

Divison **5. MAGNOLIOPHYTA** Cronquist, Takht. & W. Zimm.

Class **1. MAGNOLIOPSIDA** Cronquist, Takht. & W. Zimm.

Subclass 5. ROSIDAE Takht.

Order **2. FABALES** Bromhead

*Trees, shrubs or herbs. Leaves* often pinnate or bipinnate, sometimes trifoliolate or simple; stipules present or absent. *Flowers* bisexual, hypogynous to perigynous, actinomorphic to zygomorphic, often large and showy. *Sepals* often 5, often more or less united below into a calyx tube. *Petals* usually 5, rarely absent, occasionally united. *Stamens* often 10, sometimes numerous, often monadelphous or diadelphous. *Ovary* of 1 carpel. *Fruit* a legume, often dehiscent; seeds usually with little or no endosperm, rarely with abundant endosperm; embryo large.

Contains 3 families and some 4,000 species widely distributed throughout the world.

The following 3 families are now accepted as one family in Lewis, G. et al. (2005) *Legumes of the world*. The 3 families are retained here to keep our numbering system and the Fabaceae is brought up to date to follow this fine book. All genera should be consulted in it as it contains a vast amount of information.

**86. MIMOSACEAE** R. Br. nom. conserv.

*Leguminosae* subfamily *Mimosoideae* (R. Br.) Taub.

Suckering, deciduous or evergreen, monoecious *trees*. *Leaves* alternate, of 2 kinds, the juvenile bipinnate with numerous leaflets, the adult simple; stipules more or less absent. *Inflorescence* a dense, racemose, spherical head or spiciform raceme; flowers bisexual, hypogynous and actinomorphic. *Calyx* mostly with 5 lobes. *Corolla* 5-lobed. *Stamens* numerous, longer than petals. *Carpel* 1, with several ovules in a row. *Style* 1; stigma capitate. *Fruit* a legume; seeds with a distinct areole, the radicle straight.

Contains 66 genera and over 2,000 species, widespread in tropical and subtropical regions with a few species extending into temperate areas.

Lewis, G. et al. (2005). *Legumes of the world*. Kew.

An easily recognisable family by its balls of flowers of which the stamens are the most conspicuous part.

1. Stamens united into a tube  
 1. Stamens free or nearly so

- 1. Albizia**  
**2. Acacia**

**1. Albizia** Durazz.

*Shrubs* or small evergreen *trees*. *Leaves* alternate, bipinnate. *Inflorescence* an axillary, spiciform raceme; stipules more or less absent. *Calyx* infundibuliform, with 5 short lobes. *Corolla* infundibuliform, with 5 lobes. *Stamens* numerous; filaments connate in the lower part

forming a slender tube. *Style* 1; stigma capitate. *Fruit* a legume, straight and flattened.

Contains about 100–150 species widely distributed in the tropics and subtropics.

Rushforth, K. (1999). *Trees of Britain and Europe*. London.

**1. A. lophantha** (Willd.) Benth. Plume Albizia  
*Acacia lophantha* Willd.

*Shrub* or small spreading evergreen *tree* to 7.5 m with fern-like appearance. *Bark* brown. *Branches* spreading, strongly striate or angled, shortly hairy. *Buds* small. *Leaves* alternate, 12–25 × 10–20 cm, oblong in outline, bipinnate; leaflets 20–40 pairs along each pinna, dark green on upper surface, paler beneath, 5–15 × 2.0–4.5 mm, oblong or the terminal obovate, obtuse and shortly mucronate at apex, glabrous or very sparingly hairy; rachis velvety hairy; petiole 4–6 cm, sulcate, usually with a prominent sessile gland near its base. *Inflorescence* an axillary spiciform raceme, solitary or in pairs near the tips of the young shoots; peduncle 1.5–4.0 cm, hairy; pedicels 1–2 mm, hairy; bracteoles deltoid, hairy, caducous; flowers fragrant. *Calyx* infundibuliform, with 5 short, deltoid, obtuse lobes, hairy. *Corolla* about 6 mm, about twice as long as the calyx, greenish, with 5 tongue-shaped, obtuse, hairy lobes. *Stamens* numerous; filaments 13–18 mm, creamy-white, connate for a short distance above the base; anthers whitish, minute. *Style* 1. *Legume* 7–10 × 1.5–2.5 cm, reddish-brown, oblong, flattened, rounded or acute at apex, sutures distinctly thickened; valves glabrous, conspicuously swollen about the seeds; seeds 5–12, about 8.0 × 4.5 mm, oblong, not much compressed, dark blackish-brown, minutely punctate. *Flowers* 6–8.  $2n=26$ .

Introduced. Planted for ornament in the Isles of Scilly where it produces seedlings. Native of southern and western Australia.

**2. Acacia** Mill.

Evergreen *shrubs* or small *trees*. *Leaves* alternate, bipinnate, sometimes mixed with phyllodes or only phyllodes. *Inflorescence* of many-flowered, globose heads arranged in axillary racemes. *Calyx* with 5 lobes. *Corolla* white to yellow, 5-lobed. *Stamens* numerous, free. *Style* 1; stigma terminal. *Fruit* a legume.

Contains more than 1,500 species, cosmopolitan but mainly in the southern hemisphere.

Maslin, B. R. et al. (2001). *Acacia* L. in *Flora of Australia*: 11A. Canberra.

More, D. & White, J. (2003). *Trees of Britain and Northern Europe*. Jersey.

Pedley, L. (1986). Derivation and dispersal of *Acacia* (Leguminosae) with particular reference to Australia, and the

recognition of *Senegalia* and *Racosperma*. *Bot. Jour. Linn. Soc.* 92: 219–254.

Rushforth, K. (1999). *Trees of Britain and Europe*. London.

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|---|-----------------------|
| 1. Mature plants with bipinnate leaves                                      | <b>1. dealbata</b>    |
| 2. Mature plants with only phyllodes or phyllodes and some bipinnate leaves | <b>2. melanoxyton</b> |

### 1. *A. dealbata* Link

Silver Wattle

Evergreen *shrub* or *tree* up to 20 m, with a conical crown when young becoming columnar with age, suckering freely. *Trunk* up to 30 cm in diameter, extending into crown. *Bark* bluish-green and smooth in young trees, becoming chocolate brown, then grey or black, often corrugated or fluted. *Branches* spreading or drooping; twigs ribbed; young shoots green, angled, with short silvery hairs. *Buds* 1.5 mm, ovoid; scales blackish-brown, ovate, acute at apex. *Leaves* alternate, broadly oblong in outline, bipinnate; pinnae (12–)20–42, broadly oblong-elliptical in outline, each pinna with 50–80(–100) pinnules, the pinnules 2–4 (–7) × about 0.7 mm, when young golden brown, becoming greyish-green, narrowly oblong, obtuse to subacute at apex, entire; with a few silvery hairs; petioles (5–)10–20 mm; stipules inconspicuous; solitary glands present between each pair of pinnae, usually excepting the basal pair. *Inflorescence* a many-flowered, globose head arranged in axillary, compound racemes. *Calyx* with 5 lobes. *Corolla* bright yellow, fragrant, 5-lobed. *Stamens* numerous, free, exerted; filaments pale; anthers yellow. *Style* 1, filiform; stigma terminal. *Legume* 4–10 × 0.8–1.2 cm, oblong, more or less straight, glabrous, compressed between the seeds. *Flowers* 2–4.  $2n=26$ .

Introduced. Frequently planted in estates and parks. Devonshire, Cornwall and Ireland, rare in south-east England. Native of New South Wales, Victoria and Tasmania. Probably the most tolerant of the species cultivated and that most commonly sold as ‘mimosa’.

### 2. *A. melanoxyton* R. Br. Australian Blackwood *Racosperma melanoxyton* (R. Br.) C. Mart.

Tall evergreen *shrub* or *tree* up to 25 m, with a columnar to domed crown. *Trunk* up to 80 cm in diameter, extending through much of tree. *Bark* dark greyish-brown, becoming rough and furrowed. *Branches* spreading; twigs angular, glabrous or hairy; young shoot angular and hairy. *Buds* minute. *Leaves* mostly reduced to phyllodes, or occasionally some of them bipinnate in young trees and mixed with phyllodes, rarely present in old trees; phyllodes 8–10 × 0.6–3.5 cm, dark green on upper surface, slightly paler beneath, oblanceolate or slightly obovate, obtuse to acute at apex, entire, glabrous, with 3–5(–7) longitudinal veins, the venation reticulate and conspicuous; true leaves with a narrowly winged rachis, the pinnae 4–9 cm, bearing about 40 narrowly oblong, obtuse leaflets about 8.0 × 2.5 mm. *Inflorescence* of 1–6 heads, forming short, rather congested, axillary racemes, the heads globose and 5–8 mm in diameter; peduncles usually less than 4 mm. *Calyx* with 5 lobes. *Corolla* white to yellow, 5-lobed. *Stamens* numerous; filaments pale; anthers yellow.

*Style* 1; stigma capitate. *Legumes* 7–12 × 0.4–0.7 cm, valves dark brown with paler sutures, linear, compressed, much twisted and curled, obtuse at apex, thickened at sutures; seeds about 4.0 × 2.5 mm, oblong, dark shining brown, the funicle more than 10 mm, bent back on itself and almost completely circling the seed. *Flowers* 5–6.  $2n=26$ .

Introduced. Planted for ornament in gardens and parks and locally more or less naturalised in Devonshire, the Isles of Scilly and Cos. Kerry and Cork. Native of Australia and Tasmania and long in cultivation in other parts of the world.

## 87. CAESALPINIACEAE R. Br. nom. conserv.

*Leguminosae* Subfamily *Caesalpinioideae* (R. Br.)

Deciduous monoecious *trees* or *shrubs* or perennial herbs. *Leaves* alternate, paripinnate or simple and subtund. *Inflorescence* of dense lateral clusters of flowers or racemes; flowers bisexual, slightly zygomorphic, but rarely as strongly as in Fabaceae. *Calyx* with 5 lobes as free as the disc. *Corolla* 5-lobed, the upper inside the laterals. *Stamens* usually 10; anthers without an apical gland. *Style* 1. *Fruit* a legume; seeds generally without an areole; radicle normally straight.

Contains 156 genera and over 2,200 species and is widespread in tropical and subtropical regions, with a few species in temperate areas.

Lewis, G. et al. (2005). *Legumes of the world*. Kew.

Petigrew, C. J. & Watson, L. (1977). On the classification of Caesalpinioideae. *Taxon* 26: 57–64.

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|--|------------------|
| 1. Tree or shrub; leaves subtund       | <b>1. Cercis</b> |
| 1. Perennial herbs; leaves paripinnate | <b>2. Senna</b>  |

### 1. *Cercis* L.

Deciduous *trees*. *Leaves* alternate; lamina subtund. *Inflorescence* of dense, lateral clusters of flowers along mature twigs and branches and sometimes from the trunk. *Calyx* cupular, with 5 lobes. *Corolla* deep rose-purple, rarely paler or white, with 5 free petals, the 2 abaxial ones not connate and forming a keel. *Stamens* 10, free. *Style* 1. *Fruit* a legume, oblong and strongly compressed.

Contains 7 species in the northern hemisphere.

More, D. & White, J. (1993). *Trees of Britain & Northern Europe*. Jersey.

Bean, W. J. (1970). *Trees and shrubs hardy in the British Isles*. Ed. 8. 1. London.

### 1. *C. siliquastrum* L.

Judas Tree

Deciduous often sprawling *tree* up to 10(–15) m with a spreading, rounded, domed crown. *Trunk* up to 60 cm in diameter, extending well into the crown. *Bark* greyish-brown, smooth or folded, becoming cracked into small, rough squares. *Branches* spreading, twisted and turning at various angles; twigs brown or reddish-brown, angled, glabrous; young shoots green, often tinted red, glabrous. *Buds* 2–3 × 1.0–1.5 mm, ovoid, pointed; scales brownish, ovate, obtuse at apex. *Leaves* alternate; lamina 6–13 × 6–13 cm,

tinted copper-colour when opening, when mature medium yellowish-green on upper surface, paler and slightly glaucous beneath, subrotund, slightly emarginate to slightly pointed at apex, entire but slightly sinuate, cordate at base, glabrous; veins prominent beneath; petiole up to 5 cm, green or tinted pink, glabrous; stipules small, deltoid, caducous. *Inflorescence* of dense lateral clusters of flowers along mature twigs and branches, sometimes even protruding from the trunk and appearing slightly in advance of the leaves; pedicels 15–20 mm, deep reddish-purple, glabrous, slender. *Calyx* 5–6 mm, usually deep reddish-purple, rarely pale greenish, cupular, with 5, short, rounded, imbricate lobes. *Corolla* 12–14 mm, deep rose-purple, rarely pale pink or white, all 5 petals free, the 2 abaxial ones not connate and forming a keel, elliptical or ovate and rounded at apex. *Stamens* 10, free; filaments pale purple, curved; anthers yellowish. *Style* 1, pale purple; stigma yellowish. *Legume* 6–12 × 1.5–2.0 cm, narrowly oblong, flattened, acute at apex, the dorsal suture narrowly but distinctly winged; seeds about 6 × 4 mm, dark brown, strongly compressed, smooth. *Flowers* 5.  $2n = 14$ .

Introduced. Planted in parks, gardens and amenity areas and seedlings have been recorded in Kent, Southern England, Wales and Ireland.

## 2. Senna Mill.

*Perennial herbs* or small shrubs. *Leaves* alternate, paripinnate; stipulate. *Inflorescence* of 1–4 axillary flowers. *Sepals* 5, subequal. *Petals* 5, slightly zygomorphic. *Stamens* 10, 6 or 7 fertile, the remainder sterile. *Style* 1, short; stigma terminal, minute. *Fruit* a legume.

The two species described here are fairly frequent casuals from soya-bean waste, but rarely reach flowering. They can, however, be distinguished by their leaves.

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|---|------------------------|
| 1. Leaflets 6–14, broadly elliptical to ovate, acute or acuminate at apex | <b>1. occidentalis</b> |
| 2. Leaflets 4–6, obovate, rounded-obtuse and mucronulate at base          | <b>2. obtusifolia</b>  |

### 1. *S. occidentalis* (L.) Link Coffee Senna *Cassia occidentalis* L.

*Shrub* up to 2 m. *Stems* erect, branched. *Leaves* alternate, 15–17 cm, broadly oblong in outline, paripinnate; leaflets 6–14, 5–7 × 3–4 cm, medium green on upper surface, paler beneath, broadly elliptical to ovate, acute or acuminate at apex, entire, rounded at base, hairy on both surfaces; petiole 2–4 cm, ribbed, with 1 gland very near the base; stipules acicular and caducous. *Inflorescence* of 2–4 flowers, terminal and in upper leaf axils, paniculate; peduncle 2–5 mm; pedicels 10–15 mm; bracts caducous. *Sepals* 5, green or yellowish, subequal, obovate. *Petals* 5, up to 10 mm, yellow. *Fertile stamens* 6, with 3 adaxial and 1 abaxial staminodes; fertile filaments 2–8 mm, very unequal; fertile anthers 4–6 mm, very unequal, with short beaks. *Style* 1, short; stigma terminal, minute. *Legume* 12–18 × about 0.3 cm, cylindrical, slightly curved, entire; seeds all reniform. *Flowers* 8–9.  $2n = 26$ .

Introduced. Casual from soya-bean waste. Probably native of the New World but now an aggressive pantropical weed.

### 2. *S. obtusifolia* (L.) H. S. Irwin & Barneby

American Sicklepod

*Cassia obtusifolia* L.

*Perennial herb* or *subshrub*. *Stems* up to 2 m, erect or spreading, branched. *Leaves* 4–6 cm, alternate, broadly oblong or obovate in outline, paripinnate; leaflets 4–6, 4–5 × 2–3 cm, medium green on upper surface, paler beneath, obovate, rounded-obtuse and mucronulate at apex, entire, narrowed at base, hairy on both surfaces; petiole 1.5–2.0 cm; glands 1–2 between the lowest pairs of leaflets; stipules lanceolate, somewhat persistent. *Inflorescence* of 1–2 axillary flowers; peduncle 2–4 mm; pedicels 15–20 mm; bracts caducous. *Sepals* 5, green or yellowish, subequal, obovate. *Petals* 5, 8–10 mm, yellow. *Fertile stamens* 7, with 3 adaxial staminodes; fertile filaments unequal, 1–4 mm; fertile anthers 3–5 mm, unequal, shortly beaked. *Style* 1. *Legume* 12–18 × about 0.3 cm, entire, curved; seeds dull or lustrous, with a narrow, oblique areole.  $2n = 26$ .

Introduced. Casual from soya-bean waste. Probably native to the Americas, but now of almost pantropical distribution.

## 88. FABACEAE Lindl. nom. conserv.

*LEGUMINOSAE* Juss. nom. altern.

*Papilionaceae*; *Leguminosae* subfam. *Papilionoideae*; *Leguminosae* subfam. *Lotoideae*

*Annual* or *perennial* monoecious *herbs*, *shrubs* or *trees*, sometimes spiny. *Leaves* alternate, simple to palmate, trifoliolate or pinnate, often with tendrils, usually stipulate. *Inflorescence* terminal or axillary, in spikes, racemes or panicles; flowers bisexual, hypogynous, zygomorphic. *Calyx* often 2-lipped, the upper lip of 2 lobes, the lower lip with 3 lobes. *Petals* 5, the upper usually large (*standard*), the 2 laterals free (*wings*) and the 2 lower fused (*keel*), the keel more or less concealing the stamens and carpel. *Stamens* 10, usually fused into a tube below (*monadelphous*), or the uppermost free and the 9 lower fused (*diadelphous*), rarely all 10 free. *Style* 1; stigma capitate. *Carpel* 1, with 1-many ovules in row. *Fruit* a legume, usually dehiscent along 2 sides, but often breaking transversely into 1-seeded units like a schizocarp.

Contains 455 genera and over 10,000 species. Widespread in cold, temperate and tropical regions.

Gunn, C. R. (1969). Genera, types and lectotypes in the tribe *Vicieae* (Leguminosae). *Taxon* **18**: 725–733.

Lewis, G. et al. (2005). *Legumes of the world*. Kew.

Polhill, R. M. & Raven, P. H. (Eds.) (1981). *Advances in legume systematics*. **1** and **2**; Stirton, C. H. (Edit.) (1987). **3**. Kew.

Stirton, C. H. & Zarucchi, J. L. (1989) (Eds.). *Advances in legume biology*. Missouri Botanical Garden.

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|---|---------------------|
| 1. Leaves consisting of a tendril only (but with large leaf-like stipules)            | <b>42. Lathyrus</b> |
| 1. Leaves not consisting of a tendril only  | 2.                  |
| 2. At least some leaves paripinnate, imparipinnate or digitate; leaflets 2, 4 or more | 3.                  |
| 2. Leaves simple, 1-foliolate or 3-foliolate, sometimes very small                    | 44.                 |

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|--|-----------------------|---|-------------------------|
| 3. Leaves paripinnate; rhachis often ending in a spine or tendril  | 4.                    | 20. Plant with glandular hairs, at least in part  | <b>26. Robinia</b>      |
| 3. Leaves imparipinnate or digitate  | 14.                   | 20. Plant without glandular hairs   | 21.                     |
| 4. Shrubs or small trees; rhachis often ending in a spine  | 5.                    | 21. Flowers in umbels or clusters, the pedicels arising more or less from the same point  | 22.                     |
| 4. Herbs; rhachis not ending in a spine  | 6.                    | 21. Flowers in racemes or condensed panicles or solitary  | 30.                     |
| 5. Pedicels usually less than 5 mm, not articulated  |                       | 22. Legume lomentaceous   | 23.                     |
|  |                       | 22. Legume dehiscent or indehiscent, not lomentaceous   | 25.                     |
| 5. Pedicels 5 mm or more, articulated  | <b>28. Astragalus</b> | 23. Keel obtuse; legume strongly reticulate-veined  | <b>22. Ornithopus</b>   |
| 6. Stipules adnate to the petiole; calyx bilabiate, the upper lip with 4 teeth, the lower with 1 tooth                         | <b>31. Caragana</b>   | 23. Keel acute; legume not or only faintly reticulate-veined  | 24.                     |
| 6. Stipules not adnate to the petiole; calyx actinomorphic or if bilabiate, the upper lip with 2 teeth, the lower with 3 teeth | <b>8. Arachis</b>     | 24. Segments of the legume linear or oblong, straight or slightly curved  | <b>19. Coronilla</b>    |
| 7. Stem and leaves glandular-hairy   | 7.                    | 24. Segments of the legume lunate or horseshoe-shaped to rectangular with a semicircular to orbicular sinus which has a curved protuberance at its base | <b>16. Hippocrepis</b>  |
| 7. Stem and leaves not glandular-hairy   | <b>34. Cicer</b>      | 25. Keel beaked   | 26.                     |
| 8. Stem winged   | 8.                    | 25. Keel not beaked   | 28.                     |
| 8. Stem not winged   | <b>42. Lathyrus</b>   | 26. Leaves with 4–7 pairs of leaflets   | <b>18. Securigera</b>   |
| 9. Leaflets parallel veined  | <b>42. Lathyrus</b>   | 26. Leaves with 2–3 pairs of leaflets or simple   | 27.                     |
| 9. Leaflets pinnately veined   | 10.                   | 27. All leaves with 2 pairs of leaflets; legume linear or oblong, straight or curved  | <b>23. Lotus</b>        |
| 10. Calyx teeth all equal and at least twice as long as the tube   | 11.                   | 27. Lower leaves simple, upper leaves with 2–3 pairs of leaflets; legume spirally twisted and flattened so that it is circular in outline               | <b>21. Hymenocarpus</b> |
| 10. At least 2 calyx teeth less than twice as long as the tube   | 12.                   | 28. Keel very dark red or black   | <b>24. Dorycnium</b>    |
| 11. Legume linear  | <b>15. Sesbania</b>   | 28. Keel not dark red or black  | 29.                     |
| 11. Legume strongly compressed   | <b>41. Lens</b>       | 29. Leaves digitate or apparently so  | <b>14. Caragana</b>     |
| 12. Calyx teeth more or less leaf-like; stipules up to 10 cm   | <b>43. Pisum</b>      | 29. Leaves imparipinnate  | <b>12. Astragalus</b>   |
| 12. Calyx teeth not leaf-like; stipules not more than 2 cm   | 13.                   | 30. Leaflets distinctly parallel veined   | <b>42. Lathyrus</b>     |
| 13. Style hairy all round or on the lower side, or glabrous  | <b>40. Vicia</b>      | 30. Leaflets pinnately veined or the lateral veins obscure  | 31.                     |
| 13. Style hairy on upper side only   | <b>42. Lathyrus</b>   | 31. Leaflets with a spinescent apex   | <b>31. Caragana</b>     |
| 14. Principal lateral veins of the leaflets terminating at the margin, often in a tooth  | 15.                   | 31. Leaflets without a spinescent apex  | 32.                     |
| 14. Lateral veins of the leaflets anastomosing and not reaching the margin   | 17.                   | 32. Legume lomentaceous   | 33.                     |
| 15. Without or soon losing simple eglandular hairs, without glandular hairs (except to replace bracts)                         | <b>35. Trifolium</b>  | 32. Legume not lomentaceous   | 34.                     |
| 15. With various amounts of simple eglandular and glandular hairs, sometimes sparse  | 16.                   | 33. Racemes 2–4- to many-flowered   | <b>32. Hedysarum</b>    |
| 16. Calyx gibbous at base; stipules free from petiole  | <b>34. Cicer</b>      | 33. Flowers solitary, axillary  | <b>16. Hippocrepis</b>  |
| 16. Calyx not gibbous at base; stipules adnate to petiole  | <b>36. Ononis</b>     | 34. Legume indehiscent, usually toothed or spiny  | <b>33. Onobrychis</b>   |
| 17. At least some flowers in a terminal or apparently terminal inflorescence   | 18.                   | 34. Legume usually dehiscent, not toothed or spiny  | 35.                     |
| 17. All flowers axillary or in axillary inflorescences   | 20.                   | 35. Racemes 10 cm or more, pendulous; stipules usually forming spines; leaflets stipulate   | <b>2. Robinia</b>       |
| 18. Leaves digitate  | <b>2. Lupinus</b>     | 35. Racemes usually less than 10 cm, erect; stipules not forming spines   | 26.                     |
| 18. Leaves imparipinnate   | 19.                   | 36. Legume strongly inflated, membranous  | 37.                     |
| 19. Climbing shrubs; flowers in pendulous racemes; legume velutinous   | <b>9. Wisteria</b>    | 36. Legume not or only slightly inflated, not membranous  | 38.                     |
| 19. Non-climbing; flowers in erect inflorescences; legume not velutinous   | <b>20. Anthyllis</b>  | 37. Acaulescent herbs   | <b>28. Astragalus</b>   |
|  |                       | 37. Shrubs up to 2 m or more  | <b>29. Colutea</b>      |
|  |                       | 38. Keel beaked   | <b>23. Lotus</b>        |
|  |                       | 38. Keel not beaked but sometimes mucronate   | 39.                     |
|  |                       | 39. Keel mucronate at apex  | 40.                     |
|  |                       | 39. Keel not mucronate at apex  | 41.                     |
|  |                       | 40. Mucro on abaxial side of the keel   | <b>27. Oxytropis</b>    |
|  |                       | 40. Mucro on adaxial side of the keel   | <b>28. Astragalus</b>   |
|  |                       | 41. Stamens monadelphous  | 42.                     |

41. Stamens diadelphous 43.
42. Annual; corolla about 3 mm **28. Astragalus**
42. Perennial; corolla 10–15 mm **30. Galega**
43. Style glabrous **28. Astragalus**
43. Style pubescent on the lower side **40. Vicia**
44. Principal lateral veins on the leaflets terminating at the margin; leaflets often toothed 45.
44. Principal lateral veins of the leaflets anastomosing and not reaching the margin, sometimes obscure; leaflets not toothed (leaves sometimes caducous or reduced to a spine-tipped phyllode) 56.
45. Plant with glandular hairs 46.
45. Plant without glandular hairs (except to replace bracts) 47.
46. Stamens monadelphous; legume straight or very slightly curved **36. Ononis**
46. Stamens diadelphous; legume falcate to spirally coiled, rarely almost straight **39. Medicago**
47. At least some petal-claws adnate to the staminal tube; corolla usually persistent in fruit **35. Trifolium**
47. Petal-claws free from the staminal tube; corolla deciduous 48.
48. Filaments of at least 5 stamens dilated at the apex **35. Trifolium**
48. Filaments all filiform 49.
49. Legumes coiled in 1 or more turns of a spiral **39. Medicago**
49. Legume straight or curved 50.
50. Perennial 51.
- 50 Annual or biennial 52.
51. Legume obovate or ovate to subglobose **37. Melilotus**
51. Legume oblong, oblong-falcate, oblong-reniform, reniform or variously curved **39. Medicago**
52. Corolla blue **38. Trigonella**
52. Corolla white or yellow 53.
53. Legume linear or oblong, at least 3 times as long as wide **38. Trigonella**
53. Legume ovate or obovate to subglobose or reniform, less than 3 times as long as wide. 54.
54. Legume reniform **39. Medicago**
54. Legume ovate or obovate to subglobose 55.
55. Legume without or with a very short beak and without a membranous wing **37. Melilotus**
55. Legume with a long, curved beak or with a broad membranous wing on the margin **38. Trigonella**
56. Plant spiny 57.
56. Plant not spiny 59.
57. Leaves of adult plants reduced to persistent spine-tipped phyllodes **7. Ulex**
57. Leaves not spine-tipped, often caducous 58.
58. Calyx more or less distinctly bilabiate **5. Genista**
58. Calyx with 5 more or less equal teeth, not or only slightly bilabiate **20. Anthyllis**
59. Leaflets stipellate; leaves 3-foliolate 60.
59. Leaflets not stipellate; leaves simple or 3-foliolate 62.
60. Corolla not more than 7 mm; plant with reddish-brown hairs **10. Glycine**
60. Corolla 10 mm or more; plant glabrous or with whitish hairs 61.
61. Beak of the keel recurved **11. Vigna**
61. Beak of the keel forming  $1\frac{1}{3}$ –2 turns of a spiral **12. Phaseolus**
62. Leaves simple or 1-foliolate, sometimes very small 63.
62. At least some leaves 3-foliolate 68.
63. Annual herbs 64.
63. Shrubs or perennial herbs, woody at base 65.
64. Leaves obovate or elliptical, not grass-like; legume indehiscent **17. Scorpiurus**
64. Leaves linear, grass-like; legume dehiscent **42. Lathyrus**
65. Calyx split to the base adaxially **6. Spartium**
65. Calyx not split to the base 66.
66. Calyx more or less tubular; legume more or less included in the persistent calyx **20. Anthyllis**
66. Calyx campanulate; legume exerted, or the calyx not persistent 67.
67. Upper lip of calyx with short teeth **4. Cytisus**
67. Upper lip of calyx deeply 2-fid or deeply toothed **5. Genista**
68. Leaflets conspicuously glandular-punctate 69.
68. Leaflets not or very minutely glandular-punctate 70.
69. Fruit never black glandular warty **13. Bitumaria**
69. Fruit conspicuously black glandular warty when mature **14. Cullen**
70. Legume lomentaceous **19. Coronilla**
70. Legume not lomentaceous 71.
71. Annual or perennial herbs, sometimes with a woody stock 72.
71. Shrubs or trees 76.
72. Stamens free; flowers in clusters of 3 arranged in a terminal leafy raceme **1. Thermopsis**
72. Stamens connate; flowers not in a cluster of 3 arranged in a terminal leafy raceme 73.
73. Calyx inflated to 4.5–6.0 mm wide in flower, up to 12 mm wide in fruit and enclosing the legume **20. Anthyllis**
73. Calyx less than 4.5 mm wide, not inflated 74.
74. Keel very dark red or black **24. Dorycnium**
74. Keel not very dark red or black 75.
75. Stipules inserted at the base of the petiole; legume not longitudinally winged **23. Lotus**
75. Stipules inserted on the stem, and adnate to the base of the petiole; legume with 2 or 4 longitudinal wings **25. Tetragonolobus**
76. Legume more or less included in the persistent calyx; calyx with 5 more or less equal teeth **20. Anthyllis**
76. Legume exerted or the calyx deciduous; calyx bilabiate 77.
77. Flowers in pendulous racemes **3. Laburnum**
77. Flowers in erect inflorescences 78.
78. Upper lip of calyx with 2 short teeth **4. Cytisus**
78. Upper lip of calyx deeply 2-fid 79.
79. Pedicel 5–10 mm; legume glabrous **4. Cytisus**
79. Pedicel 1–3 mm; legume hairy **5. Genista**

Tribe **1. Thermopsidae** Yakovlev

Rhizomatous *perennial herbs*. *Leaves* trifoliolate, with entire leaflets. *Inflorescence* a raceme, with small flowers. *Stamens* 10. *Fruits* a longitudinally dehiscent legume, with 2–7 seeds.

**1. Thermopsis** R. Br.

*Perennial herbs* with spreading rhizomes. *Leaves* alternate, pinnately 3-foliolate; leaflets entire. *Inflorescence* a lax, terminal raceme with small linear bracts; stipules large, ovate. *Calyx* with 5 lobes. *Corolla* yellow; standard with limb subrotund, deeply emarginate at apex, cordate at base; wings with limb ovate, rounded at apex, with a wrinkled lobe at base and a short claw; keel with limb broadly oblong, with lobe at base and a slender claw. *Stamens* 10, all free. *Style* 1. *Legume* linear, erect, hairy, longitudinally dehiscent; seeds 3–7.

Contains about 23 species in east Asia and North America.

Larisy, M. M. (1940). A revision of the North American species of *Thermopsis*. *Ann. Miss. Bot. Gard.* **27**: 245–258.

**1. T. montana** Nutt. ex Torr. & A. Gray False Lupin

*Perennial herb* with spreading rhizomes. *Stems* 30–70 (–100) cm, pale green, erect, rigid, triangular, hollow, with pale hairs, with long ascending branches, leafy. *Leaves* alternate, pinnately 3-foliolate, broadly ovate in outline; leaflets 30–100 × 14–36 mm, dull medium green on upper surface, paler beneath, elliptical or oblanceolate, acute at apex, entire, attenuate at the sessile or shortly petiolulate base, glabrous on upper surface and with impressed midrib, softly hairy beneath with prominent veins, especially the midrib; petiole up to 35 mm, pale green, sometimes tinted purplish, channelled above, rounded below, hairy; stipules 30–50 × 15–30 mm, ovate, acute at apex. *Inflorescence* a lax terminal raceme of 5–60 flowers; bracts up to 12 mm, linear; pedicels 7–8 mm, densely hairy. *Calyx* 11–12 mm, medium green; lobes 5, unequal, triangular, acute at apex, sericeous-hairy. *Corolla* 18–25 mm, golden yellow; standard with limb subrotund, deeply emarginate at apex, cordate at base; wings with limb ovate, rounded at apex, with a wrinkled lobe at base and a short claw; keel with limb broadly oblong, rounded at apex, with lobe at base and a slender claw. *Stamens* 10, all free; filaments pale yellow; anthers orange. *Style* 1, green, curved at apex; stigma minute. *Legume* 40–60 × 4.5–5.0 mm, linear, erect, hairy, longitudinally dehiscent; seeds 2–7. *Flowers* 5–6.  $2n = 18$ .

Introduced. Grown in gardens and naturalised on a few old sites or rough grassy places. Fetlar in Shetland since about 1978; formerly in Northamptonshire by gravel pits at Oundle for at least 25 years. Native of western North America.

Tribe **2. Genisteae** (Adans.) Benth.

*Perennial or annual herbs* or woody *shrubs* or *trees*. *Leaves* simple, entire, ternate or palmate. *Inflorescence* an axillary or terminal raceme, sometimes reduced to 1 or 2

flowers. *Stamens* 10, monadelphous. *Fruits* a longitudinally dehiscent legume, with 2 to many seeds.

**2. Lupinus** L.

*Annual and perennial herbs* and sometimes a small shrub. *Leaves* alternate, palmately foliolate, petiolate; stipules adnate to the base of the petiole. *Inflorescence* a terminal raceme. *Calyx* 2-lipped, often divided nearly to base. *Corolla* white, yellow or blue to purple; standard erect, subrotund or broadly ovate; wings falcate-oblong or obovate; keel beaked. *Stamens* 10, monadelphous. *Style* 1. *Fruit* a dehiscent, compressed legume, usually constricted between the seeds; seeds 3–12, with a sunken hilum.

Contains about 200 species in America and the Mediterranean region.

Bean, W. J. (1973). *Trees and shrubs hardy in the British Isles*. Ed. 8. 2. London.

Gorer, R. (1970). *The development of garden flowers*. London.

1. Small shrub with stems woody towards the base and not dying down to the ground in winter 2.
1. Stems herbaceous, dying down to ground in winter 4.
2. Flowers white **1(1). arboreus** forma **albus**
2. Flowers yellow 3.
3. Flowers pale yellow **1(2). arboreus** forma **arboreus**
3. Flowers golden yellow **1(3). arboreus** forma **aureus**
4. Annuals easily uprooted 5.
4. Perennials tuft-forming 7.
5. Leaflets linear **6. angustifolius**
5. Leaflets oblanceolate or obovate-oblong 6.
6. Corolla white with a pale blue keel; seeds 8–14 mm **5. albus**
6. Corolla yellow; seeds 6–8 mm **7. luteus**
7. Basal leaves absent at flowering time; stem with long, shaggy hairs **4. nootkatensis**
7. Basal leaves present at flowering time; stem with sparse, short hairs 8.
8. Stem mostly branched with more than 1 inflorescence; leaflets broad and obtuse-mucronate to acute at apex; corolla various shades of pink, purple, yellow or white **2. × regalis**
8. Stem unbranched with 1 inflorescence; narrower and longer, long acute at apex; corolla blue **3. polyphyllus**

**1. L. arboreus** Sims

Tree Lupin

Short-lived, semi-evergreen *shrub* 1–3 m. *Stems* brownish, much-branched, erect, with rather numerous hairs, leafy. *Leaves* alternate, palmately foliolate; leaflets 5–12, 20–60 × 5–10 mm, medium green on upper surface, paler beneath, obovate-oblong, mucronate at apex, entire, strigose or glabrous on upper surface, strigose beneath; stipules subulate. *Inflorescence* lax, terminal, 10–30 cm, the flowers alternate or subverticillate and scented; peduncles 4–10 cm. *Calyx* 9–10 mm, 2-lipped, the upper lip emarginate, the lower lip entire, with 2 small lobes often present

between it and upper lip. *Corolla* 14–17 mm, white to deep yellow, sometimes blue tinged; standard subrotund, rounded at apex, reflexed at sides; wings large, covering the keel and joined together at the point; keel acute and black pointed. *Stamens* 10, monadelphous. *Style* 1, pale. *Legume* 40–80 mm, brown, linear, strigose; seeds 8–12, 4–5 mm, dark brown, ellipsoid, more or less mottled with a pair of spots near the micropyle. *Flowers* 6–8.  $2n=40, 48$ .

(1) Forma **albus** P. D. Sell  
*Corolla* white.

(2) Forma **arboreus**  
*Corolla* pale yellow

(3) Forma **aureus** P. D. Sell  
*Corolla* golden yellow.

Introduced in 1793. Widely planted on sand dunes and shingle where it covers large areas by virtue of its copiously produced seed. It also occurs on roadsides, railway banks and waste places inland. All round the coast of Great Britain and eastern Ireland and scattered localities inland. Native of California. All 3 colour forms grow together on the Suffolk coast.

**2. *L. × regalis* Bergmans** Russell Lupin  
***L. arboreus* × *polyphyllus***

*Perennial herb* with a tap-root and fibrous side-roots. *Stem* up to 1.5 m, pale green, erect, striate, sparingly branched, with sparse appressed hairs, leafy. *Leaves* alternate, palmate, subrotund in outline; leaflets 8–15, 9–12 × 2–3 cm, medium green on upper surface, paler, slightly glaucous green beneath, elliptical or lanceolate, rounded-mucronate to shortly acute, entire, narrowed at base, glabrous on upper surface, appressed-hairy beneath, sessile or nearly so; petiole up to 30 cm, pale green, appressed-hairy; stipules up to 30 mm, lanceolate, acute at apex. *Inflorescence* a dense, terminal raceme up to 40 cm; pedicels up to 10 mm, densely hairy. *Calyx* 6–8 mm, deeply 2-lipped, upper lip 2-lobed, lower lip 5.8 mm, 3-lobed, very hairy. *Corolla* 12–16 mm, various shades of whitish through yellow to blue; standard subrotund, rounded at apex; wings elliptical, rounded at base; keel upcurved, with a subacute apex. *Stamens* 10, monadelphous; filaments pale; anthers pale yellow. *Style* 1, upcurved. *Legume* 25–50 mm, oblong, silky hairy; seeds almost 4 mm, ellipsoid. *Flowers* 7–9.

Introduced. Commonly grown in gardens and frequently well naturalised on rough ground and rail and roadside banks. Scattered throughout Great Britain with a solitary record in Ireland. Of garden origin, and most records are of garden escapes, but occurs spontaneously in Scotland where both parents occur naturalised. It probably crosses with *L. nootkatensis* but is difficult to distinguish.

**3. *L. polyphyllus* Lindl.** Garden Lupin

*Perennial herb*. *Stem* 50–150 cm, pale green, stout, minutely hairy, usually unbranched, leafy. *Leaves* alternate, palmately foliolate, basal present at flowering time; leaflets 9–17, 70–150 × 15–30 mm, medium green on upper surface, paler beneath, obovate-lanceolate, obtuse to acute

at apex, entire, usually glabrous on upper surface, sparingly sericeous beneath; stipules subulate. *Inflorescence* a rather dense terminal raceme 15–60 cm, the flowers verticillate; peduncle 3–8 cm. *Calyx* 9–10 mm, 2-lipped, both lips entire, or upper shallowly 2-toothed. *Corolla* 12–14 mm, blue, purple, yellow, pink or white; standard short, subrotund, apiculate, revolute; wings half-oblong, obtuse at apex, convex; keel falcate, with a long acuminate deep purple beak. *Stamens* 10, monadelphous. *Style* 1, subulate. *Legume* 25–40 mm, brown, sparsely hairy; seeds 5–9, about 4 mm, variously spotted. *Flowers* 5–9.  $2n=48$ .

Introduced. Formerly grown in gardens and naturalised by rivers and railways, sometimes in waste places. Scattered records throughout Great Britain and in north-east Ireland. Native of western North America. Cultivated for ornament and fodder in a large part of Europe.

**4. *L. nootkatensis* Donn ex Sims** Nootka Lupin

*Perennial herb* with a tap-root and fibrous side-roots. *Stems* up to 1 m, pale green, erect, with long shaggy hairs, leafy. *Leaves* alternate, palmate, subrotund in outline, basal absent at flowering time; leaflets 6–9(–12), 25–50 × 5–10 mm, medium green on upper surface, paler beneath, narrowly elliptical, acute-mucronate at apex, entire, attenuate at base, upper surface glabrous or sparsely hairy, lower surface with numerous hairs; petiole rather longer than leaflet; stipules subulate to linear, acuminate at apex. *Inflorescence* a dense, terminal raceme up to 10 cm; bracts caducous; pedicels up to 10 mm, hairy. *Calyx* up to 13 mm, deeply 2-lipped, upper lip 2-lobed, lower lip 3-lobed, very hairy. *Corolla* 12–16 mm, bluish-purple, sometimes whitish tinged; standard with limb subrotund, rounded at apex; wings with standard broadly elliptical, broadly rounded at apex, rounded at base with a short, narrow claw; keel with limb ovate, upturned at the subacute apex, with a short slender claw. *Stamens* 10, monadelphous; filaments upcurved; anthers yellowish. *Style* 1, upcurved, glabrous; stigma brownish. *Legume* 40–50 × 6–8 mm, brown, oblong, silky-hairy; seeds 4.5–5.0 mm, ellipsoid. *Flowers* 5–7.  $2n=48$ .

Introduced. Naturalised on riverside shingle and moorland since at least 1862. Central and north Scotland, from Perthshire to Orkney Islands, especially by the River Tay and River Dee; north-west Ireland. Native of North America and north-east Asia.

× **regalis**

This triple hybrid probably occurs with *L. nootkatensis* and *L. × regalis* in Morayshire and Perthshire, but is difficult to identify. It is intermediate and fertile.

**5. *L. albus* L.** White Lupin

*Annual herb* with fibrous roots. *Stems* up to 120 cm, pale green, shortly hairy, branched, leafy. *Leaves* alternate, palmately 5-foliolate; leaflets of the lower leaves 25–35 × 14–18 mm and obovate, those of the upper leaves 40–50 × 10–15 mm, obovate and cuneate at base, all medium green on upper surface, paler beneath, mucronulate at apex, entire, nearly glabrous on upper

surface and sparsely long-hairy beneath; stipules setaceous. *Inflorescence* a terminal raceme 5–10 cm, sessile, with the flowers alternate. *Calyx* 8–9 mm, 2-lipped, the upper lip deeply 2-lobed, the lower lip 2–3-lobed, both lips shallowly dentate. *Corolla* 15–16 mm, white with deep pale blue at apex; standard 18–20 × about 13 mm; wings 17–20 × 8–10 mm; keel 13–15 × about 6.0 mm. *Stamens* 10, monadelphous. *Styles* 1. *Legume* 80–100 × 17–20 mm, yellow, shortly hairy becoming glabrous, and longitudinally rugulose; seeds 4–6, 8–14 mm, dull pale yellow, orbicular-quadrangular, compressed or depressed, smooth. *Flowers* 6–9.  $2n=50$ .

Introduced. Casual on tips, at docks and in waste places. Sporadic in a few localities in Great Britain. Subsp. *graeus* (Boiss. & Spruner) Franco & P. Silva (*L. graecus* Boiss. & Spruner) is native of the Balkan Peninsula and the Aegean region. Our plant is subsp. **albus** which is the cultivated variant which is widely grown in central and southern Europe for its edible seeds and for fodder.

#### 6. *L. angustifolius* L. Narrow-leaved Lupin

*Annual or biennial herb* with fibrous roots. *Stem* 10–50 cm, pale green, appressed hairy, simple or with numerous suberect or ascending branches, leafy. *Leaves* alternate, 2–7 × 2–7 cm, palmately 5-foliolate; leaflets 10–50 × 1–6 mm, dark bluish-green on upper surface, paler beneath, narrowly oblong, rounded at apex, entire, tapered at base, more or less glabrous on upper surface, thinly appressed-hairy beneath; petiole up to 5 cm, channelled above, slender, appressed-hairy; stipules 5–10 mm, linear, caudate at apex. *Inflorescence* lax, terminal raceme 5–10 cm, overtopping the foliage; peduncle very short; pedicels up to 2.5 mm, hairy; bracts 5–8 mm, elliptical, caducous, thinly appressed-hairy; bracteoles 1–2 mm, narrowly obovate or oblanceolate, adnate to upper part of calyx. *Calyx* markedly 2-lipped; upper lip 3–4 mm, divided almost to base into 2 acute lobes; lower lip up to 7 mm, shortly 3-lobed at apex. *Corolla* 12–14 mm, bright purplish-blue with a paler keel; standard with limb ovate, subacute at apex, with 2 marked longitudinal pleats and reflexed margins; wings oblong, distinctly rugose towards the base; keel oblong with an upturned, dark-tipped acuminate apex. *Stamens* 10, monadelphous; filaments not swollen below anther; anthers narrowly oblong. *Style* 1, up-curved, glabrous; stigma barbellate. *Legume* 40–50 × 10–13 mm, oblong, acute and often beaked, strongly compressed laterally, densely appressed-hairy; seeds 3–5, about 6 mm, marbled cream, brown and grey, smooth. *Flowers* 6–9.  $2n=40, 48$ .

Introduced. Imported for trial as a seed-crop and scarce casual in docks and waste places. Sporadic records in Great Britain, mainly the south, and Cape Clear in Ireland. Native throughout the Mediterranean area.

#### 7. *L. luteus* L. Annual Yellow Lupin

*Annual herb* with fibrous roots. *Stem* 25–80 cm, pale green, erect, hairy, branched, leafy. *Leaves* alternate, palmately 5-foliolate; leaflets 40–60 × 8–12 mm; dark green on upper

surface, paler beneath, obovate-oblong, mucronate at apex, entire, sparsely long-hairy; stipules dimorphic, those of the lower leaves about 8 mm and subulate, those of the upper leaves 22–30 × 2–4 mm and linear-obovate. *Inflorescence* a terminal raceme 5–16 cm, the flowers scented and regularly verticillate; peduncle 4–12 cm. *Calyx* 2-lipped, the upper lip 6–7 mm and 2-lobed, the lower lip about 10 mm and shallowly 3-lobed. *Corolla* 13–16 mm, bright yellow; standard 15–18 × 10–11 mm, ovate, subacute; wings 14–17 × 8–9 mm, half-oblong; keel 14–15 × 4–6 mm, oblong. *Stamens* 10, monadelphous. *Style* 1, pale; stigma brownish. *Legume* 40–50 × 10–12 mm, black, linear, usually constricted between the seeds, densely long-hairy; seeds 4–6, 6–8 × 4.5–6.5 mm, black marbled with white, with a white curved line on each side, orbicular-quadrangular, compressed, smooth and dull. *Flowers* 6–9.  $2n=52$ .

Introduced. An escape from cultivation, particularly on sandy soil, and a wool casual. Native of the west Mediterranean region. Widely cultivated for fodder and green manure.

#### 3. *Laburnum* Fabr.

Deciduous *trees*. *Leaves* alternate, 3-foliolate; long petiolate. *Inflorescence* a simple, pendulous raceme on short shoots. *Calyx* 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed. *Corolla* yellow; standard oblong-elliptical or ovate, emarginate at apex, more or less cordate at base with a short claw; wings narrowly oblong, rounded at apex, with a short lobe at base and a short claw; keel oblong, upturned at apex, with a short claw. *Stamens* 10, monadelphous. *Style* 1. *Fruit* a legume; seeds several, poisonous (to humans), dispersed by explosive dehiscence.

Contains 2 species in central and south Europe.

Chater, A. O. (1992). *Laburnum anagyroides* and *L. alpinum* as hedge plants in Cardiganshire v.c. 46. *BSBI Welsh Bulletin* **52**: 4–5.

Bean, W. J. (1973). *Trees and shrubs hardy in the British Isles*. Ed. 8. 2. London.

Wettstein, R. (1890–1891). Untersuchungen über die Section *Laburnum* der Gattung *Cytisus*. *Östr. Bot. Zeitschr.* **40**: 395–399, 435–439 (1890); **41**: 127–130; 169–173; 261–265 (1891).

- |   |                       |
|---|-----------------------|
| 1. Racemes lax; corolla 17–23 mm  | <b>1. anagyroides</b> |
| 1. Racemes dense; corolla 13–21 mm  | 2.                    |
| 2. Plant hairy to almost glabrous; corolla 15–21 mm; good seeds rarely formed | <b>2. × watereri</b>  |
| 2. Plant glabrous or sparsely hairy; corolla 13–20 mm; good seeds formed      | <b>3. alpinum</b>     |

**1. *L. anagyroides* Medik.** Laburnum  
*Cytisus laburnum* L.; *L. vulgare* Bercht. & J. Presl; *L. laburnum* (L.) Dörrfl.

Deciduous *tree* up to 12 m, with an open crown. *Trunk* up to 1.4 m in diameter, only part of way into the crown. *Bark* dark green, becoming brown in old trees, smooth. *Branches* ascending and arching wide; twigs pale brown, slender;



young shoots greyish-green, with dense, appressed, silky hairs. *Buds* 1.0–1.5×0.5–1.0 mm, ovoid, pointed at apex; scales greyish-brown, ovate, pointed at apex, hairy. *Leaves* alternate, 3-foliolate; leaflets 30–80×15–30 mm, medium greyish-green on upper surface, paler and bluish-green beneath, elliptical to elliptical-obovate or oblanceolate, pointed but obtuse at apex, entire, cuneate to rounded at base, shortly petiolulate, glabrous on upper surface, silky appressed hairs beneath when young; petiole 2–8, with short appressed hairs. *Inflorescence* a simple, lax, pendulous raceme, 10–30 cm, on short shoots; pedicels 10–16 mm, appressed-hairy. *Calyx* 1.0–6.5 mm, pale green, 2-lipped, the upper lip 2-lobed with a V-shaped sinus, the lower lip 3-lobed, appressed-hairy. *Corolla* 17–23 mm, medium yellow; standard with limb 18–20 mm, oblong-elliptical, emarginate at apex, subcordate at base with a short claw; wings with limb 18–20 mm, narrowly oblong, rounded at apex, with a short lobe at base and a short claw; keel with limb oblong, upturned to a rounded apex and a narrow claw. *Stamens* 10, monadelphous; filaments pale green; anthers golden yellow. *Style* 1, pale green; stigma shortly bifid, yellow. *Legume* 30–60×7–8 mm, green, turning brown, oblong, pendulous, subterete but bulging over the seeds, the upper suture thickened, appressed-hairy when young; seeds several, explosive dehiscent, poisonous, remaining on the trees all winter. *Flowers* 5–6. Pollination mainly by bumble-bees.  $2n=48$ .

Introduced. Formerly much planted in gardens and parks and frequently self-sown in rough ground and on banks of roadsides and railways, formerly planted for hedging and still persistent in some areas. Scattered records throughout Great Britain and Ireland. Native of the mountains of south-central Europe.

**2. *L. × watereri* (Wettst.) Dippel** Hybrid Laburnum  
***L. alpinum × anagyroides***

*L. × vossii* auct.; *Cytisus × watereri* Wettst.

Deciduous *tree* up to 12 m, with an open crown. *Trunk* up to 1.4 m in diameter, only part of the way into the crown. *Bark* dark green, becoming brown in old trees, smooth. *Branches* ascending and arching wide; twigs pale brown or greenish-brown, hairy becoming glabrous with age; young shoots pale green, densely appressed-hairy. *Buds* 1.0–1.5×0.5–1.0 mm, ovoid, pointed at apex; scales greyish-brown, ovate, pointed at apex, hairy. *Leaves* alternate, 3-foliolate; leaflets 30–60×15–30 mm, medium green on upper surface, paler beneath, elliptical, ovate or lanceolate, more or less acute at apex, entire, narrowed at base, very shortly petiolulate, glabrous on upper surface, shortly appressed hairy beneath; petiole up to 5 cm, shortly appressed-hairy. *Inflorescence* a simple, dense, pendulous raceme up to 20 cm on short shoots; pedicels 9–11 mm, slender, with short appressed hairs. *Calyx* 4–5 mm, pale green, 2-lipped, the upper lip 2-lobed with a U-shaped sinus, the lower lip 3-lobed, with short appressed hairs. *Corolla* 15–21 mm, medium yellow, with brownish veins at base of standard; standard with limb 18–19 mm, ovate, emarginate at apex, cordate at base to a short, narrow claw; wings 17–18 mm, with limb asymmetrically oblong, rounded at apex, with a small lobe at base and a

short, narrow claw; keel with limb oblong, curved up at apex, with a short lobe and a short claw at base. *Stamens* 10, monadelphous; filaments pale green; anthers yellow. *Style* 1, pale green; stigma shortly bifid, yellow. *Legume* 40–60×6–8 mm, green, turning brown, oblong, pendulous, appressed-hairy when young; seeds rarely formed and usually sterile. *Flowers* 5–6. Pollination mainly by bumble-bees.

Introduced. Probably now more widely planted in gardens, by roads and railways and in parks and amenity areas than either of its parents; has been used for hedging in Wales.

**3. *L. alpinum* (Mill.) J. Presl** Scottish Laburnum  
***Cytisus alpinus* Mill.**

Deciduous *tree* up to 13 m with an open crown. *Trunk* up to 1 m in diameter, only part of the way into the crown. *Bark* dark green, becoming brown in old trees, smooth. *Branches* ascending and arching wide; twigs grey, smooth or wrinkled; young shoots green, glabrous. *Buds* 1.0–1.5×0.1–1.0 mm, ovoid, pointed at apex; scales greyish-brown, ovate, pointed at apex, hairy. *Leaves* alternate, 3-foliolate; leaflets 45–70×15–30 mm, medium yellowish-green on upper surface, slightly paler beneath, elliptical or lanceolate, acute at apex, entire, cuneate at base, sessile or nearly so, hairy only on midrib and margin; petiole up to 6 cm, pale green, hairy. *Inflorescence* a simple, dense, pendulous raceme 15–35 cm; pedicels 8–12 mm, hairy. *Calyx* 5–6 mm, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed, the lobes triangular and acute at apex. *Corolla* 13–20 mm, medium yellow grading to orange at base; standard subrotund, emarginate at apex, cordate at base with a short claw; wings oblong, obtuse at apex, with a short claw; keel half ovate, turned up at apex. *Stamens* 10, monadelphous; filaments pale green; anthers orange. *Style* 1, green; stigma yellow. *Legume* 30–40×4–5 mm, green, turning brown, linear, pendulous, appressed-hairy. *Flowers* 5–6.

Introduced. Planted on roadsides and in woodland and hedges, occasionally in quantity, rarely reproducing from seed but occasionally forming thickets. Scattered records throughout Great Britain but mainly in the west and north; and locally abundant in one area of north-east Ireland.

**4. *Cytisus* Desf.**

*Sarothamnus* Wimm.; *Lembotopis* Griseb.

Unarmed *shrubs*. *Leaves* alternate, 1- or 3-foliolate, sometimes crowded on older branches; sessile or petiolate. *Inflorescence* of terminal or axillary racemes or 1–few flowers in leaf axils. *Calyx* 2-lipped, the upper lip with 2 lobes, the lower lip with 3 lobes. *Corolla* yellow or white; standard subrotund or ovate; wings broadly oblong to elliptical; keel oblong or ovate. *Stamens* 10, monadelphous. *Style* 1. *Fruit* a linear or oblong, dehiscent legume; seeds usually numerous, usually strophiolate.

Contains about 30 species mostly in Spain and Portugal.

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1. All leaves 3-foliolate; most with petioles more than 10 mm; flowers in terminal, leafless racemes **1. nigricans**
1. Lower leaves 3-foliolate, upper leaves usually 1-foliolate; petioles less than 10 mm; flowers 1-few in lateral groups **2.**
2. Calyx less than 3 mm; corolla 7–12 mm, white **2. multiflorus**
2. Calyx more than 3 mm; corolla 10–25 mm, yellow to red **3.**
3. Twigs 8–10-angled, fragile; legumes densely, long, white hairy **3. striatus**
3. Twigs 5-angled, pliable; legumes with long white hairs on the sutures only **4.**
4. Plant erect or spreading; young shoots and leaves glabrous or sparingly hairy **4(a). scoparius** subsp. **scoparius**
4. Plant procumbent, looking as though someone has sat on it; young shoots and leaves densely silky hairy **4(b). scoparius** subsp. **maritimus**

**1. C. nigricans** L. Black Broom  
*Lembotropis nigricans* (L.) Griseb.

Unarmed *shrub* up to 1.0(–1.5) m. *Stems* erect; twigs up to 45 cm or more and 1–2 mm in diameter, terete, appressed-hairy, flowering in the first year. *Leaves* alternate, all 3-foliolate; leaflets (6–)10–30 × (2–)5–10(–16) mm, medium green on upper surface, paler beneath, obovate to elliptical or linear, obtuse at apex, entire, narrowed at base, appressed-hairy on both surfaces when young, becoming glabrous on upper surface; stipules minute; petioles 5–15 mm, appressed-hairy. *Inflorescence* a pyramidal, terminal, leafless raceme; pedicels 4–8 mm, appressed-hairy, with 1, linear, long-persistent bract. *Calyx* 3–5 mm, campanulate, 2-lipped, the upper lip with 2 lobes, the lower lip with 3 lobes, appressed-hairy. *Corolla* 8–10 mm, yellow, becoming black when dry; standard 7–10 × about 6 mm, subrotund, emarginate; wings 5–7 mm, broadly oblong; keel 7–8 mm, ovate, beaked. *Stamens* 10, monadelphous. *Style* 1; stigma capitate. *Legume* 20–35 × 5–6(–7) mm, linear-oblong, appressed-hairy, dehiscent; seeds about 6 mm, with a rudimentary strophiole. *Flowers* 5–6.  $2n=48$ .

Introduced. Naturalised on waste ground by railways and in gravel pits since 1970. Middlesex, Kent and Ross

and Cromarty. Native of central and south-east Europe. Our plant is subsp. **nigricans** which occurs throughout the range of the species.

**2. C. multiflorus** (L'Hér. ex Aiton) Sweet White Broom  
*Spartium multiflorum* L'Hér. ex Aiton; *C. albus* (Lam.) Link, non Hacq.; *C. lusitanicus* Willk.; *Genista alba* Lam.

Unarmed *shrub* 1–3 m. *Stems* erect and much branched; branches flexible and 5-angled; twigs striate, sericeous when young, becoming glabrous at maturity. *Leaves* alternate, 3-foliolate on lower branches, 1-foliolate on upper branches; leaflets 7–10 × 0.5–2.0 mm, linear-lanceolate or oblong, acute at apex, entire, narrowed at base, silvery-sericeous; stipules minute; petioles very short or absent. *Inflorescence* of profuse fascicles of 1–3 flowers; pedicels up to 10 mm. *Calyx* 2.7–3.5 mm; 2-lipped, the upper lip with 2 lobes, the lower lip with 3 lobes, sericeous. *Corolla* 7–12 mm, white; standard 9–12 mm, ovate, obtuse at apex; wings 10–12 mm, oblong; keel 11–13.5 mm, oblong. *Stamens* 10, monadelphous. *Style* 1. *Legume* 15–25 × 5–9 mm, oblong, strongly compressed, appressed-hairy. *Flowers* 5–6.  $2n=48, 96$ .

Introduced. Naturalised on banks of roads and railways. Scattered localities in south England, north Wales and south Scotland. Native of north-west and central Spain and north and central Portugal.

**3. C. striatus** (Hill) Rothm. Hairy-fruited Broom  
*Genista striata* Hill; *C. pendulinus* L. fil.; *Sarothamnus patens* Webb

*Shrub* 1–3 m. *Stems* erect and much branched; branches and twigs cylindrical, striate, usually 8- to 10-angled when young, often drying black, fragile, the young branches sericeous or villous, later becoming glabrous and leafless. *Leaves* solitary or sometimes fasciculate, those on the lower branches 3-foliolate and petiolate, those on the middle and upper branches 3- or 1-foliolate and sessile; leaflets 4–16 × 1–6 mm, glaucous on upper surface, paler beneath, ovate or elliptical to linear-lanceolate, acute at apex, entire, glabrous on upper surface, sericeous or villous beneath; stipules minute. *Inflorescence* of solitary or pairs of flowers, rarely in clusters of 3; pedicels as long as or up to twice as long as calyx. *Calyx* 5–7 mm, sericeous; 2-lipped, the upper lip with 2 lobes, the lower lip with 3 lobes. *Corolla* 25–27 mm, yellow; standard 10–25 mm, subrotund, emarginate; wings 18–27 mm, elliptical; keel 19–27 mm, oblong, upcurved at apex. *Stamens* 10, monadelphous. *Style* 1. *Legume* 18–35(–40) × 8–12 mm, oblong-ovate to oblong-elliptical, straight or slightly curved, more or less inflated, densely long white hairy, erect or semi-patent. *Flowers* 5–6.  $2n=46, 48$ .

Introduced in 1816. Naturalised on roadside banks where it was planted and now reproduces. Scattered localities throughout Great Britain and one record in the west of Ireland. Native of Portugal and west and central Spain.