaria rigida* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 wet soil and can grow in water.

kcakta Edible Parts: RootEdible Uses: Root - cooked[177]. Tastes like potatoes[183].

nrakta Eastern N. America - Quebec to Minnesota and southwards. Naturalized in Britain in S.W. England[17]. ksacta Calcareous or brackish shallow water and shores of ponds, swamps, and rivers, occasionally in deep water from sea level to 1000 metres[270].

propta Seed - best sown as soon as it is ripe in a pot standing in about 5cm of water. Prick out the seedlings into individual pots when they are large enough to handle, and gradually increase the depth of water as the plants grow until it is about 5cm above the top of the pot. Plant out in late spring or early summer of the following year. Division of the tubers in spring or autumn. Easy. Runners potted up at any time in the growing season.

nwatta A pond or bog garden plant, it requires a moist or wet loamy soil in a sunny position[1, 200]. Prefers shallow, still or slowly flowing water up to 30 - 60cm deep. Plants can succeed in deep water[43].

7.2.12 *Acorus gramineus*

Grass-leaved Sweet Rush, Japanese Sweet Flag, Dwarf Sweet Flag

6 tlin 10 cyuc 3 kcaak 0 tcan 3 dwat 0.3 m hkuc
htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Acorus gramineus* is an evergreen 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 leaf all year, 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 Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water.

pcista Although no records of toxicity have been seen, this species belongs to a family where most of the species are poisonous, at least in the fresh state. The following notes are from the related *A. calamus* - the fresh root can be poisonous[7]. When using the plant medicinally, the isolated essential oil should not be used[165].

kcakta Edible Parts: RootEdible Uses: CondimentRoot - raw or cooked[105, 177]. It should be peeled, finely chopped and soaked in several changes of water first[183]. A stronger and more pleasing taste than *A. calamus*[2, 183]. The root is also used as a ginger substitute[177]. Some caution is advised, see the notes above on toxicity.

tcanta Essential Insecticide Parasiticide RepellentThe dried root repels insects[178]. It is probably also insecticidal[178, 240] and is used in Vietnam to kill lice, bugs and fleas[283]. An essential oil is obtained from the plant[240]. A useful ground cover plant, forming a spreading clump[208].

dwatta Anodyne Antibacterial Antifungal Antiperiodic Antirheumatic Antispasmodic Aromatic Cardiac Carminative Diaphoretic Diuretic Emmenagogue Epilepsy Expectorant Febrifuge Parasiticide Sedative Stimulant Stomachic Tonic VermifugeThe root is antifungal, antibacterial, antiperiodic, antirheumatic, antispasmodic, aromatic, cardiac, carminative, diaphoretic, emmenagogue, febrifuge, sedative, stimulant, stomachic, tonic and vermifuge[4, 7, 9, 21, 61, 147, 165, 176, 178, 218, 238, 240, 279]. It is also powdered and applied to bleeding gums[218, 238]. It is used internally in the treatment of digestive problems - particularly gastralgia and diarrhoea[283], cough, bronchial asthma, neurasthenia, depression, epilepsy etc[176, 238, 283]. Externally, it is used to treat body parasites, dermatosis and haemorrhoids[283]. The root can be harvested at any time of the year, except when the plant is in flower[238]. The root contains an essential oil consisting of asarone and asaryl aldehyde, plus a bitter glucoside acorin[176, 283]. Asarone increases the hypnotic effect of barbiturates and ethanol, lowers blood pressure and is antibacterial against *Staphylococcus aureus*, streptococci and mycobacterium[176]. The whole plant is anodyne, antiperiodic, antispasmodic, digestive, diaphoretic, diuretic, expectorant, sedative, stimulant, stomachic, sudorific, tonic, vermifuge[218].

nrakta E. Asia - China, Japan, India. ksacta Wet places by streams and around ponds in C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe. Stand the pot in about 3cm of water. Pot up young seedlings as soon as they are large enough to handle, keep them wet by standing the pots in shallow water and overwinter for the first year in a greenhouse or cold frame. Division in spring just before growth starts[1]. Very easy, the plants can be divided at any time in the growing season and can be planted direct into their permanent positions[K].

kilos each[95]. Fruit[105]. No more details but caution is advised - see the notes above on toxicity.

nrakta South-eastern N. America - North Carolina to Florida. ksacta Non-alluvial swamps, especially on acid soils[72], and in shallow water at the edges of ponds[1].

propta Seed - best sown as soon as it is ripe in late summer in pots of soil that are submerged to their rims in water[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in trays of water 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]. 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. Stem cuttings rooted in wet mud in the summer[200].

nwatta Requires a wet lime-free humus-rich soil by the side of water or in shallow still or slowly flowing water in a sunny position[200]. Plants are best grown in clumps[1].

7.2.22 *Cardamine lyrata*

6 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfixre7t hjonli

drutta *Cardamine lyrata* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June, and the seeds ripen from May to September. 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. 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 RootEdible Uses: Leaves - raw or cooked[105, 177]. Root - raw or cooked[105, 177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Wet places and paddy fields in lowland and foothills, C. and S. Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. 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]. Prefers a moist humus rich soil in shade or semi-shade[200]. A stoloniferous species[200].

7.2.23 *Mimulus luteus*

Monkey Musk, Yellow monkey-flower

6 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Mimulus luteus* 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 7. It is in flower from July to August. 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: LeavesEdible Uses: Leaves - raw or cooked[105, 257]. Eaten as greens[257].

nrakta S. America - Chile. Naturalized in Britain. ksacta Wet places[60]. Locally naturalized by streams in Scotland.

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 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]. Hardy to about -20°C[187]. There is some confusion over the naming of this plant, the entry on edibility may refer to *M. guttatus*, which is closely related to this species[161, 200]. Hybridizes with *M. guttatus*[187].

7.2.24 *Petasites palmatus*

Sweet Butterbur, Golden Palms Coltsfoot, Sweet Coltsfoot, Butterbur

6 tlin 10 cyuc 2 kcaak 0 tcan 1 dwat 0.4 m hkuc
pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Petasites palmatus* is a PERENNIAL growing to 0.4 m (1ft 4in) by 1 m (3ft 3in) at a fast rate. It is in flower from February 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 Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

kcakta Edible Parts: Flowers StemEdible Uses: SaltY-oung flower stalks, used before the flower buds appear, are boiled until tender and seasoned with salt[172, 177, 183]. Flower buds - cooked[183]. Leafstalks - peeled and eaten raw[105, 177, 183, 257]. The ash of the plant is used as a salt substitute[46, 61, 95, 102, 183]. To prepare the salt, the stems and leaves are rolled up into balls whilst still green, and after being carefully dried they are placed on top of a very small fire on a rock and burned[213].

dwatta Pectoral Salve TBThe roots have been used in treating the first stages of gripe and consumption[257]. The dried and grated roots have been applied as a dressing on boils, swellings and running sores[257]. An infusion of the crushed roots has been used as a wash for sore eyes[257]. A syrup for treating coughs and lung complaints has been made from the roots of this species combined with mullein(*Verbascum* sp.) and plum root (*Prunus* sp.)[257].

nrakta N. America - Newfoundland to Massachusetts, west to Alaska and south to California. ksacta Low woods, glades and damp clearings[43]. Swamps and along the sides of streams[235].

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 Landscape Uses:Seashore, Woodland garden. 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]. Requires a moist shady position[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to about -20°C[187]. 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. Special Features:Attractive foliage, North American native, Invasive, Wetlands plant.

banks and bars, pioneering in disturbed places, often emergent in water up to 1 metre deep, from sea level to elevations of 2400 metres[270].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, 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 wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200].

7.2.19 Scirpus validus creber

Soft-Stem Bulrush

6 tin 9 cyuc 2 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcuphja/nhs6s hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Scirpus validus creber is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. 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. 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.

kcaakta Edible Parts: Leaves Pollen Root SeedEdible Uses: Root - raw or cooked[159, 161, 172, 183]. Rich in starch. The bruised young roots, when boiled in water, furnish a sweet syrup[183]. The rhizomes are 3 - 10mm in diameter[270]. Young shoots - cooked[55, 62, 85, 183]. The tender base of the stem is eaten raw in salads[183]. The pollen is used in soups or mixed with flour and used in making bread[177, 183]. It is rich in protein. Seed[62, 85, 159, 183]. No further details are given but it is probably ground into a powder and used in making bread etc. Small and rather fiddly to harvest and utilize.

tcanta Basketry WeavingThe stems are used in weaving and basket making[189, 257]. They are used to make good quality mats for use on the floor, for sleeping on and for making temporary partitions[257]. The stems are pulled off the plant rather than cut to ensure the maximum length of stem[257].

dwatta Astringent DiureticThe root is astringent and diuretic[152].

nrakta N. America - all areas except the extreme north. ksacta Fresh to brackish marshes, fens, bogs, lakes, stream banks and bars, pioneering in disturbed places, often emergent in water up to 1 metre deep, from sea level to elevations of 2400 metres[270].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, 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 We have very little information on this species and do not know if it will be hardy in Britain. However, judging by its native range, it is likely to succeed outdoors at least in the milder areas of the country. The following notes are based on the general needs of the genus. This species may be no more than a synonym for Schoenoplectus tabernaemontani[270]. Succeeds in any wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200].

7.2.20 Petasites frigidus

Sweet Coltsfoot, Arctic sweet coltsfoot, Arrowleaf sweet coltsfoot, Golden Palms Coltsfoot, Butterb
6 tin 10 cyuc 2 kcaak 0 tcan 1 dwat 0.2 m hkuc

pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli nyanhjen hjonli

drutta Petasites frigidus 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 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 Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) 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 or wet soil.

kcaakta Edible Parts: Flowers Leaves Root StemEdible Uses: SaltYoung leaves - raw or cooked[46, 61, 257]. They are mixed with other greens and used as a potherb[183, 257]. The leaves can also be made into a sauerkraut[257]. Young stalks and flower heads - cooked[183]. Roots - cooked[172, 183]. The burnt leaves are used as a salt substitute[172]. The stems and leaves, whilst still green, are rolled up into balls, dried and then placed on top of a very small fire on a rock and burned[207]. A very acceptable condiment for piñole[207].

tcanta Containers StuffingA good ground cover for the wilder areas of the garden[200]. The cotton-like seed heads have been used as a stuffing material for mattresses[257]. The leaves have sometimes been folded into conical containers for collecting fruit[257]. They have also been used to make a temporary funnel[257].

dwatta Antispasmodic Pectoral PoulticeAntispasmodic, poultice[172]. An infusion of the dried leaves has been used in the treatment of colds, head and chest congestion[257].

nrakta N. Europe to Northern N. America. ksacta Streambanks, moist woods, bogs and other wet places in N. America[60].

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 Landscape Uses:Seashore, Woodland garden. 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]. 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. Special Features:Attractive foliage, North American native, Invasive, Wetlands plant.

7.2.21 Peltandra sagittifolia

White Arrow Arum

6 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc htut cyutli hja7nhs6s hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Peltandra sagittifolia is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. 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. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers wet soil and can grow in water.

pcista The plant is rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of tiny needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant[95].

kcaakta Edible Parts: Fruit RootEdible Uses: Root - must be well cooked in order to destroy an acrimonious principle, see the notes above on toxicity[95]. The root contains much farinaceous material[1, 105, 161] and can weigh up to 2.7

nwatta Landscape Uses:Container, Foundation, Ground cover, Massing, Rock garden, Seashore. Grows well in shallow water margins of ponds etc[1, 2], though it can also succeed in drier habitats[56]. Requires a sunny position[200]. A very ornamental plant, there are some named varieties[208, 238]. The cultivar 'Pusillus' can be grown as a submerged aquatic plant[238]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms.

7.2.13 Picea sitchensis

Sitka Spruce

6 tin 7 cyuc 2 kcaak 0 tcan 2 dwat 50 m hkuc htut cyutli tcuphja7n hwicli hyishrasjlutnyik hpa7tli frusflat-prik hpa7tmwatli hjonli

drutta Picea sitchensis is an evergreen Tree growing to 50 m (164ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 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 nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure. It cannot tolerate atmospheric pollution.

kcaakta Edible Parts: Flowers Inner bark Seed Seed-podEdible Uses: Condiment Gum TeaYoung shoots - raw[118, 256]. Young male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are 6 - 10cm long[82]. Inner bark - raw or cooked[256]. It can be dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. The inner bark was usually harvested in the spring, though it was also sometimes taken in the summer[256]. An emergency food, it is only used when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229]. It is rich in fats and has a pleasant slightly resinous flavour but is too small and fiddly to be worthwhile unless you are desperate[172, K]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172]. A gum obtained from the bark is hardened in cold water and then used for chewing[118, 177, 256]. It should be aged for 3 days or more before using it. The best gum is obtained from the southern side of the tree.

tcanta Adhesive Basketry Fuel Gum Pitch String Varnish Waterproofing WoodThe tough and flexible root is used in basket making and as a string[118, 229]. The roots were burnt over an open fire to remove the bark, then they were dried and split to make hats, ropes etc[257]. The main body material of baskets was made from the roots. These were cut into lengths 75 - 90cm long and 12 - 25mm in diameter. Whilst still full of sap and soft, these were split into broad flat bands and these in turn were sub-divided by knife and teeth until the desired size was obtained - a little larger than coarse thread, about like small twine. The vertical rods were made of hazel (Corylus spp) and the overlay was bear grass (Xerophyllum tenax)[257]. The roots were used by several native North American Indian tribes to make tightly woven baskets that would hold water[226]. The limbs and roots can be pounded, shredded and used to make ropes[257]. A pitch is obtained from the tree and is used for caulking boats, waterproofing boxes etc[118, 257]. The rendered pitch has been used as a glue[257]. The pitch can be melted then used as a protective varnish-like coat on wood[257]. Wood - strong according to some reports[171, 229], not strong according to others[1, 11, 46]. The quality of the wood for aircraft construction is unsurpassed, it is remarkably strong yet light and its resistance - weight ratio is among the highest[226]. The wood is elastic, soft, light, straight grained. Equal in quality to P abies but more quickly produced, the wood is used for shipbuilding, construction, packing cases, doors, posts etc[1, 11, 46, 226]. The wood is also valued for making musical instruments[226] and is widely used in the pulp industry to make paper[171]. The wood is a good fuel, knotted bits of wood would keep the fire burning all night[257].

dwatta Analgesic Antirheumatic Antiseptic Diuretic Laxative Ophthalmic Pectoral Poultice Salve Stomachic TB Vitamin CSitka spruce was widely employed medicinally by several native North American Indian tribes who used it especially for its antiseptic and pectoral qualities in the treatment of lung complaints, wounds, sores etc[257]. It is little, if at all, used in modern herbalism. The inner bark is laxative[256, 257]. It has been chewed in the treatment of throat problems, coughs and colds[257]. A decoction of the branch tips and the bark has been used in the treatment of rheumatism, stomach pains, constipation and gonorrhoea[257]. A decoction of the cones has been taken in the treatment of pain[257]. The cones have also been used in steam baths to treat rheumatism[257]. A decoction of the bark has been used as a steam bath in the treatment of back aches[257]. The resin is antiseptic and diuretic[257]. A decoction has been used in the treatment of gonorrhoea[257]. A poultice of the resin has been used as a rub on rheumatic joints[257]. Combined with Indian Hellebore roots (Veratrum viride), it has been used as a poultice on rheumatic joints[257]. The resin has also been used as a dressing or poultice on cuts, broken skin, boils, wounds, infections and suppurating sores[257]. The resin has been chewed as a breath freshener and as a treatment for TB[257]. The gum from new shoots and small branches has been placed in the eyes as a treatment for snow blindness[257]. A decoction of the roots has been used in the treatment of diarrhoea[257].

nrakta Western N. America - Alaska to N. California. ksacta Moist, sandy, often swampy soils, occasionally on wet rocky slopes in the far north of its range[82]. Alluvial soils from sea level to 300 metres, usually close to the coast[118].

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

nwatta Landscape Uses:Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet, cold, poor and shallow soils[81]. Trees have succeeded on pure chalk when on a north facing hollow deep in beech woods[200]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Very tolerant of exposure[81], resisting salt laden gales[172], though trees are not very wind firm in shallow soils[1]. A long-lived tree, with specimens 700 - 800 years old being recorded[229]. It is slow growing for its first two or three years, though it soon becomes an extremely fast growing tree and is very widely planted for timber in Britain and other temperate areas[11, 17]. Even trees 30 metres tall are increasing in height by 1 metre a year[185]. New growth takes place from May to July or August and some very vigorous trees will produce a second flush of growth until September[185]. Although the dormant tree is very cold-hardy, growth can be severely checked if the trees are growing in a frost hollow, because the young shoots are very susceptible to damage by late frosts[125, 185]. In Britain the best stands are produced in the sheltered valleys of W. Scotland. Trees are unsurpassed for rapid volume wood production in cool wet mountain sites on blanket peat in W. Britain[200]. In areas with cool wet summers (1200mm of rain per year) it makes a huge specimen tree[200]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[1, 200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200].

They hybridize freely with other members of this genus[200]. Many trees do not bear female flowers in most years. Subject to damage by the green spruce aphid[1], trees are also often attacked by a bark beetle and so should be kept away from more valuable plantings[125]. A biological control for the bark beetle is being introduced (1990)[125]. Special Features:North American native, Inconspicuous flowers or blooms.

7.2.14 Nyssa aquatica

Water Tupelo

6 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 30 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli prikwlis hpa7tmwatli xre7t hjonli

drutta Nyssa aquatica is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. 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 and can grow in water.

ksakta Edible Parts: FruitEdible Uses: Fruit - occasionally eaten raw but more often used in preserves[177, 183]. The fruit is up to 4cm long, it has a thick, tough skin with a thin acid flesh surrounding a large seed[82, 229].

tcanta Cork Dye WoodThe wood of the roots is sometimes used for making floats instead of cork[82]. A red dye can be obtained from the burnt bark mixed with water and the ash of red oak (*Quercus rubra*)[257]. Wood - light, close-grained, soft, difficult to split[82, 229, 235]. Tough according to one report[235], weak according to another[229]. It has an intricately contorted and twisted grain[82]. It weighs 29lb per cubic foot[235], and is used for various things such as panelling, broom handles, woodenware and crates[82, 229]. It is sometimes exploited commercially[229].

nrakta South-eastern N. America - Virginia to Florida, west to Illinois and Texas. ksacta Swamps, bottomlands, or sites periodically under water, in soils ranging from clay to rich silts[229].

propta The seed can be sown in late winter in a cold frame[78] but would probably benefit from an earlier sowing if the seed can be obtained any sooner. Three months stratification at 5°C improves germination[200]. Germination rates are variable[78]. As soon as 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, July/August in a frame. Layering.

nwatta Landscape Uses:Specimen, Woodland garden. Although this is a plant of swamps and other wet soils in the wild, once established it can succeed in Britain when growing in an ordinary good loamy soil in sun or semi-shade[1]. This plant probably requires a very wet soil, it is very difficult to establish in Britain, though it should be hardy at least in the milder parts of the country. It prefers a neutral to alkaline soil[200]. Plants are fast-growing in well-drained bottomlands in the wild, but slower in swampy sites[229]. They are long-lived trees, commencing to bear seeds when about 30 years old and usually producing heavy crops each year[229]. The seed is mainly distributed by water[229]. Resents root disturbance[1]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms.

7.2.15 Crataegus apiifolia

Parsley-Leaved Hawthorn

6 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Crataegus apiifolia* is a deciduous Shrub growing to 4 m (13ft 1in). 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 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.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. About 7.5mm in diameter[200] with a thin flesh[227]. 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 RootstockUsed as a dwarfing rootstock for *C. aestivalis*[183]. Wood - heavy, hard, strong, close-grained[82, 227, 235]. It weighs 46lb per cubic foot[227, 235]. It has no particular commercial value[227], though it is 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 Southern N. America - Virginia to Florida, west to Texas and Missouri. ksacta Along streams and the borders of swamps[235]. Also found in hummocks in pine barrens near the coast[82]. Acidic sandy soils, woods and roadsides in Texas[274].

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 not hardy in all parts of Britain, it usually succeeds outdoors for a number of years at Kew, but is killed in severe winters there[11]. It does not seem to fruit well in Britain[11]. 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]. 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].

7.2.16 Dryopteris carthusiana

Narrow Buckler Fern, Spinulose woodfern

6 tlin 8 cyuc 2 kcaak 0 tcan 4 dwat 1 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta *Dryopteris carthusiana* is a FERN growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains 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]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

ksakta Edible Parts: Leaves RootEdible Uses: Root - baked[61]. Some caution is advised, see notes above on toxicity. Old leafstalks on the underground stems can be roasted, peeled and the inner portion eaten[257]. Young curled fronds, harvested as they are developing in the spring, can be boiled and eaten like asparagus[257].

tcanta When spaced about 30cm apart each way, the plants can be grown as a ground cover[208].

dwatta VermifugeThe root contains 'filicin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent[4, 222, 238]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as castor oil, increases the absorption of the fern root and can be dangerous[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity.

nrakta Europe, including Britain, from Scandinavia south and east to Spain and Siberia. N. America.. ksacta Damp and wet woods, marshes and wet heaths[17].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°C. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. 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:Foundation, Ground cover, Massing, Woodland garden. Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Requires permanently moist conditions at its roots. A very ornamental plant[1], it is often evergreen in mild winters[188]. Plants spread slowly at the rootstock[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Not North American native, Naturalizing, There are no flowers or blooms.

7.2.17 Cyperus longus

Galingale

6 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 1.2 m hkuc htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Cyperus longus* is an evergreen Perennial growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, 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. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water.

ksakta Edible Parts: RootEdible Uses: CondimentTuber - used as a spice in soups, pies and sweets[5, 183].

tcanta Basketry Essential Paper WeavingThe leaves are used in basketry and for weaving hats, matting etc[100]. The root and stem have the scent of violets and are used in perfumery[4, 46, 61, 245]. The aroma becomes more pronounced when the root has been dried and left to age[245]. A fibre obtained from the plant is used in paper making[100].

dwatta Aromatic TonicThe root is an aromatic tonic[4]. It was at one time considered to be a good stomachic and useful in the first stages of dropsy, but it has now fallen into disuse[4, 238].

nrakta Britain and the Mediterranean region north to Lake Geneva. ksacta By water in ditches and marshy places[17].

propta Seed - surface sow in the spring and keep the compost moist[164]. The seed usually germinates in 2 - 6 weeks at 18°C[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow on for their first winter in a greenhouse and plant them out in late spring after the last expected frosts. Division in spring or autumn. Division is simple at almost any time of the year, so long as the roots are not allowed to become dry. Plant them out straight into their permanent positions.

nwatta Prefers a moist sandy loam[95, 117]. Succeeds in any good garden soil so long as it does not dry out[162], it also grows well in up to 30cm of water[200]. Plants are hardy to about -15°C[200]. A very ornamental plant[1], though it can spread freely at the roots when well-seeded[233]. Galingale was one of the favourite spices of the medieval kitchen and was an ingredient of 'pokerounce', a kind of medieval cinnamon toast[183]. It is rarely used at present. Both the root and the stem have a sweet moss-like perfume, resembling that of the violet but not so pure. The aroma becomes more fragrant with age[245].

7.2.18 Scirpus validus

River Club-Rush

6 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Scirpus validus* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. 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. 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.

ksakta Edible Parts: Leaves Pollen Root SeedEdible Uses: Root - raw or cooked[159, 161, 172, 183]. Rich in starch. The root contains a meagre amount of starch[193]. The sweet roots are eaten raw in mid summer[257]. The bruised young roots, when boiled in water, furnish a sweet syrup[183]. The rhizomes are 3 - 10mm in diameter[270]. Young shoots - cooked[55, 62, 85, 183]. The tender base of the stem is eaten raw in salads[183, 257]. The pollen is used in soups or mixed with flour and used in making bread[177, 183]. It is rich in protein. Seed[62, 85, 159, 183]. No further details are given but it is probably ground into a powder and used in making bread etc. The seed is small and rather fiddly to harvest and utilize.

tcanta Basketry WeavingThe stems are used in weaving and basket making[189, 257]. They are used to make good quality mats for use on the floor, for sleeping on and for making temporary partitions[257]. The stems are pulled off the plant rather than cut to ensure the maximum length of stem[257].

dwatta Astringent Diuretic HaemostaticThe root is astringent and diuretic[152]. The stem pith is haemostatic[257]. A poultice of the stem pith has been placed under a dressing in order to stop wounds bleeding[257].

nrakta N. America - all areas except the extreme north. ksacta Fresh to brackish marshes, fens, bogs, lakes, stream