

## 8. Tribe SOPHOREAE

槐族 huai zu

Sun Hang (孙航), Bao Bojian (包伯坚); Michael A. Vincent

Trees, shrubs, lianas, rarely herbs. Leaves pinnately 1- to many foliolate or digitately 3-foliolate. Inflorescence racemose or paniculate, terminal, axillary or leaf-opposed. Calyx 5-toothed or lobed or rarely entire. Corolla papilionaceous or subactinomorphic, petals (1-)5. Stamens (6-)10(-30); filaments free or connate only at base or lower ones up to ca. 1/2 their length, exceptionally 9 joined high up; anthers uniform. Ovary 1- to several ovuled. Legumes various, not jointed, indehiscent or 2-valved, sometimes winged. Seeds reniform, elliptic, or globose; hilum small, sometimes arillate.

About 45 genera and 390-400 species: mostly distributed in the tropics to subtropics; seven genera (one endemic) and 74 species (55 endemic, one introduced) in China.

- 1a. Leaves simple (1-foliolate).
- 2a. Scandent shrubs or lianas; racemes axillary, to 5 cm; calyx 2-3 mm, teeth short; style  $\pm$  straight ..... 39. *Bowringia*
- 2b. Shrubs or small trees, not scandent; panicles terminal (rarely racemes axillary), mostly 5-13 cm; calyx more than 5 mm, teeth longer than calyx tube; style recurved ..... 40. *Ormosia*
- 1b. Leaves compound.
- 3a. Shrubs, spiny; leaflets 2 (sometimes appearing 1), to 1.5 cm, apex spiny-mucronate ..... 41. *Ammodendron*
- 3b. Shrubs or trees, usually without spines (if spiny, leaflets many more than 2); leaflets 3 or more, more than 1.5 cm, apex not spiny-mucronate.
- 4a. Legumes moniliform, cylindric (rarely markedly flattened) ..... 42. *Sophora*
- 4b. Legumes not moniliform, compressed laterally or markedly flattened.
- 5a. Buds hidden in swollen petiole base; leaflets usually alternate, stipels present or absent ..... 43. *Cladrastis*
- 5b. Buds exposed; leaflets mostly opposite, stipels usually absent.
- 6a. Filaments of 9 stamens fused for ca. 1/2 their length, 1 free; leaflets nearly linear, less than 4 mm wide, blade hard, folded ..... 44. *Salweenia*
- 6b. Filaments free or all 10 slightly fused basally; leaflets much larger, blade softer, not folded.
- 7a. Legumes compressed to nearly cylindric, woody to leathery, ovate to long elliptic, unwinged; seeds nearly globose or circular, mostly more than 1 cm; leaflets (1-)3-11(-19); style recurved, stigma elongate, oblique; keel petals free ..... 40. *Ormosia*
- 7b. Legumes markedly flattened, thinner walled, leathery to papery, linear-lanceolate to long elliptic, often winged; seeds flattened, long elliptic, less than 1 cm; leaflets (5-)9-11; style nearly straight, stigma small, terminal; keel petals fused ..... 45. *Maackia*

### 39. BOWRINGIA Champion ex Benth, Hooker's J. Bot. Kew Gard. Misc. 4: 75. 1852.

藤槐属 teng huai shu

Bao Bojian (包伯坚); Michael A. Vincent

Scandent shrubs or lianas. Leaves large, simple; stipules very small. Racemes axillary, very short. Calyx cup-shaped, membranous. Corolla white; standard stipitate; wings falcate-oblong; keels similar to wings, slightly larger. Stamens 10, free. Ovary stalked, many ovuled; style subulate; stigma small, terminal. Legume ovoid or globose, dehiscent along sutures; valves membranous, leathery. Seeds oblong to globose, arillate.

About four species: WC Africa and Madagascar, one species in SE Asia including China.

*Bowringia* was treated by Breteler (Wageningen Agric. Univ. Pap. 94(4): 1-41. 1994) as a synonym of the African genus *Leucomphalos* Benth ex J. E. Planchon.

**1. *Bowringia callicarpa*** Champion ex Benth, Hooker's J. Bot. Kew Gard. Misc. 4: 75. 1852.

藤槐 teng huai

*Leucomphalos callicarpus* (Champion ex Benth) Breteler.

Scandent shrubs or lianas, 15-25 m tall. Stipules small, ovate-triangular; petiole slightly inflated at base, 1-3 cm; leaf blade oblong or ovate-oblong, 6-13  $\times$  2-6 cm,  $\pm$  leathery, glabrous, veins raised on both surfaces, veinlets obvious, base rounded, apex acuminate. Racemes axillary, 2-5 cm. Flowers

sparse; bracts small, caducous; pedicel slender, 10-13 mm. Calyx cup-shaped, 2-3  $\times$  3-4 mm, very small toothed. Corolla white; standard orbicular or oblong, 6-8 mm, retuse or orbiculate at apex, claw 1-2 mm; wings falcate; keels shorter, oblong, 5-7 mm, claw 2-3 mm. Stamens 6-10 mm. Ovary pubescent. Legumes ovoid, 2.5-3 cm, ca. 15 mm in diam., beaked at apex, dehiscent along sutures. Seeds 1 or 2(or 3), red, dark brown, or black, elliptic, 9-14  $\times$  8-10 mm; aril white. Fl. Apr-Jun, fr. Jul-Sep.

Forest margins in valleys. Fujian, Guangdong, Guangxi, Hainan [Vietnam].

**40. ORMOSIA** Jackson, Trans. Linn. Soc. London 10: 360. 1811, nom. cons.

红豆属 hong dou shu

Sun Hang (孙航); Michael A. Vincent

*Arillaria* Kurz; *Fedorovia* Yakovlev; *Layia* Hooker & Arnott (1833), not Hooker & Arnott ex Candolle (1838, nom. cons.); *Macroule* Pierce; *Ormosiopsis* Ducke; *Podopetalum* F. Mueller; *Ruddia* Yakovlev; *Toullichiba* Adanson; *Trichocymos* Yakovlev.

Trees or shrubs; buds naked or subtended by stipules. Leaves alternate, rarely subopposite, imparipinnate, paripinnate, or rarely simple (1-foliolate); stipules usually small or inconspicuous, rarely lacking; leaflets (1–)3–11(–19), opposite, often leathery or thickly papery; stipules usually absent. Inflorescences paniculate or racemose, axillary or terminal. Bracts small, caducous. Calyx campanulate; teeth 5, unequal, upper 2 connate. Corolla white, yellow, lavender, or purple, longer than calyx; petals clawed; standard suborbicular; wings and keel oblique, obovate-oblong, keel petals free. Stamens 10, exerted, free or only slightly basally connate, subequal, incurved; anthers small, versatile, undeveloped or degenerate on a few filaments. Ovary subsessile; ovules 1 to many; style long, filiform, incurved; stigma oblique or terminal. Legumes woody or leathery, 2(or 3)-valved, rarely indehiscent, ovate to oblong or obovate, laterally compressed to nearly cylindrical; valves internally septate between seeds or without septae; sutures without wings; calyx persistent or deciduous. Seeds 1 to many, red, scarlet, brown, or black, sometimes 2-toned; hilum seldom over 1/2 length of seed, white; cotyledon often fleshy.

About 130 species: tropical America, SE Asia, N Australia; 37 species (34 endemic) in China.

*Ormosia monosperma* (Swartz) Urban was reported for Taiwan by F. C. Ho (J. Taiwan Mus. 36(2): 1–5. 1983), but the species is not known as an escape, only as a cultivated ornamental.

The Asian species of *Ormosia* are in need of a complete revision.

- 1a. Valves of fruit not internally septate.
  - 2a. Leaves simple.
    - 3a. Flowers pink; standard retuse; ovary glabrous ..... 17. *O. simplicifolia*
    - 3b. Flowers white; standard broadly rounded; ovary yellow pubescent ..... 18. *O. boluoensis*
  - 2b. Leaves imparipinnate.
    - 4a. Legumes densely appressed pubescent.
      - 5a. Legumes indehiscent or tardily dehiscent; hilum 15–18 mm, over 1/2 circumference of seed ..... 1. *O. balansae*
      - 5b. Legumes dehiscent; hilum less than 4 mm.
        - 6a. Hilum 3–4 mm, seed light red; legumes slightly convex; branchlets and leaves abaxially with short hairs, glabrous at maturity; leaves widest at middle ..... 13. *O. nanningensis*
        - 6b. Hilum small, 1–1.5 mm, seed dark brown or chestnut-brown; legumes turgid or somewhat turgid; branchlets and leaves abaxially densely appressed pubescent; leaves often widest above middle.
          - 7a. Leaflet apex caudate, narrow, length ca. 4 × width ..... 4. *O. inflata*
          - 7b. Leaflet apex acute to abruptly mucronate, length less than 3 × width.
            - 8a. Legumes with stipe; branchlets and leaves abaxially densely appressed yellow-brown tomentose ..... 5. *O. sericeolucida*
            - 8b. Stipe absent; branchlets and leaves abaxially sparsely to densely appressed yellow tomentose, or white or brown woolly.
              - 9a. Leaflets 5–7, densely appressed white woolly, becoming gray woolly ..... 2. *O. pachycarpa*
              - 9b. Leaflets 5–9, glabrous adaxially, sparsely to densely yellow-brown tomentose abaxially ..... 3. *O. merrilliana*
      - 4b. Legumes glabrous or sparsely pubescent, sometimes only at margin.
        - 10a. Seeds large, more than 2 cm, hilum inconspicuous.
          - 11a. Legumes compressed, brownish outside, ivory inside; seed red-brown; branchlets densely rusty brown pubescent ..... 7. *O. fordiana*
          - 11b. Legumes swollen, brownish to black outside, brownish inside; seed chestnut-brown; branchlets glabrous or finely white pilose ..... 6. *O. longipes*
        - 10b. Seeds smaller, less than 18 mm, hilum conspicuous, large or small.
          - 12a. Seeds 14–18 mm; legumes yellowish brown.
            - 13a. Hilum small, less than 3 mm; leaflets 3–5; branchlets brownish pilose ..... 16. *O. napoensis*
            - 13b. Hilum 9–10 mm; leaflets 5–7; branchlets glabrous.
              - 14a. Legumes compressed, suborbicular, valves leathery, mesocarp absent; leaflets ovate ..... 14. *O. hosiei*
              - 14b. Legumes fleshy, elliptic, protuberant, valves woody, mesocarp conspicuous; leaflets oblong ..... 15. *O. elliptica*

- 12b. Seeds less than 14 mm; legumes black or light blackish brown.
- 15a. Legumes oblique-elliptic, obovate, or oblong-elliptic, length greater than width; seeds 1–3.
- 16a. Valves thickly leathery; branchlets densely appressed rusty brown tomentose; leaves appressed pubescent abaxially ..... 12. *O. yunnanensis*
- 16b. Valves thinly leathery; branchlets glabrous or glabrescent; leaves glabrous abaxially ..... 11. *O. pingbianensis*
- 15b. Legumes suborbicular, length equaling width; seed 1, rarely 2.
- 17a. Legumes apiculate at apex, mucro 4–6 mm, curved, stipe 5–8 mm; both petiole and rachis glabrous ..... 8. *O. apiculata*
- 17b. Legumes apiculate at apex, mucro less than 4 mm, stipe less than 4 mm; petiole and rachis pubescent.
- 18a. Legumes inequilateral; valves thickly leathery, sparsely pubescent, more conspicuous at margin; leaflets oblong-obovate, thickly leathery, widest above middle, apex acute; rachis prolonged 5–8 mm below terminal leaflet ..... 10. *O. howii*
- 18b. Legumes equilateral; valves thinly leathery, sparsely pubescent at margin when young, becoming glabrescent; leaflets oblong, leathery, widest below (rarely above) middle, apex acuminate; rachis prolonged more than 10 mm below terminal leaflet ..... 9. *O. semicastrata*
- 1b. Valves of fruit internally septate, or if 1-seeded then wall convex at both ends of valve.
- 19a. Legumes very fleshy, valves 6–10 mm thick, often stained red internally; seeds large, 2.5–3 cm, elliptic, red-brown ..... 19. *O. hekouensis*
- 19b. Legumes compressed or slightly fleshy, valves thinly woody or leathery, less than 5 mm thick, not stained red internally; seeds small, less than 2 cm.
- 20a. Branchlets, petiole, and rachis densely appressed brownish or rusty brown tomentose.
- 21a. Legumes densely appressed fulvous sericeous ..... 26. *O. xylocarpa*
- 21b. Legumes glabrous or only basally pubescent at maturity.
- 22a. Valves thinly woody, swollen around seed; leaflets leathery, glossy, pale green when dry; leaf scar flat to concave.
- 23a. Legumes 4–6 cm; seeds 2–4; calyx ca. 7 mm; leaflets 13–19, sparsely appressed pubescent abaxially; branchlets dark rusty brown pubescent ..... 24. *O. ferruginea*
- 23b. Legumes 5–12 cm; seeds 4–8; calyx 12–14 mm; leaflets fewer than above, densely appressed tomentose abaxially; branchlets pale fulvous pubescent ..... 22. *O. henryi*
- 22b. Valves thickly woody, flattened or slightly convex; leaflets papery or rigidly papery, dull, dark green when dry; leaf scar protruding.
- 24a. Leaflets (14–)17–23, both surfaces densely appressed fulvous velvety, more so abaxially ..... 34. *O. saxatilis*
- 24b. Leaflets often fewer than 17, rarely more, glabrous, rarely sparsely appressed pubescent.
- 25a. Leaves larger, often more than 4.5 cm, apex acuminate, lateral veins impressed adaxially when dried ..... 32. *O. olivacea*
- 25b. Leaves smaller, often less than 4.5 cm, apex obtuse, lateral veins slightly raised when dried ..... 33. *O. microphylla*
- 20b. Branchlets, petiole, and rachis glabrous or sparsely appressed pubescent, old branches sparsely glabrous.
- 26a. Leaflets 11–19, abaxially pale when dried.
- 27a. Leaflets 15–19, widest above middle, apex long acuminate or caudate, rachis convex between pair of leaflets ..... 23. *O. pachyptera*
- 27b. Leaflets 11–13, widest at middle or slightly lower, apex obtuse, not long acuminate, rachis not convex ..... 25. *O. purpureiflora*
- 26b. Leaflets 3–9(–11), not pale abaxially when dried.
- 28a. Ovary and legume glabrous.
- 29a. Racemes axillary; leaflets 7–9(–11), apex caudate; valves fulvous when dried; seeds 1.1–1.8 cm, striate ..... 27. *O. striata*
- 29b. Panicles terminal; leaflets 5–7, apex not caudate; valves blackish when dried; seeds 1–1.5 cm, not striate.
- 30a. Leaflets obovate or obovate-elliptic, apex obtuse, emarginate; calyx pubescent along outer margin and inside; standard apex rounded ..... 20. *O. emarginata*
- 30b. Leaflets ovate or elliptic-lanceolate, apex acuminate; calyx pubescent inside and out; standard apex retuse ..... 21. *O. glaberrima*

- 28b. Ovary completely pubescent or at least on margin; legumes ± pubescent, rarely glabrous.
- 31a. Legumes cylindric or slightly compressed, orange-red at maturity and brownish when dry ..... 28. *O. pinnata*
- 31b. Legumes compressed, brownish at maturity and blackish brown when dry.
- 32a. Leaflets obovate or oblanceolate, apex obtuse or emarginate; legumes 2–4.5 cm.
- 33a. Young branchlets sparsely fulvous velvety; leaflets 7–9, often oblanceolate, lateral veins 4–6 pairs ..... 29. *O. indurata*
- 33b. Young branchlets densely appressed fulvous pubescent; leaflets (5–)7, obovate, lateral veins 5–8 pairs ..... 30. *O. eugenifolia*
- 32b. Leaflets elliptic or oblong, apex acute; legumes 3–10 cm.
- 34a. Legumes somewhat fleshy, swollen, densely appressed short grayish brown pubescent; leaflets 5, often elliptic, apex acute ..... 31. *O. pubescens*
- 34b. Legumes slightly compressed; leaflets 7–23, oblong, apex acuminate, caudate, or acute.
- 35a. Rachis prolonged more than 1 cm below terminal leaflet; legumes more than 4 cm; plants of mainland China ..... 37. *O. nuda*
- 35b. Rachis prolonged less than 1 cm below terminal leaflet; legumes less than 3 cm; plants restricted to Taiwan.
- 36a. Leaflets 3–5(–7), apex acute to acuminate, margin entire, not sinuous; flowers white; seeds globose ..... 35. *O. formosana*
- 36b. Leaflets (5–)7(–9), apex acute to obtuse, slightly retuse, margin entire, often sinuous; flowers reddish purple; seeds angular ..... 36. *O. hengchuniana*

**1. *Ormosia balansae*** Drake, J. Bot. (Morot) 5: 215. 1891.

长脐红豆 chang qi hong dou

*Macroule balansae* (Drake) Yakovlev; *Ormosia elliptilimba* Merrill & Chun.

Trees evergreen, trunk vertical, to 30 m, to 60 cm d.b.h. Bark of young trees grayish, smooth, of old trees grayish brown, minutely longitudinally striate. Branchlets terete, densely appressed brownish pannose. Leaves imparipinnate, 15–20(–35) cm; petiole 2–6.3 cm; petiole and rachis densely appressed pubescent; leaflets 5–7, often 7 near inflorescence; petiolule 5–9 mm, pubescent; blades oblong or elliptic, (5–)8–13(–20) × (2.5–)4–5.5(–8.5) cm, leathery or thinly so, ± yellowish appressed pannose abaxially, glabrous, sometimes villosulous at midvein, adaxially, base rounded or broadly cuneate, apex obtuse, retuse, or acute, rarely acuminate or caudate; midvein raised abaxially, impressed adaxially, lateral veins 16 or 17 pairs, angled 50° with midvein, raised. Panicles terminal or axillary, large, to ca. 19 cm, branches to 20 cm at base of inflorescence; peduncle and pedicel densely appressed grayish brown tomentulose; pedicel 2–3 mm. Calyx campanulate; teeth dimorphic, upper 2 triangular, others lanceolate, densely brownish velvety. Corolla white; standard suborbicular, shortly stipitate; wings and keel oblong. Stamens unequal. Ovary densely appressed short grayish brown velvety; ovules 2; style glabrous. Legumes indehiscent or tardily dehiscent, broadly ovate, suborbicular, or obovate, 3–4.5 × 2.4–3 cm (excluding stipe), swollen around seed, beak oblique, stipe 3–4 mm; valves thinly leathery, fragile, densely appressed brownish velvety; calyx persistent. Seed 1(or 2), red or carmine, rounded or elliptic, 1.3–2 × 1.2–1.7 cm; hilum 1.5–1.8 cm, over 1/2 circumference of seed. Fl. Jun–Jul, fr. Oct–Dec.

Valleys and streamsides in broad-leaved mixed forests; 300–1000 m. Guangxi (Shiwan Dashan), Hainan, Jiangxi, Yunnan (Hekou) [Vietnam].

**2. *Ormosia pachycarpa*** Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 4: 76. 1852.

茸荚红豆 rong jia hong dou

Trees evergreen, to 15 m, to 20 cm d.b.h. Bark grayish green. Branchlets densely appressed pallid pannose. Leaves imparipinnate, 18–30 cm; stipule broadly triangular, densely appressed white woolly; petiole 3–6.2 cm, densely appressed pubescent; leaflets 5–7; petiolule 4–9 mm; blades obovate-oblong, 6.7–11.7 × 2.5–4.7 cm, leathery, base cuneate-subrounded, apex acute, mucronate; lateral veins 12–22 pairs, arcuate, pubescent abaxially with brown hairs or densely white woolly hairs. Panicles terminal, up to 20 cm; flowers subsessile. Calyx broadly campanulate; teeth woolly abaxially, sparsely hairy adaxially. Corolla white; standard suborbicular, ca. 8 × 1 mm, apex retuse; petal stalk ca. 3 × 2 mm; wings oblong, ca. 10 × 4 mm; keel falcate, nearly same size as wings, laterally 1-auriculate at base. Stamens nearly equal, 0.7–1.5 cm. Ovary ovate or elliptic, densely appressed pubescent; ovules 3–6; style filiform, glabrous. Legumes elliptic or suborbicular, 2.5–5 × 2.5–3 × ca. 1.3 cm, turgid, ends obtuse; valve walls ca. 2 mm thick, septum absent. Seeds 1 or 2, brownish red, subrhombic or rounded, asymmetric at base, 1.8–2.5 × ca. 1.4 cm, fleshy, glossy; hilum small, ca. 1 mm, elliptic, indented, slightly oblique. Fl. Jun–Jul.

• Mountain slopes, valleys or streamsides in mixed forests, roadsides. Guangdong.

1a. Lateral veins of leaflets 12–14 pairs,

- densely white woolly abaxially ..... 2a. var. *pachycarpa*  
 1b. Lateral veins of leaflets 18–22 pairs,  
 sparsely brown hairy abaxially ..... 2b. var. *tenuis*

**2a. *Ormosia pachycarpa* var. *pachycarpa***

茸荚红豆(原变种) rong jia hong dou (yuan bian zhong)

*Trichocycamos pachycarpum* (Champion ex Benth) Yakovlev.

Leaflet lateral veins 12–14 pairs, densely white woolly abaxially.

- Mountain slopes, valleys or streamsides in mixed forests. Guangdong.

**2b. *Ormosia pachycarpa* var. *tenuis* Chun ex R. H. Chang, Acta Phytotax. Sin. 22: 14. 1984.**

薄毛茸荚红豆 bao mao rong jia hong dou

Leaflet lateral veins 18–22 pairs, sparsely appressed brown hairy abaxially, without white woolly pubescence.

- Valleys, roadsides. Guangdong.

**3. *Ormosia merrilliana* L. Chen, Sargentia 3: 99. 1943.**

云开红豆 yun kai hong dou

*Trichocycamos merrillianum* (L. Chen) Yakovlev.

Trees evergreen, to 20 m. Stems with grayish brown bark and shallower longitudinal stripes; young branches fulvous tomentose. Leaves imparipinnate, 20–30 cm; stipule triangular, densely appressed fulvous velvety; petiole 4–5 cm; rachis 8–12 cm, not elongate at uppermost leaflet pair; leaflets 5–9; stipel lanceolate, densely appressed tomentose; petiolule thickened, 2–5 mm, densely appressed brown pubescent; blades elliptic-oblong to oblanceolate, 5–20 × 3–7 cm, leathery, sparsely to densely gray to yellow-brown pubescent abaxially, glabrous and greenish adaxially, base cuneate to broadly acute, apex shortly acute to acuminate; lateral veins 12–17 pairs, raised on both surfaces, somewhat arcuate at margin. Panicles terminal, 17–30 cm, sparsely branched, slightly to densely patulous or appressed hairy; pedicel 2–5 mm; bracts deciduous. Calyx teeth triangular-oblong, ca. 4 × 3 mm, densely appressed rusty brown hairy. Corolla white; standard broadly ovate, ca. 1.2 × 1 cm including claw; wings broadly elliptic, ca. 9 × 6 mm, base 2-auriculate; keel ca. 7 × 4 mm, base shortly laterally 1-auriculate, claw 4–5 mm. Stamens subequal; filaments glabrous, 6–12 mm. Ovary broadly ovate, sessile, densely appressed pilose; ovule 1; style filiform, 6–12 mm, base laterally pubescent. Legumes broadly ovate or obovate, turgid, 3.5–4.5 × 2.5–3.5 × ca. 1.5 cm, base rounded, apex obtuse or mucronate, stipe absent; valves densely appressed tomentose, internal septum absent. Seed 1, dark chestnut-brown or blackish, suborbicular or broadly obovate, slightly compressed, 1.5–2.4 × 1–1.5(–2.1) cm, glossy; testa densely concavely dotted; hilum small, elliptic, 1–1.5 mm. Fl. Jun, fr. Oct.

- Mountain slopes, valleys in open forests, forest margins; below 100–1200 m. Guangdong, Guangxi, Yunnan (Funing).

**4. *Ormosia inflata* Merrill & Chun, Sargentia 3: 100. 1943.**

胀荚红豆 zhang jia hong dou

*Trichocycamos inflatum* (Merrill & Chun) Yakovlev.

Trees evergreen, 6–10 m, to 30 cm d.b.h. Stems terete, glabrous; bark brownish. Branchlets, petiole, rachis, and inflorescence densely appressed rusty brownish pubescent. Leaves imparipinnate, 10.5–19.5 cm; petiole 1.5–2.1 cm; rachis 3–6 cm, not elongate at uppermost leaflet pair; leaflets 5–7; petiolule 2–5 mm, densely appressed pilose; blades oblong-lanceolate or oblong, 5–11 × 1.5–3.5 cm, densely appressed rusty or brownish pilose abaxially, glabrous adaxially, base narrowly cuneate, apex caudate; midvein raised abaxially, impressed adaxially, lateral veins 10–15 pairs, arcuate with conspicuous veinlets abaxially, inconspicuous adaxially. Panicles terminal, 12–15 cm, sparsely branched. Flowers congested, 1–1.2 cm; pedicel short. Calyx teeth ovate, abaxially densely appressed brownish tomentose, apex obtuse. Corolla white; standard suborbicular, apex retuse, 7–8 mm, claw 2–5 mm; wings and keel oblong, ca. 8 × 2 mm, claw ca. 3 mm. Ovary densely appressed villous; ovules 2 or 3; style slightly puberulent. Legumes ovate or elliptic, fleshy, turgid, 3–5 × 2–2.5 × ca. 1.5 cm; valves thickly leathery, densely appressed brownish tomentose outside, glabrous inside, septum absent. Seeds 1 or 2, chestnut-brownish, subelliptic or suborbicular, slightly compressed, ca. 1.5 × 1.7 × 1 cm, glossy; hilum small, ca. 1 mm. Fl. May, fr. Oct–Nov.

- Streamsides in open or dense forests; 300–1100 m. Hainan.

**5. *Ormosia sericeolucida* L. Chen, Sargentia 3: 107. 1943.**

亮毛红豆 liang mao hong dou

*Trichocycamos sericeolucidum* (L. Chen) Yakovlev.

Trees evergreen, to 24 m, to 34 cm d.b.h. Bark grayish brown with shallow longitudinal stripes. Branches, branchlets, petiole, rachis, and inflorescence densely appressed fulvous pubescent. Leaves imparipinnate, 16–21 cm; petiole 3.5–4 cm; rachis 7.6–7.8 cm, prolonged 3–15 mm below terminal leaflet; leaflets 5–7; petiolule 8–10 mm, densely appressed pubescent; blades oblong-oblong to obovate-oblong, or oblong, widest above middle, 5.5–11.6 × 2.3–4.8 cm, leathery, adnate yellow sericeous abaxially, olive-green, glossy, and glabrous adaxially, base cuneate, margin slightly revolute, apex acute or obtuse; midvein impressed adaxially, lateral veins 10–12 pairs, conspicuous and raised abaxially, inconspicuous adaxially. Panicles terminal, ca. 20 cm, much branched. Calyx ca. 1 cm, persistent; teeth unequal, densely appressed pilose. Corolla white. Legumes slightly compressed, elliptic or obovate, oblique, 3–5 × 2.2–2.6 cm, apex rounded to shortly acuminate, sometimes oblique; stipe 4–5 mm; valves leathery, ca. 1 mm thick, densely appressed fulvous pubescent, internal septum absent. Seeds 1 or 2, reddish brown, becoming chestnut-brown at maturity, oblique, subrhombic-square or obovate, compressed, 1.6–1.8 × 1.2–2 × 0.3–0.4 cm, glossy; hilum small, less than 1 mm, slightly oblique. Fl. Aug, fr. Oct.

- Valleys or streamsides in mixed forests; 300–2400 m. Guangdong (Yangchun), Guangxi (Shangsi).

**6. *Ormosia longipes* L. Chen, Sargentia 3: 100. 1943.**

纤柄红豆 xian bing hong dou

Trees, 6–30 m, to 50 cm d.b.h. Branchlets brownish, glabrous or inconspicuously pilose. Leaves imparipinnate, 25–49 cm; petiole 6.5–7.5 cm; rachis 12–17 cm, prolonged 0.3–1.7 cm below terminal leaflet; leaflets 7–9; petiolule 5–8 mm, thick, rough; blades pale green abaxially, green or olive-green adaxially, narrowly oblong or broadly oblong-lanceolate, 12–24 × 2.5–6.2 cm, papery, glabrous or very sparsely white pubescent, base acute to cuneate, apex acuminate to caudate; lateral veins 8–10 pairs, conspicuously raised, arcuate, anastomosing. Panicles terminal, to 26 cm, branches few at base, up to ca. 18 cm, flowers sparse; pedicel 5–6 mm, peduncle and pedicel glabrous or sparsely grayish pubescent; bractlets acicular, caducous or absent, glabrous or grayish hairy. Calyx ca. 1.2 cm; teeth oblong, ca. 7 mm, both surfaces grayish pubescent. Corolla russet-red; standard suborbicular, ca. 10 × 12 mm, apex retuse, claw ca. 1 mm, thickened at base; wings obovate-elliptic, ca. 1 × 0.4 cm, claw ca. 2 mm; keel elliptic, ca. 9 × 5 mm, laterally 1-auriculate, claw ca. 3 mm. Stamens unequal, 7–13 mm. Ovary sparsely yellow pubescent, becoming glabrescent. Legumes elliptic or oblong-elliptic, 3.5–4 × ca. 2.5 × 2 cm, stipe ca. 5 mm; valves brownish or black, ca. 1 mm thick, leathery, glabrous, rugose, internal septum absent. Seeds 1–3, elliptic or ovate, 2–2.3 × 1.7–2.3 × ca. 1.8 cm; testa brownish, fragile, easy to separate from cotyledon; hilum small, inconspicuous. Fl. Jul, fr. Sep–Oct.

• Valleys and streamsides in dense or open forests; 1000–1600 m. SE Yunnan.

**7. *Ormosia fordiana*** Oliver, Hooker's Icon. Pl. 25: t. 2422. 1895.

肥荚红豆 fei jia hong dou

*Ruddia fordiana* (Oliver) Yakovlev.

Trees, to 17 m, to 20 cm d.b.h. Bark of stems dark gray, with shallow longitudinal stripes. Young branches and leaves densely appressed rusty brown pubescent, becoming sparsely hairy or glabrescent. Leaves imparipinnate, 19–40 cm; petiole 3.5–7 cm; rachis 5.5–15.5 cm, prolonged 3–15 mm below terminal leaflet; leaflets (5–)7–9(–13); petiolule 6–8 mm, grooved, rusty pubescent, becoming glabrate; blades obovate-lanceolate or obovate-elliptic, rarely elliptic, terminal leaflet larger, 6–20 × 1.5–7 cm, thinly leathery, base cuneate or suborbicular, apex acute or caudate; midvein raised abaxially, impressed adaxially, lateral veins 11 pairs, angled 40° with midvein, lateral veins and veinlets inconspicuous on both surfaces, scattered rusty brown appressed pubescent or glabrous abaxially, glabrous adaxially. Panicles terminal on young branches, 15–26 cm; peduncle and pedicel densely appressed rusty pubescent. Pedicel 6–12 mm; bractlets 2, at pedicel apex, lanceolate, 3–5 mm, densely appressed rusty brown pubescent. Flowers 2–2.5 cm. Calyx light brown-green, 1.5–2 cm; teeth oblong-lanceolate, slightly obtuse, upper 2/3 of upper pair connate, densely appressed rusty pubescent; tube short. Corolla purplish red, ca. 1.5 cm; standard rounded, cucullate, upper margin strongly inflexed, yellow spotted subcentrally, claw short, thick, compressed; keel similar to wings, elliptic-obovate, apex obtuse, claw short. Stamens unequal, all functional; filaments basally thickly compressed. Ovary flattened, densely appressed rusty brown silky pubescent; ovules usually 4; style incurved, glabrescent. Legumes

semicircular or oblong, 5–12 × 5–6.8 cm, apex obliquely beaked, stipe compressed, 5–10 mm, convex at seed; valves woody, dehiscent, ca. 2 mm thick, externally yellow pubescent or glabrescent, internally glossy, often whitish, stained reddish, septum absent, slightly thickened at margin, tip reflexed; calyx persistent. Seeds 1–4, large, oblong, obtuse at ends, 2.5–3.3 × 1.7–2.7 cm, slightly flattened; testa red or red-purple, fleshy, becoming thin and fragile when dry; hilum suborbicular, 3–4 mm. Fl. Jun–Jul, fr. Nov.

Valleys, roadsides on mountain slopes, streamsides in mixed open forests; 100–1400 m. Guangdong, Guangxi, Hainan, S to SE Yunnan [Bangladesh, Myanmar, Thailand, Vietnam].

**8. *Ormosia apiculata*** L. Chen, Sargentia 3: 111. 1943.

喙顶红豆 hui ding hong dou

*Ormosia semicastrata* Hance f. *apiculata* (L. Chen) Yakovlev.

Trees evergreen, ca. 19 m tall. Bark of stems grayish, smooth. Branchlets grayish green, grayish brown tomentose or glabrescent. Leaves imparipinnate, 14–24.5 cm; petiole 2–4 cm; rachis 3–4.7 cm, prolonged 0.3–2.8 cm below terminal leaflet, glabrous; leaflets 3–5; petiolule 5–7 mm; blades dark green abaxially, oblong, 6–14.5 × 2.5–3.7 cm, terminal leaflet larger, leathery, both surfaces glabrous, base cuneate, apex acuminate, obtuse, or retuse; midvein raised abaxially, impressed adaxially, lateral veins 7–11 pairs, angled 40° with midvein, veinlets anastomosing, raised on both surfaces, conspicuous abaxially. Panicles terminal, up to 20 cm in fruit, lower branches up to 15 cm; peduncle appressed fulvous pubescent, becoming sparsely pubescent to glabrescent. Legumes broadly orbicular or obliquely elliptic, 1.5–2.5 × 1.8–2.4 cm (excluding beak and stipe), compressed to slightly swollen, abruptly contracted to oblique beak, 4–6 mm, base truncate to suborbicular, stipe 5–8 mm; valves leathery, ca. 1 mm thick, sparsely pubescent, glabrescent when old; calyx persistent, densely appressed yellowish brown pubescent. Seed 1(or 2), dark red, oblate, rarely prolate, 10–13 mm in diam., thick; hilum elliptic, ca. 1 mm. Fl. Apr, fr. Sep–Oct.

• Forests of mountain slopes; ca. 1400 m. Guangxi (Lingyun).

**9. *Ormosia semicastrata*** Hance, J. Bot. 20: 78. 1882.

软荚红豆 ruan jia hong dou

*Ormosia cathayensis* L. Chen; *O. semicastrata* f. *litchii-folia* F. C. How; *O. semicastrata* f. *pallida* F. C. How.

Trees evergreen, up to 14 m. Bark of stems brown; lenticels convex with irregular cracks. Branchlets yellowish pilose. Leaves imparipinnate, 18.5–24.5 cm; petiole, rachis, and petiolule appressed grayish brown pilose; rachis prolonged 1–2.4 cm below terminal leaflet; leaflets 3–9(–13), green or sometimes glaucous abaxially, ovate-oblong, elliptic, or lanceolate, 4–14.2 × 1–5.7 cm, leathery, glabrous on both surfaces, sometimes appressed pilose along midvein abaxially, base rounded or broadly to narrowly cuneate, apex acuminate or acute, obtuse or retuse; lateral veins 10 or 11 pairs, angled 60° with midvein, arcuate, inconspicuous. Panicles terminal, sometimes axillary, subequal to leaves; peduncle and pedicel densely appressed fulvous pi-

lose. Flowers ca. 7 mm. Calyx broadly campanulate, 4–5 mm; teeth triangular, subequal, abaxially densely appressed fulvous tomentose, adaxially sparsely rusty brown pilose. Corolla white, ca. 2 × as long as calyx; standard suborbicular, ca. 4 × 4 mm, claw ca. 4 mm; wings linear-oblongate, ca. 4.5 × 2 mm, claw ca. 4.5 mm; keel oblong, ca. 4 × 2 mm, claw ca. 2 mm. Stamens unequal, 5 developed, 5 shorter, reduced and without functional anthers. Ovary ovate, ovary sutures and lower style densely appressed fulvous pubescent; ovules 2. Legumes small, dark brown when dried, suborbicular, compressed, slightly swollen, leathery, 1.5–2 cm, apex shortly beaked, stipe 2–3 mm. Seed 1, red to red-brown, compressed laterally, ca. 9 × 9 × 6 mm; hilum ca. 2 mm. Fl. Apr–May, fr. Aug–Sep.

• Mixed forests, mountains, valleys, streamsides, roadsides; 100–1700 m. SE Fujian, Guangdong, Guangxi, SE Guizhou, Hainan, Hunan, S Jiangxi.

**10. *Ormosia howii*** Merrill & Chun, *Sargentia* 3: 112. 1943.

缘毛红豆 yuan mao hong dou

*Ormosia semicastrata* Hance f. *howii* (Merrill & Chun) Yakovlev.

Trees evergreen, to 10 m, to 12 cm d.b.h. Bark of stem grayish brown. Branchlets terete to angled, densely appressed grayish brown pubescent, becoming glabrate. Leaves imparipinnate, 14.5–36 cm; petiole 4.2–5 cm; rachis 6.5–7 cm, prolonged 5–8 mm below terminal leaflet; petiole, rachis, and petiolule grayish pubescent; leaflets 5–7; petiolule 7–10 mm, slightly grooved adaxially; blades oblong-obovate or oblong, 6–17 × 2–6.5 cm, thickly leathery, both surfaces glabrous or pubescent only on midvein abaxially, base cuneate or rounded, apex mucronate, obtuse, or retuse; lateral veins ca. 12 pairs, rarely 17, angled 60° with midvein, veinlets raised abaxially, impressed adaxially. Panicles terminal, up to 15 cm at fruiting, densely appressed brownish pubescent. Legumes obliquely elliptic-ovate or ovate-rhombic, slightly compressed, 2–2.5 × 1.5–2 cm, apex abruptly contracted to oblique beak, 3–4 mm, stipe 3–4 mm; valves light brown, thickly leathery, young valves and margin brownish pubescent, glabrescent or sparsely appressed brownish villous along margin at maturity; calyx persistent, densely appressed rusty brown pubescent. Seeds 1 or 2, dark red, suborbicular, slightly compressed or triangular, one surface flattened, 8–9 × 8–9 mm, glossy; hilum retuse, elliptic, ca. 2 mm.

• Open forests of mountain slopes, mostly on granite mountains; below 100–900 m. Hainan.

**11. *Ormosia pingbianensis*** Cheng & R. H. Chang, *Acta Phytotax. Sin.* 22: 18. 1984.

屏边红豆 ping bian hong dou

Trees evergreen, to 15 m tall. Youngest branchlets appressed yellowish brown pubescent, glabrous with age; bud naked, stalked, gray pubescent. Leaves imparipinnate, alternate or rarely subopposite, 15–17 cm; petiole and rachis glabrous; petiole 2.5–3.5 cm; rachis 3–5 cm, prolonged 1.4–2 cm below terminal leaflet; leaflets (5–)7; petiolule ca. 3 mm, glabrous, grooved; blades oblong, 5.2–8.5 × 1.7–2.6 cm, thinly leathery, both surfaces glabrous, base cuneate or rarely rounded, apex

acuminate or long acuminate; midvein impressed adaxially, lateral veins and veinlets raised when dried. Inflorescence rachis brown pubescent. Legumes oblong, elliptic-obovate, or long ovate, 3.2–4.4 × 1.8–2 cm, base rounded or cuneate, apex obtuse, mucronate, stipe 3–4 mm; calyx persistent and small, densely appressed fulvous pilose; valves thinly leathery, less than 1 mm thick, blackish brown when dried, glabrous, internal septum absent. Seeds 1–3, red to red-purple, suborbicular, slightly compressed, ca. 10 × 9 × 7 mm; hilum elliptic, retuse, ca. 2 mm.

• Valleys of open forests; 900–1000 m. Guangxi (Ningming), Yunnan (Jinping, Pingbian).

This species is similar to *Ormosia glaberrima* but differs from that species in having legumes without septae, valves thinly leathery (vs. woody), and leaflets usually 7 (vs. (3–)5–7) and smaller.

**12. *Ormosia yunnanensis*** Prain, *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* 69: 183. 1900.

云南红豆 yun nan hong dou

Trees evergreen, to 25 m, ca. 80 cm d.b.h. Bark of stems gray. Branchlets and buds densely appressed rusty brown tomentose. Leaves imparipinnate, 14–31 cm; petiole, rachis, and petiolule densely appressed rusty brown tomentose; petiole 3.3–5.5 cm; rachis 6.5–12.5 cm, prolonged 0.6–1.5 cm or not prolonged below terminal leaflet; leaflets (7–)9–13(–15), opposite or upper rarely alternate; petiolule 2–3 mm, grooved; blades oblong or oblong-lanceolate, rarely obovate-oblong, 4.7–13.4 × (1.5–)2.2–3.8 cm, leathery, densely appressed rusty brown tomentose abaxially, becoming glabrescent, glabrous and glossy adaxially, base broadly cuneate to rounded, apex acute to acuminate or obtuse; lateral veins 7–9 pairs, raised abaxially, impressed adaxially. Panicles terminal and axillary, congested, 14–25 cm; peduncle and pedicel densely appressed rusty brown pilose; pedicel 2–3 mm; bracts 2–5 × ca. 1.5 mm, acute, deciduous, rusty pilose. Flowers 0.9–1.1 cm. Calyx campanulate, ca. 8 mm; teeth divided to middle part of calyx, triangular, densely appressed rusty brown tomentose inside and out. Corolla pink to orange-red. Ovary rusty brown pilose at margin. Legumes obovate, oblique, or oblong, 2.5–6 × 1.8–2.5 cm, beak acute, stipe ca. 5 mm, densely appressed rusty brown pilose at margin and base; valves thinly leathery, black when dry, glabrous, swollen around seeds, constricted between seeds; calyx persistent. Seeds 1–3, bright red, ovate or oblate, 8–13 × 6–12 × ca. 5 mm, glossy; hilum elliptic, sunken, 1–1.5 mm. Fl. Mar, fr. Oct.

• Plains, bottoms of ravines, mixed forests of mountain slopes; 500–1700 m. S Yunnan.

It is difficult to distinguish between this species and *Ormosia olivacea* from vegetative characters. The former has dense appressed rusty brown hairs; leaflets acute at the apex, glossy adaxially, with lateral veins arcuate; and legume valves thinly leathery, constricted between seeds. The latter has yellowish brown hairs; leaflets acuminate at the apex, dull adaxially, with lateral veins straight; and legume valves woody, not constricted between seeds.

“*Ormosia lancifolia*” (Cheng & Q. W. Yao, *Sylva Sin.* 2: 1324. 1985) belongs here but was not validly published because no Latin description or diagnosis was provided and no type was indicated (*Vienna Code*, Art. 36.1, 37.1).

**13. *Ormosia nanningensis*** L. Chen, Sargentia 3: 113. 1943.

南宁红豆 nan ning hong dou

*Ormosia semicastrata* Hance f. *nanningensis* (L. Chen) Yakovlev.

Trees evergreen, to ca. 20 m. Branchlets appressed grayish brown pubescent. Leaves imparipinnate, 13–28 cm; rachis and petiolule densely appressed grayish pubescent; leaflets 5; petiolule 7–10 mm, thin; blades green adaxially and paler abaxially, oblong or oblong-lanceolate, widest at middle, 6–15 × 1.5–4 cm, thinly leathery, young leaves densely appressed pilose abaxially, becoming glabrate, glabrous adaxially, base cuneate or rounded, apex obtuse or acuminate, rarely retuse; lateral veins 9–11 pairs, fine, slightly raised on both surfaces. Inflorescence 10–15 cm, densely appressed very short grayish pubescent. Legumes suborbicular or elliptic, slightly convex, 2.4–4 × 2–2.8 cm, apex beak acute, stipe ca. 4 mm; valves densely appressed grayish brown pubescent, internal septum absent; calyx persistent, densely appressed grayish pubescent. Seeds 1 or 2, dark red, suborbicular, slightly compressed, 9–13 × 8–11 mm, hard; hilum 3–4 mm. Fr. Oct.

• Mountain slopes, valley forests, infrequent; 100–700 m. Guangxi (Shiwan Dashan).

**14. *Ormosia hosiei*** Hemsley & E. H. Wilson, Bull. Misc. Inform. Kew 1906: 156. 1906.

红豆树 hong dou shu

*Ormosia taiana* C. Y. Chiao.

Trees evergreen or deciduous, 20–30 m, to 1 m d.b.h. Bark of stems grayish green, smooth. Branchlets green, yellowish brown pubescent, becoming glabrescent; winter buds brownish yellow pubescent. Leaves imparipinnate, 12.5–23 cm; petiole 2–4 cm; rachis 3.5–7.7 cm, prolonged 0.2–2 cm below terminal leaflet, petiolule and rachis sparsely appressed pubescent or glabrous; leaflets (3–)5(–9); petiolule 2–6 mm, rounded, without groove; blades pale green abaxially, dark green adaxially, ovate or ovate-elliptic, rarely suborbicular, 3–10.5 × 1.5–5 cm, thinly leathery, young leaves sparsely appressed pubescent, becoming glabrate or with scattered hairs only on midvein abaxially, base rounded or broadly cuneate, apex acute or acuminate; lateral veins 8–10 pairs, angled 60° with midvein, both lateral veins and veinlets conspicuously reticulate when dried. Panicles terminal or axillary, 15–20 cm, pendulous. Flowers few, fragrant; pedicel 1.5–2 cm. Calyx broadly campanulate; teeth purplish green, triangular, densely appressed brownish pubescent. Corolla white or purplish; standard obovate, 1.8–2 cm; both wings and keel oblong. Stamens unequal; anthers yellow. Ovary glabrous; ovules 5 or 6; style purple, filiform, curved; stigma oblique. Legumes suborbicular, compressed, 3.3–4.8 × 2.3–3.5 cm, apex shortly beaked, stipe 5–8 mm; valves subleathery, 2–3 mm thick, brownish when dried, glabrous, veins obvious, internal septum absent. Seeds 1 or 2, red, suborbicular or elliptic, 15–18 × 12–15 × ca. 5 mm; hilum 9–10 mm. Fl. Apr–May, fr. Oct–Nov.

• Riversides, mountain slopes, valley forests; 200–900(–1400) m. Anhui, Fujian, Gansu, Guizhou, Hubei, SE Jiangsu, Jiangxi, S Shaanxi, Sichuan, Zhejiang.

**15. *Ormosia elliptica*** Q. W. Yao & R. H. Chang, Acta Phytotax. Sin. 22: 20. 1984.

厚荚红豆 hou jia hong dou

Trees, ca. 15 m tall. Leaves imparipinnate, 15–18 cm; petiole 2.3–3.2 cm; rachis ca. 3 cm, prolonged 1–1.5 cm below terminal leaflet, glabrous or sparsely hairy at base; leaflets 5(–7), oblong, 3.3–9 × 1–3 cm, glabrescent or sparsely hairy only on midvein abaxially, glabrous adaxially, base cuneate, apex obtuse; lateral veins 6–8 pairs, angled 40° with midvein, veinlets indistinct, conspicuous, raised on both surfaces when dried. Inflorescence racemose, terminal or axillary. Legumes elliptic, 4.5–5.6 × 2.5–3 cm; valves fleshy, woody, 3–4 mm thick, glabrous externally, internal septum absent. Seeds 1 or 2(or 3), ellipsoid, ca. 1.6 × 1–1.3 × 0.7–0.8 cm; hilum 8–10 mm.

• Roadsides, riversides. Fujian, Guangdong, Guangxi.

This species is close to *Ormosia hosiei* but differs from that species by its oblong leaflets, elliptic legumes, and fleshy valves.

**16. *Ormosia napoensis*** Z. Wei & R. H. Chang, Acta Phytotax. Sin. 22: 21. 1984.

那坡红豆 na po hong dou

Trees small, to ca. 10 m, to 25 cm d.b.h. Branchlets appressed rusty brown pubescent. Leaves imparipinnate, 8.3–19 cm; petiole 1.5–4.8 cm; petiole and petiolule glabrous or glabrescent; rachis 1–3.5 cm, prolonged 0.5–1.5 cm below terminal leaflet; leaflets 3–5; petiolule ca. 2 mm; blades oblong, terminal leaflet larger, 6–13.2 × 1.5–4 cm, glabrous or glabrescent on both surfaces, base rounded or cuneate, apex acuminate to caudate. Panicles terminal. Inflorescence 11–12 cm. Legumes compressed, suborbicular or elliptic, 2.8–4.5 × 2.4–2.8 cm, stipe 3–5 mm, sparsely grayish pubescent, sometimes glabrous, pubescent only at apex and base; valves woody, dehiscent at maturity, reflexed outward, 2–3 mm thick, externally yellowish, internally rough, yellowish brown. Seed 1, dark red-brown, large, elliptic, 1.4–1.8 × 1–1.2 cm, slightly mucilaginous, slightly hard but fragile, easily separated from cotyledons; hilum on shorter axis but slightly off-center, white, convex, aril a yellow ring.

• Forests of mountain slopes; 400–500 m. Guangxi (Napo).

This species is close to *Ormosia fordiana* but has fewer leaflets, smaller legumes, with valves that are not internally glossy or stained reddish, and a smaller seed. Also it differs by its hilum not at the center of axis but slightly oblique, with white funicle and yellow aril ring.

**17. *Ormosia simplicifolia*** Merrill & Chun, Sargentia 3: 102. 1943.

单叶红豆 dan ye hong dou

*Fedorovia simplicifolia* (Merrill & Chun) Yakovlev.

Shrubs or small trees, 2–5 m. Branches glabrous; buds triangular-ovoid, densely appressed brownish tomentose. Leaves simple, alternate or sometimes subopposite at apex; stipules absent; petiole 4–8 mm, with short hairs; leaf blade oblong or lanceolate, 4.7–25 × 1.4–6 cm, leathery, sparsely appressed reddish brown hirtellous abaxially, glabrous adaxially, base cuneate or rounded, apex long caudate, sometimes retuse; lateral

veins 8–10 pairs, inconspicuous. Inflorescence paniculate or racemose, terminal or in upper axils, 6–10 cm, grayish brown pubescent or glabrescent. Flowers 1.2–1.5 cm, fragrant; pedicel thin, 0.7–1 cm, appressed yellowish gray pubescent. Calyx appressed short yellowish gray hairy; teeth triangular, blunt, slightly longer than calyx tube. Corolla rose-pink; standard broadly ovate, ca. 1.5 cm wide, base broadly truncate to rounded, apex retuse, claw 1.8–2 mm; wings and keel oblong to oblanceolate, 1.2–1.4 × ca. 0.5 cm, claw ca. 4 mm. Stamens unequal, 8–15 mm. Ovary glabrous; ovules 4. Legumes compressed, oblong or obovate, 3–4.5(–6) × 2–2.5 cm; valves nearly woody, ca. 2 mm thick, internal septum absent. Seeds 1–3, red, elliptic, ca. 1.5 × 1.2 × 0.6 cm, glossy; hilum small, aril absent. Fl. Jul, fr. Sep–Oct.

- Valley forests; 400–1300 m. Guangxi, Hainan.

**18. *Ormosia boluoensis*** Y. Q. Wang & P. Y. Chen, J. Trop. Subtrop. Bot. 3: 29. 1995.

博罗红豆 bo luo hong dou

Shrubs or small trees, 2–4 m. Branchlets glabrous. Leaves simple, alternate; petiole 1.8–3 cm; leaf blade oblong-elliptic, 5–9 cm, leathery, glabrous, base cuneate, apex acuminate; midvein raised abaxially, impressed adaxially. Inflorescence paniculate (terminal) or racemose (axillary), 3–13 cm, densely yellow pubescent. Flowers 1.2–1.5 cm; pedicels 1–3 mm. Calyx bilateral, broader toward base, narrowing toward mouth, 0.6–0.7 mm, densely yellow pubescent; teeth 0.3–0.4 mm, apex acute. Corolla white; standard broadly ovate, 1–1.2 × 1.3–1.5 cm, base truncate-rounded to broadly cuneate, apex rounded, claw thickened, ca. 1 mm; wings narrowly obovate to broadly spatulate, 1–1.2 × 0.5–0.6 cm, oblique, claw ca. 1 mm; keel narrowly ovate to elliptic, 1–1.2 × 0.5–0.6 cm, base cuneate, 1- or 2-auriculate, apex blunt to obliquely narrowly rounded, claw ca. 1 mm. Stamens unequal, free, 0.9–1.5 cm, curved; anthers well developed on 5, poorly developed and infertile on 5. Ovary ovate-elliptic, yellow pubescent; style curved. Legumes unknown. Fl. May.

- Sparse riverine forests; 800–900 m. Guangdong.

**19. *Ormosia hekouensis*** R. H. Chang, Acta Phytotax. Sin. 22: 110. 1984.

河口红豆 he kou hong dou

Trees, to 20 m. Branchlets dark brown pubescent, becoming glabrescent; buds densely appressed black pubescent. Leaves imparipinnate, 26–41 cm; petiole 3–5 cm; rachis 10–20 cm, prolonged 0.8–1.8 cm below terminal leaflet, glabrous or glabrescent; leaflets 9–11; petiolule 3–5 mm, grooved, glabrous or sparsely pubescent; blades lanceolate, obovate-lanceolate, or oblong, 6.5–18 × 2.7–6.4 cm, young leaves dark brownish pubescent, becoming glabrescent, hairs short abaxially, base narrowly cuneate, apex acute; midvein impressed adaxially, lateral veins 9 or 10 pairs, raised abaxially. Panicles terminal; rachis densely appressed grayish brown pubescent. Legumes large, very fleshy, woody, spheroidal or oblong, 4.5–9 × ca. 4 cm, beak 6–8 mm, stipe absent or short; valves grayish brown, 6–10 mm, apex and base densely appressed yellowish brown pubescent, internally white, tinged reddish near seed, septum between

seeds membranous. Seeds 1–3, reddish brown, elliptic, 2.5–3 × 1.7–2 cm, fragile; hilum 2–3 mm, slightly off-center.

- Humid open forests and riversides; ca. 300 m. Yunnan (Hekou, Mengla).

*Ormosia hekouensis* is similar to *O. crassivalvis* Gagnepain (of Vietnam) but differs by its larger, differently shaped leaflets and its terminal panicles. The latter has linear-lanceolate leaflets, ca. 15 × 2 cm, and axillary inflorescences.

**20. *Ormosia emarginata*** (Hooker & Arnott) Benth, Hooker's J. Bot. Kew Gard. Misc. 4: 77. 1852.

凹叶红豆 ao ye hong dou

*Layia emarginata* Hooker & Arnott, Bot. Beechey Voy. 183. 1833; *Fedorovia emarginata* (Hooker & Arnott) Yakovlev; *Macrotripis emarginata* (Hooker & Arnott) Walpers.

Trees evergreen, small, 6(–12) m, 8(–30) cm d.b.h., sometimes shrubs; bark of young trees greenish, becoming grayish green. Branchlets green, smooth, glabrous, lenticels inconspicuous; buds rusty brown pubescent. Leaves imparipinnate, (6.5–)11–20.5 cm; petiole (2.3–)3.4–4.8 cm; rachis (2.3–)4–8.6 cm, not prolonged or prolonged 1.2–2 cm below terminal leaflet, young petiole, rachis, and leaves abaxially sparsely appressed yellowish brown pilose, becoming glabrescent, both petiole and rachis grooved; leaflets (3–)5–7; petiolule 3–5 mm, stout, grooved, wrinkled; blades obovate, obovate-elliptic, long-obovate, or oblong, (1.4–)3.7–7 × (0.9–)1.6–3.2 cm, thickly leathery, base cuneate or rounded, apex obtuse, emarginate; lateral veins 7 or 8 pairs, fine, angled 45° with midvein, veinlets fine, raised, more conspicuous abaxially. Panicles terminal, 10–11.5 cm, few flowered. Flowers fragrant; pedicel 3–5 mm, glabrous. Calyx broadly campanulate, flared out and appearing flat-faced; teeth isometric, margin and inner surface gray tomentose. Corolla white or pink; standard semiorbicular, ca. 7 × 8 mm, apex rounded, claw ca. 2 mm; wings oblong, base auriculate, claw 2.5–3 mm; keel oblong, somewhat curved, slightly auriculate, claw ca. 2.5 mm. Stamens unequal. Ovary glabrous. Legumes dark brown or black, compressed, rhombic or oblong, 3–5.5 × 1.7–2.4 cm, apiculate, stipe 2–3 mm; valves woody, septate. Seeds 1–4, red-brown, suborbicular or elliptic, slightly compressed, 7–10 × ca. 7 mm; hilum whitish yellow, small, ca. 2 mm. Fl. May–Jun, fr. Aug–Oct.

Mountain slopes, mixed valley forests. Guangdong, S Guangxi (Dongxing), Hainan [Vietnam].

**21. *Ormosia glaberrima*** Y. C. Wu, Bot. Jahrb. Syst. 71: 182. 1940.

光叶红豆 guang ye hong dou

*Fedorovia glaberrima* (Y. C. Wu) Yakovlev; *Ormosia kwangsiensis* L. Chen.

Trees evergreen, 15(–21) m, to 40 cm d.b.h., or shrubs. Bark of stems grayish green, smooth. Branchlets green, dark green when dried, rusty brown pubescent, becoming glabrescent; buds brown pubescent. Leaves imparipinnate, 12.5–19.7 cm; petiole 2.5–3.7 cm; rachis 3.5–7.2(–10.8) cm, prolonged 0.7–0.8 cm below terminal leaflet, not grooved, yellowish brown pubescent when young, becoming glabrescent; leaflets

(3–)5–7, ovate or elliptic-lanceolate, (2.7–)4–9.5 × 1.4–3.6 cm, leathery or thinly so, both surfaces glabrous, base broadly cuneate to rounded, apex acute to acuminate, slightly retuse, lateral veins 9 or 10 pairs, angled 45° with midvein; petiolule 3–6 mm, grooved. Panicles terminal or axillary, 9–12 cm; peduncle and pedicel densely appressed rusty pubescent, becoming glabrescent. Flowers ca. 1 cm; pedicel short. Calyx campanulate; teeth broadly flared out and appearing flat-faced, appressed yellowish pubescent abaxially, fulvous pubescent adaxially. Standard suborbicular, ca. 8 × 8 mm, apex retuse, claw 2–3 mm; wings oblong, 8–9 × 3.5–4 mm, 2-auriculate, claw 2–3 mm; keel oblong, 8–9 × 3.5–4 mm, curved, 2-auriculate, claw 2–3 mm. Stamens unequal, 3–5 longer, others shorter, incurved. Ovary glabrous; ovules 5. Legumes compressed, elliptic or oblong, 3.5–5 × 1.7–2 cm, base cuneate, apex acute, beak short, slightly curved, stipe ca. 1 mm; valves black, woody, glabrous, internally septate. Seeds 1–4, red-brown, oblate or oblong, 1–1.1 × 0.8–0.9 cm, glossy; hilum elliptic, concave, 1–3 mm. Fl. Jun, fr. Oct.

• Mountain slopes, open valley forests; 200–800 m. W Guangdong, SE Guangxi, Hainan, Hunan (Jianghua), Jiangxi.

*Ormosia glaberrima* is similar to *O. emarginata* due to the color and shape of the legumes and to the flat-faced calyx. The former has ovate or elliptic-lanceolate leaflets that are thinly leathery, with tapering, slightly retuse apices; its calyx is hairy on both surfaces; the standard apex is emarginate; and the peduncle is often covered with appressed yellow-brown silky hairs. The latter has obovate, obovate-elliptic, or oblong leaflets that are thickly leathery, with broadly rounded, emarginate apices; its calyx is glabrous on the outside, hairy only on the margin and inside; the apex of the standard is rounded; and the peduncle is glabrous.

**22. *Ormosia henryi*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69: 180. 1900.

花榈木 hua lü mu

*Fedorovia henryi* (Prain) Yakovlev; *Ormosia mollis* Dunn.

Trees evergreen, to 16 m, to 40 cm d.b.h. Bark of stems grayish green, smooth, shallowly striate. Branchlets, rachis, and inflorescence densely appressed tawny tomentose. Leaves imparipinnate, 13–32.5(–35) cm; leaflets (3–)5–7; petiolule 3–6 mm; blades elliptic or oblong-elliptic, 4.3–13.5(–17) × 2.3–6.8 cm, leathery, abaxial surface and petiole densely appressed yellowish brown tomentose, adaxial surface dark green and glabrous, base rounded or broadly cuneate, sometimes slightly cordate, margin slightly repand, apex broadly rounded or acute, blunt or mucronate; lateral veins 6–11 pairs, angled 45° with midvein. Panicles terminal, or racemes axillary, (8–)11–17 cm, densely appressed brownish tomentose. Flowers ca. 2 × 2 cm; pedicel 7–12 mm. Calyx campanulate, 5.5–6 mm; teeth ca. 2/3 length of calyx, triangular-ovate, densely appressed brownish tomentose on both surfaces. Corolla greenish white, darker at center, margin green and slightly purplish; standard suborbicular, apex rounded or retuse, claw thickened; wings purplish green, obovate-oblong, ca. 1.4 × 1 cm, claw ca. 3 mm; keel obovate-oblong, ca. 1.6 × 0.7 cm, claw ca. 3.5 mm. Stamens free, 1.3–2.5 cm, unequal; filaments light green; anthers light grayish purple. Ovary flattened, densely appressed brownish villous along suture, otherwise glabrous; ovules 9 or 10; style

filiform; stigma oblique. Legumes compressed, oblong, 5–12 × 1.5–4 cm, apex beaked, stipe ca. 5 mm; valves purplish brown, 2–3 mm thick, leathery, glabrous, internally septate. Seeds (1–)4–8, red-brown to scarlet, ellipsoid or ovoid, 0.8–1.5 cm, glossy; hilum ca. 3 mm. Fl. Jul–Aug, fr. Oct–Nov.

• Mountain slopes, streamsides in mixed forests; 100–1300 m. Anhui, Guangdong, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, SE Yunnan, Zhejiang.

**23. *Ormosia pachyptera*** L. Chen, Sargentia 3: 104. 1943.

菱荚红豆 ling jia hong dou

*Fedorovia pachyptera* (L. Chen) Yakovlev.

Trees, ca. 8 m, ca. 18 cm d.b.h. Bark of stems gray, smooth, not fissured. Branchlets glabrous, lenticels inconspicuous, buds superposed, suborbicular, brown pubescent, leaf scars circular and convex. Leaves imparipinnate, congested at ends of branches, 25–28.5 cm; petiole 5.8–6.4 cm; rachis 15.2–19.7 cm, prolonged 0.7–2.8 cm below terminal leaflet, a convex gland at junction of 2 leaflets; petiole, rachis, and petiolule sparsely appressed white pubescent or glabrescent; leaflets 15–19; petiolule 4–6 mm; blades oblong-oblong-elliptic or oblong, often widest above middle, 3.7–8.6 × 1.3–2.4 cm, leathery, pale green and sparsely appressed pubescent abaxially, dark green and glabrous adaxially, base cuneate, apex acute to acuminate; midvein raised abaxially, impressed adaxially, lateral veins 6 or 7 pairs, veinlets inconspicuous, lateral veins raised abaxially when dried, veinlets slightly raised. Inflorescence axillary, 15–18 cm; peduncle sparsely pubescent; pedicel 6–7 mm, hairs brownish. Legumes rhombic to obovate, compressed, 4–6.5 × 3.7–5.2 cm (excluding stipe), apex broadly rounded, abruptly acuminate, stipe 5–6 mm; valves black, thinly woody, densely appressed short grayish pubescent, broadly winged along suture, wings 1–1.6 cm wide, internally septate; calyx persistent, abaxially sparsely appressed short pallid pubescent, adaxially densely yellowish brown pubescent. Seeds 1 or 2(–4), red, prolate, slightly compressed, 13–15 × 7–12 × ca. 3 mm; hilum small, ellipsoid and slightly concave, ca. 3 mm.

• Sandy acidic lowland slopes, scattered at forest margins; 400–1000 m. SW Guangxi.

**24. *Ormosia ferruginea*** R. H. Chang, Acta Phytotax. Sin. 22: 112. 1984.

锈枝红豆 xiu zhi hong dou

Trees small, evergreen, ca. 2.5 m. Branches, buds, petiole, and rachis densely appressed rusty tomentose. Leaves imparipinnate or paripinnate, 11–15.5 cm; petiole 1.3–2 cm; rachis 5–8.3 cm, prolonged ca. 2 mm below terminal leaflet, or terminating rachis; leaflets 13–19; petiolule ca. 2 mm, densely appressed rusty brown tomentose; blades green adaxially, elliptic or obovate-elliptic, (2.1–)3–5.8 × 1.7–2 cm, leathery, midvein with brown tomentose hairs, sparsely appressed brownish pubescent abaxially, base rounded or cuneate, apex obtuse, slightly retuse; midvein raised, lateral veins 6–8 pairs, angled 40° with midvein, slightly arcuate, raised abaxially. Panicles or racemes terminal or axillary. Calyx deeply cleft to slightly below middle; teeth triangular, adaxially densely appressed rusty tomentose, obtuse at apex. Inflorescence ca. 13 cm; pedicels

3–5 mm, densely appressed rusty tomentose. Legumes elliptic, 4–6 × 1.6–2 cm, apex shortly beaked, stipe 3–5 mm, dark blue-gray at maturity; valves thinly woody, smooth, glabrous, internally septate. Seeds 2–4, red-brown, elliptic, slightly compressed, ca. 1 × 0.7 cm; hilum small, elliptic, ca. 3 mm, indented at narrow end. Fl. Jul, fr. Oct.

- Mountain slopes, open forest margins. Guangdong (Yangchun).

*Ormosia ferruginea* is similar to *O. emarginata*, but the former (excluding leaflets) is densely appressed rusty tomentose and has 13–19 leaflets that are sparsely appressed brown pubescent abaxially, while the latter is largely glabrous and has only 5–7 leaflets.

## 25. *Ormosia purpureiflora* L. Chen, Sargentia 3: 105. 1943.

紫花红豆 zi hua hong dou

Shrubs or small trees, ca. 3 m. Bark of stems smooth. Branchlets inconspicuously grayish pubescent. Leaves imparipinnate, 21–31 cm; petiole 3.3–9 cm; rachis 5.5–13 cm, prolonged 6–10 mm below terminal leaflet; petiole and rachis short gray pubescent; leaflets 11–13 pairs; petiolule 2–5 mm, corrugated, grooved, sparsely gray pubescent; blades pale abaxially, dark green adaxially, ovate-elliptic or oblong-lanceolate, 6–12 × (1.5–)2–2.5 cm, widest below middle, leathery, sparsely short gray pubescent abaxially, glabrous adaxially, base broadly cuneate to rounded, apex obtuse, slightly apiculate; midvein raised abaxially and impressed adaxially, lateral veins 5–8 pairs, arcuate, both lateral veins and veinlets slightly raised, inconspicuous. Panicles terminal, 12–20 cm, appressed gray pubescent; pedicel 5–6 mm, densely appressed short gray pubescent. Calyx teeth oblong-ovate, slightly longer than calyx tube, 3–5 mm, abaxially appressed pubescent, adaxially gray pubescent inside. Corolla purple; standard broadly ovate, ca. 1.5 cm wide, widest at base, truncate-rounded, claw ca. 2 mm; wings 2-auriculate at base; keel marginally puberulent. Stamens unequal; filaments 0.8–1.5 cm, free. Ovary sessile, ovate or oblong, glabrous; ovules 6. Legumes ellipsoid or oblong, 3.5–7.2 × 2–2.3 cm, stipe 2–3 mm; valves black and glabrous, thinly leathery, internally septate, tissue loose, velvety, spongy. Seeds 2–6, red, ellipsoid, ca. 1.1 × 0.7 × 0.6 cm; hilum elliptic, ca. 3 mm. Fl. Jun, fr. Sep.

- Dense forests. Guangdong (Longmen, Luoding).

## 26. *Ormosia xylocarpa* Chun ex Merrill & L. Chen, Sargentia 3: 105. 1943.

木荚红豆 mu jia hong dou

*Fedorovia xylocarpa* (Chun ex Merrill & L. Chen) Yakovlev; *Ormosia polysperma* L. Chen.

Trees evergreen, 12–20 m, 0.4–1.5 m d.b.h. Bark of stems gray or brown, glabrous. Branches densely appressed tawny pubescent. Leaves imparipinnate, (8–)11–24.5 cm; petiole 3–5 cm; rachis 3.2–5.4 cm, prolonged 6–10 mm below terminal leaflet; petiole and rachis sparsely or densely appressed yellow pubescent; leaflets (3–)5–7; petiolule (4–)7–12 mm, grooved, densely appressed short pubescent; blades oblong or oblong-ob lanceolate, 3–14 × 1.3–5.3 cm, thickly leathery, densely or sparsely appressed short tawny pubescent abaxially, more densely so along midvein, glabrous adaxially, base narrowly to

broadly cuneate, margin slightly repand, apex obtuse or acute. Panicles terminal, 8–14 cm, pubescent. Flowers 2–2.5 cm, fragrant; pedicel ca. 8 mm. Calyx ca. 10 mm; teeth oblong, ca. 8 mm, subequal, densely appressed short brownish yellow sericeous. Corolla white or pink. Ovary densely appressed short tawny sericeous; ovules 7–9. Legumes obovate to oblong or rhombic, 5–7 × 2–4 × ca. 1.5 cm, compressed, slightly rounded around seeds; valves thickly woody, ventral suture margin reflexed outward, densely appressed short yellowish brown sericeous, internally septate. Seeds 1–5, red, prolate or suborbicular, slightly inequilateral, 0.8–1.3 × 0.6–0.8 × 0.4–0.5 cm, glossy, often viscid when moist; hilum small, 1.5–2.5 mm, somewhat oblique. Fl. Jun–Jul, fr. Oct–Nov.

- Mountain slopes, valleys, roadsides, streamsides, open or dense forests; 200–1600 m. Fujian, Guangdong, Guangxi, E Guizhou, Hainan, S Hunan, S Jiangxi.

## 27. *Ormosia striata* Dunn, J. Linn. Soc., Bot. 35: 492. 1903.

槽纹红豆 cao wen hong dou

*Fedorovia striata* (Dunn) Yakovlev.

Trees, 7–30 m, ca. 50 cm d.b.h. Branchlets glabrous; terminal bud large, densely appressed brownish pubescent. Leaves imparipinnate, 17–35.5 cm; petiole 4.2–9.5 cm; rachis 7–10.5 cm, prolonged 1.4–2.3 below terminal leaflet; petiole and rachis glabrous; leaflets 7–9(–11); petiolule glabrous; blades oblong or ovate-lanceolate, upper leaflets larger, 5–15 × 1.9–6 cm, thinly leathery, both surfaces glabrous, base obtuse, apex acuminate to caudate; veinlets conspicuous when dried. Racemes axillary, equal to leaves or slightly shorter. Flowers ca. 1 cm, 2 flowers nearly opposite at apex of inflorescence, alternate below. Calyx abaxially densely appressed pubescent, adaxially glabrous; teeth broadly triangular, obtuse. Corolla yellow, ca. 3 × as long as calyx; standard striate. Ovary stipitate, glabrous; ovules 2–4. Legumes rhombic-oval or ellipsoid, 2.3–4.8 × 1.7–2.3 cm, apex obliquely beaked, gibbous, constricted between seeds; valves thickly leathery, yellowish brown when dry, glabrous, internally septate. Seeds 1 or 2, red, elliptic, 1.1–1.8 × 0.7–1.2 × 0.6–0.8 cm, striate; hilum small, 2–3 mm, grooved along one side of long axis, 9–13 mm. Fl. in summer.

- Riversides, mountain slope forests; 1000–1500 m. S Yunnan.

## 28. *Ormosia pinnata* (Loureiro) Merrill, Lingnan Sci. J. 14: 12. 1935.

海南红豆 hai nan hong dou

*Cynometra pinnata* Loureiro, Fl. Cochinch. 1: 268. 1790; *Fedorovia pinnata* (Loureiro) Yakovlev; *Ormosia hainanensis* Gagnepain.

Trees or shrubs, evergreen, 3–18(–25) m, ca. 0.3 m d.b.h. Bark of stems grayish; xylem mucilaginous. Young branches brownish pubescent, becoming glabrescent. Leaves imparipinnate, 16–22.5 cm; petiole 2–3.5(–6.5) cm; rachis 2.5–9 cm, prolonged 0.2–2.6 cm below terminal leaflet; leaflets 7(–9); petiolule 3–6 mm, grooved, pubescent or nearly glabrous; blades lanceolate to oblanceolate, 12–15 × 4(–5) cm, thinly leathery, both surfaces glabrous, apex obtuse or acute, rarely acuminate;

lateral veins 5–7 pairs. Panicles terminal, 20–30 cm. Flowers 1.5–2 cm. Calyx campanulate, longer than pedicel, pubescent; teeth broadly triangular. Corolla pink and yellowish white; standard ca. 13 mm, base shallowly 2-auriculate, claw short and stout; wings spatulate-obovate, claw ca. 4 mm, narrow; keel broadly spatulate-obovate, slightly to not auriculate at base, claw ca. 4 mm, narrow. Ovary densely appressed brown pubescent; ovules 4; style glabrous, curved. Legumes 3–7 × ca. 2 cm, body turgid and slightly curved, constricted between seeds; valves thickly woody, orange-red at maturity, brown when dried, with light-colored spots, glabrous; stipe conspicuous, curved obliquely from body of legume. Seeds 1–4, red, ellipsoid, 1.5–2 cm; hilum less than 1 mm. Fl. Jul–Aug, fr. Oct.

• Valleys, mountain slopes, roadside forests, at middle and low elevations. SW Guangdong, S Guangxi, Hainan.

**29. *Ormosia indurata*** L. Chen, Sargentia 3: 104. 1943.

韧荚红豆 ren jia hong dou

*Fedorovia indurata* (L. Chen) Yakovlev.

Trees evergreen, 5–9 m. Old branches dark purplish brown or yellowish brown, glabrous, leaf scars convex, lenticels convex. Young branchlets conspicuously or sparsely yellow-brown pilose. Leaves imparipinnate, 8–15.5 cm; petiole 1.7–2.5 cm; rachis 3.8–5 cm, prolonged 2–10 mm (rarely not prolonged) below terminal leaflet; petiole and rachis glabrous; leaflets (5–)7–9, opposite; petiolule 3–5 mm, thin, grooved; blades pale greenish abaxially, narrowly oblanceolate or elliptic, 2.5–6 × 0.7–2 cm, leathery, sparsely yellowish pubescent or glabrous abaxially, glabrous adaxially, base cuneate, margin slightly repand, apex acute to obtuse-acuminate, slightly retuse; lateral veins 4–6 pairs, fine, inconspicuous adaxially, veinlets slightly raised abaxially. Panicles terminal, ca. 5 cm before flowering, bud obovate, inflorescence and bud appressed short rusty sericeous. Petals white. Ovary densely appressed grayish brown pilose; ovules 4. Legumes obovate or oblong, 3–4.5 × 2–2.5 cm, woody, apex acute, stipe ca. 5 mm; valves thickly woody, slightly turgid, slightly appressed short brown pubescent when young, becoming glabrescent, internally septate; calyx persistent, densely appressed short grayish brown pubescent. Seeds 1 or 2, ellipsoid, slightly compressed, ca. 1 × 0.7 cm; testa red-brown, hard, glossy; hilum elliptic, excavated, ca. 2 mm.

• Mixed forests. Fujian (Hua'an), Guangdong (Luofu Shan).

**30. *Ormosia eugeniifolia*** Tsiang ex R. H. Chang, Acta Phytotax. Sin. 22: 115. 1984.

蒲桃叶红豆 pu tao ye hong dou

Trees evergreen, 5–16 m. Buds and branchlets densely appressed yellow-brown pubescent. Older branches with convex lenticels, nearly glabrous. Leaves imparipinnate, 8–12 cm; petiole 1–2.2 cm; rachis 2.7–3.7 cm, prolonged 0.4–1.7 mm below terminal leaflet; petiole and rachis sparsely appressed short pubescent or glabrescent, brown hairy at junction of leaflets; leaflets (5–)7; petiolule 2–6 mm, grooved adaxially when dry, nearly glabrous; blades obovate, obovate-spatulate, or elliptic, 3.6–6.3 × 1.6–2.8 cm, thickly leathery, sparsely appressed short pubescent, becoming glabrescent abaxially, glabrous adaxially, base cuneate, margin slightly rolled upward, apex

rounded, obtuse, or retuse; lateral veins 5–8 pairs, inconspicuous, angled 40° with midvein. Inflorescences terminal panicles or axillary racemes, brown pubescent. Legumes rhombic or ellipsoid, 2–4.1 × 2–2.4 cm; fruiting pedicel 5–6 mm, both ends acute; stipe 3–5 mm; valves dark brown, woody, 2–3 mm thick, ± brown pubescent toward base, internally septate. Seeds 2 or 3, purple, elliptic, slightly compressed, 1–1.3 × 0.7–0.8 × ca. 0.5 cm; hilum white, slightly oblique, elliptic, ca. 2 mm. Fr. Nov.

• Valleys, riversides, sparse forests; 200–800 m. Guangxi (Shangsi).

**31. *Ormosia pubescens*** R. H. Chang, Acta Phytotax. Sin. 22: 115. 1984.

柔毛红豆 rou mao hong dou

Trees evergreen, to 20 m, to 40 cm d.b.h. Branchlets brown pubescent. Leaves imparipinnate, 12–16 cm; petiole 1.5–4 cm; rachis 2–2.7 cm, prolonged 1.2–1.5 cm below terminal leaflet; petiole and rachis slightly pubescent or subglabrate; leaflets 5; petiolule ca. 6 mm, impressed adaxially, nearly glabrous; blades elliptic or oblong, 4.5–9.5(–11) cm, light colored pubescent abaxially, green adaxially, base cuneate, apex acute, mucronate. Inflorescences terminal panicles or axillary racemes, ca. 8 cm; peduncle and pedicel densely appressed short brown pubescent, pedicel ca. 5 mm. Calyx teeth triangular, abaxially densely appressed brownish pubescent. Standard fan-shaped, ca. 7.5 × 10 mm, claw ca. 1.5 mm; wings elliptic, ca. 9 × 3 mm, claw ca. 3 mm; keel oblong, ca. 8 × 3–5 mm, claw ca. 4 mm. Stamens 5–10 mm, unequal. Ovary densely appressed yellow-brown pubescent. Legumes rhombic or ellipsoid, turgid, 3.3–5.6 × ca. 2.7 × 1.2 cm; valves woody, ca. 4 mm thick, densely appressed yellowish brown pubescent, internally septate. Seeds 1–4, red, ellipsoid, ca. 1.4 × 0.8 × 0.7 cm; hilum ca. 2 mm. Fr. Sep–Oct.

• Valleys of mountain slopes. S Guangxi (Dongxing, Shangsi).

*Ormosia pubescens* is similar to *O. xylocarpa*, but the former has 5 leaflets, which are elliptic or oblong, with an acute and mucronate apex, and legumes that are more turgid, with valves densely appressed yellowish brown pubescent and margins not reflexed. The latter has 5–7 leaflets, which are oblong or oblong-lanceolate, with an obtuse or shortly acute apex, and legumes that are compressed, with valves densely appressed short yellowish brown sericeous and margins reflexed outward.

**32. *Ormosia olivacea*** L. Chen, Sargentia 3: 110. 1943.

榄绿红豆 lan lü hong dou

*Fedorovia olivacea* (L. Chen) Yakovlev.

Trees, 20–25 m, to 1 m d.b.h. Branchlets and buds densely appressed brown pilose. Leaves imparipinnate, 17–38 cm; petiole ca. 5.3 cm; rachis ca. 18.5 cm, densely appressed brown pubescent, prolonged ca. 7 mm below terminal leaflet; leaflets (9–)15–17, opposite, sometimes subopposite on lower rachis; petiolule 2–4 mm, pubescent; blades lanceolate to lanceolate-oblong or ovate, 3.4–10.5 × 1.6–2.7 cm, thickly papery, brownish pilose abaxially, glabrous or slightly hairy only along midvein adaxially, base broadly cuneate to rounded, apex acuminate; midvein raised abaxially, impressed adaxially, lateral veins 5–8 pairs, straight or slightly arcuate, raised abaxially,

slightly impressed adaxially. Inflorescences terminal panicles, or terminal or axillary racemes, densely appressed brown pilose to nearly glabrous. Legumes compressed, elliptic or obovate-lanceolate, 5.2–8.9 × 2.5–4 cm, apex acute, shortly mucronate, stipe 5–8 mm, often yellowish brown hirtellous; valves internally septate, woody; persistent calyx densely appressed rusty brown pilose. Seeds (1 or) 2–4, red-brown, obovate or subreniform, ca. 1 × 1 cm, slightly compressed, hard, glossy; hilum ca. 3 mm. Fl. Apr, fr. Nov–Dec.

• Forest margins, secondary forests on mountain slopes; 700–2100 m. N Guangxi, S Yunnan.

**33. *Ormosia microphylla*** Merrill, *Sargentia* 3: 109. 1943.

小叶红豆 xiao ye hong dou

*Fedorovia microphylla* (Merrill) Yakovlev; *Ormosia microphylla* var. *tomentosa* R. H. Chang.

Trees or shrubs, 3–10 m. Bark of stems gray-brown. Old branches purplish brown, terete, nearly glabrous; branchlets densely appressed brownish pubescent; bud naked, densely appressed yellowish brown pilose. Leaves imparipinnate, 12–16 cm; petiole 2.2–3.2 cm; rachis 6.5–7.8 cm, densely appressed yellowish brown pilose, prolonged 5–7 mm below terminal leaflet; leaflets 11–15(–17); petiolule 1.5–2 mm, densely appressed yellowish brown pilose; blades dark green adaxially, paler abaxially, elliptic, (1.5–)2–4 × 1–1.5 cm, papery, ± appressed pubescent abaxially, glabrous or sparsely pilose adaxially, base rounded, apex acute or shortly acuminate; midvein densely yellowish pubescent, lateral veins 5–7 pairs, fine, raised abaxially, inconspicuous, arcuate, not anastomosing along margin, veinlets reticulate. Inflorescence terminal. Legumes subrhombic or oblong, 5–6 cm, compressed, apex mucronate, stipe short; valves dark brown or black, thickly leathery or woody, glossy, internally transversely septate. Seeds 3 or 4, red, ca. 2.2 × 0.6–0.8 cm, hard, slightly glossy; hilum 3–3.5 mm.

• Dense forests, mixed forests, valleys, mountain slopes, roadsides; 500–700 m. Fujian, Guangdong, E and S Guangxi, SE Guizhou.

**34. *Ormosia saxatilis*** K. M. Lan, J. Nanjing Technol. Coll. Forest Prod. 1: 134. 1981.

岩生红豆 yan sheng hong dou

Trees evergreen, trunk vertical, to 15 m, to 44 cm d.b.h. Bark of stems grayish green, smooth when young, with rounded convex lenticels or longitudinal striations forming with age. Branchlets densely appressed yellowish brown tomentose; winter buds naked. Leaves imparipinnate, 14–17(–23) cm; petiole and rachis densely appressed gray pubescent; leaflets 17–23; petiolule short, ca. 2 mm; blades oblong-lanceolate or ovate-lanceolate, 2.7–5(–7) × 1.1–1.5 cm, thinly leathery, densely appressed yellowish brown pubescent abaxially, faintly appressed pubescent or glabrous adaxially, base rounded or broadly cuneate, apex acute, acuminate, or obtuse, sometimes retuse; midvein raised abaxially, impressed adaxially, lateral veins 5 or 6( or 7) pairs. Inflorescence racemose or few branched, terminal and axillary. Legumes oblong or rhombic, compressed, 4–6 × 1.6–2.3 cm, glabrous; valves thickly woody, black at maturity. Seeds 1–3, red-brown, suborbicular, ca. 10 × 8 mm; hilum ca. 3 mm.

• Limestone neutral or slightly acidic soil of forests, often mixed with *Carpinus*, *Quercus*, etc.; 1100–1200 m. Guizhou (Qianling Shan).

*Ormosia saxatilis* is similar to *O. microphylla*, but its branchlets are densely appressed yellowish brown tomentose, its leaves are 17–23-foliolate, and its leaflets are densely appressed yellowish brown tomentose abaxially.

**35. *Ormosia formosana*** Kanehira, Bot. Mag. (Tokyo) 30: 420. 1916.

台湾红豆 tai wan hong dou

*Fedorovia formosana* (Kanehira) Yakovlev.

Trees evergreen, 5–15 m, 17(–50) cm d.b.h. Bark smooth, tawny. Branchlets green, brown pubescent, becoming glabrate. Leaves imparipinnate, 9–11 cm; petiole 1.8–2.5 cm; rachis 1.8–2 cm, prolonged 0.2–0.8 cm below terminal leaflet; leaflets (3–)5–7; petiolule ca. 5 mm, with short hairs; blades pale green abaxially, green and smooth adaxially, oblong-lanceolate or oblong, 3.5–4 × 1.1–2 cm, thinly leathery, base cuneate to rounded, margin entire, apex acute, acuminate to shortly caudate; midvein conspicuously raised abaxially, impressed adaxially, lateral veins 5–7 pairs, angled 40° with midvein, both lateral veins and veinlets inconspicuous. Racemes terminal, 8–10 cm; peduncle rusty pilose; pedicel 7–10 mm, rusty brown pilose. Flowers ca. 1.2 × 1 cm. Calyx campanulate, sparsely rusty brown pilose; teeth triangular, 3–4 mm; tube 2–3 mm. Corolla creamy white; standard suborbicular, 1–1.2 cm, apex rounded, claw 1.5–2 mm; wings long elliptic, ca. 1.4 × 0.7 cm, claw ca. 3 mm; keel oblong-elliptic, ca. 1.4 × 0.8 cm, claw ca. 3 mm. Stamens unequal; filaments 0.8–1.4 cm; anthers oblong. Ovary hispid; style filiform, incurved at tip, with curved hispid oblique stigma; ovules 1–4. Legumes elliptic, 1.2–1.5 cm, slightly compressed to nearly globose, acute at both ends, apex beaked, stipe 1.5–1.9 mm; valves woody, appressed short brown pubescent, internally septate. Seeds 1–4, scarlet, suborbicular, slightly compressed, ca. 1 cm, glossy; hilum ca. 3 mm. Fl. May, fr. Oct.

• Evergreen broad-leaved forests; 300–1000 m. C Taiwan.

**36. *Ormosia hengchuniana*** T. C. Huang, S. F. Huang & K. C. Yang, *Taiwania* 35: 2. 1990.

恒春红豆树 heng chun hong dou shu

Trees evergreen, to 8 m. Branchlets golden yellow pubescent. Leaves imparipinnate, 7–9(–10) cm; petiole 3.8–4.5 cm; rachis 3–6.5 cm, prolonged 0.2–0.4 cm below terminal leaflet; leaflets (5–)7(–9); petiolule 5–7 mm; blades oblong-lanceolate or oblong, 1.5–12 × 0.8–5 cm, thinly leathery, golden yellow pubescent abaxially, becoming glabrate, green and smooth adaxially, base cuneate to rounded, rarely slightly cordate, margin entire, often slightly sinuous, apex acute to obtuse, slightly retuse; midvein raised abaxially, impressed adaxially, lateral veins 7–12 pairs, angled 40° with midvein. Racemes terminal, rarely axillary, 8–10 cm, golden yellow pilose; pedicel 5–7 mm, golden yellow pilose. Flowers ca. 1 × 1.2 cm. Calyx campanulate, sparsely rusty brown pilose; teeth broadly triangular, ca. 1 mm; tube ca. 2 mm. Corolla reddish purple; standard oblong-obovate, obcordate, 0.9–1 cm, apex deeply emarginate, claw 1–2 mm; wings narrowly obovate, inequilateral, midvein along one margin, ca. 1.2 × 0.7 cm, claw ca. 6 mm; keel narrowly

obovate, inequilateral, midvein along one margin, ca.  $1.2 \times 0.6$  cm, claw ca. 5 mm. Stamens unequal; filaments 0.7–1.2 cm; anthers oblong. Ovary glabrous; ovules 1–4; style thickened, incurved at tip; stigma oblique. Legumes oblong, 2–2.5 cm, slightly compressed, acute at both ends, apex beaked, stipe 3–5 mm; valves woody, glabrous, internally septate. Seeds 1–3, pale red, globose-angular, ca. 1 cm, slightly glossy; hilum 3–4 mm. Fl. May, fr. Oct.

• Forest margins, stream banks; 200–500 m. S Taiwan (Hengchun Peninsula).

**37. *Ormosia nuda*** (F. C. How) R. H. Chang & Q. W. Yao, *Acta Phytotax. Sin.* 22: 117. 1984.

秃叶红豆 tu ye hong dou

*Ormosia henryi* Prain var. *nuda* F. C. How, *Acta Phytotax. Sin.* 1: 232. 1951; *Fedorovia henryi* (Prain) Yakovlev var. *nuda* (F. C. How) Yakovlev; *O. yaanensis* N. Chao.

Trees evergreen, 7–27 m, to 50 cm d.b.h. Bark of stems

gray or grayish brown. Branches brownish green, appressed short pubescent when young, becoming glabrous; buds superposed. Leaves imparipinnate, 11.5–25 cm; petiole 2–4.5 cm; rachis 2.7–7.8 cm, prolonged 1.4–2.5 cm below terminal leaflet; petiole and rachis sparsely tomentose or glabrescent; leaflets 5–7; petiolule ca. 5 mm, rounded, sparsely pubescent; blades elliptic,  $5-9.5 \times 2-3.5$  cm, leathery, slightly yellow tomentose or glabrous abaxially, green and glabrous adaxially, base cuneate or rounded, apex acuminate or caudate; midvein slightly raised abaxially, slightly impressed adaxially, lateral veins 7 or 8 pairs, inconspicuous. Flowers not seen. Infructescence with short pubescence. Legumes oblong or elliptic,  $4.3-6.6 \times 2.6-3$  cm; valves black, thickly woody, 3–7 mm thick, appressed short yellowish brown bristly, densely pubescent at apex and base, internally septate. Seeds 1–5, dark red, elliptic,  $8-10 \times 5-7 \times$  ca. 6 mm; hilum 2–2.5 mm. Fl. Jul–Aug, fr. Oct.

• Valleys, mixed forests; 800–2000 m. N Guangdong, S Guizhou, Hubei (Liquan), Yunnan (Jingdong).

## 41. AMMODENDRON Fischer ex Candolle, Prodr. 2: 523. 1825.

银砂槐属 yin sha huai shu

Bao Bojian (包伯坚); Michael A. Vincent

Shrubs, silvery-white pubescent. Leaves paripinnate, spinescent at apex of rachis; stipules small; leaflets 1 or 2 pairs. Racemes terminal; bracts small, caducous or absent; bracteoles absent. Calyx tube short, campanulate; teeth subequal, upper 2 slightly joined. Standard circular, reflexed; wings obliquely oblong; keels incurved, 2 lobes free. Stamens 10, free; anthers versatile. Ovary sessile, few ovuled; style incurved, subulate; stigma terminal, small. Legume oblong or lanceolate, flat, narrowly winged along both sutures, indehiscent. Seeds 1 or 2, oblong or subcylindric.

About six species: N Asia; one species in China.

**1. *Ammodendron bifolium*** (Pallas) Yakovlev, *Bot. Zhurn. (Moscow & Leningrad)* 57: 592. 1972.

银砂槐 yin sha huai

*Sophora bifolia* Pallas, *Sp. Astragal.* 124. 1803; *Ammodendron argenteum* Kuntze; *A. sieversii* Candolle, nom. illeg. superfl.; *Podalyria argentea* Willdenow; *Robinia argentea* Sievers; *S. argentea* Pallas (1797), not Salisbury (1796).

Shrubs, 30–150 cm tall. Branches and leaves gray-white pubescent. Leaves paripinnate, 2-foliolate, terminal one becoming spinose; stipules spinose, persistent, 1–2 mm; petiole equal to leaflets in length; leaflets opposite, without stipel, obo-

vate-oblong or obovate-lanceolate,  $10-15 \times 4-10$  mm, gray-white sericeous on both surfaces, narrowing to cuneate at base, obtuse and rigidly mucronate at apex. Racemes terminal, 3–5 cm. Pedicel 4–8(–10) mm. Calyx shortly cup-shaped, triangular 5-toothed. Corolla dark purple, 5–7 mm; standard orbicular, shorter; wings oblong-obovate; keels obtuse at apex. Stamens 10, free and persistent. Ovary pubescent. Legumes flat, oblong-lanceolate,  $18-20 \times 5-6$  mm, glabrous or pilose on stalk, 2-winged along suture, indehiscent, with 1 or 2 seeds. Fl. May–Jun, fr. Jun–Aug.

Dry stony regions. Xinjiang [Russia].

## 42. SOPHORA Linnaeus, Sp. Pl. 1: 373. 1753.

槐属 huai shu

Bao Bojian (包伯坚); Michael A. Vincent

*Ammothamnus* Bunge; *Cephalostigmaton* Yakovlev; *Edwardsia* Salisbury; *Goebelia* Bunge ex Boissier; *Keyserlingia* Bunge ex Boissier; *Styphnolobium* Schott; *Vexibia* Rafinesque.

Deciduous or evergreen trees, shrubs, subshrubs, or perennial herbs, rarely twining. Leaves imparipinnate; stipules present or absent; leaflets many, entire, rarely with stipels. Racemes terminal or axillary. Flowers white, yellow, or purple; bracts small and linear or absent. Calyx campanulate or cup-shaped, 5-lobed, equal, upper 2 lobes nearly bilabiate. Standard orbicular, oblong, elliptic, obovate, or oblanceolate; wings asymmetric or symmetric; keel similar to wings. Stamens 10, free or fused at base; anthers versatile. Ovary stalk short or absent; ovules several to many; stigma small, terminal, globose. Legumes cylindrical, moniliform, fleshy or leathery, sometimes winged, indehiscent or tardily dehiscent. Seeds 1 to many, ovate, elliptic, or subspheroidal, black, dark brown, or light red.

About 70 species: widespread in tropical and temperate zones; 21 species (nine endemic, one introduced) in China.

- 1a. Trees, rarely shrubs; petiole base inflated, covering caducous bud stipules; stipels present; inflorescence paniculate.
- 2a. Ovary almost equal to stamens in length; legume linear, slightly constricted between seeds; seeds closely spaced ..... 21. *S. brachygyna*
- 2b. Ovary obviously shorter than stamens in length; legume thick, obviously constricted between seeds; seeds more distantly spaced ..... 20. *S. japonica*
- 1b. Small trees, shrubs, subshrubs, or herbs; petioles not inflated at base, buds exposed; stipules present or absent; stipels absent; inflorescence racemose.
- 3a. Herbs or subshrubs; flowers white to creamy white; raceme terminal.
- 4a. Legume indehiscent, seeds 2 per loment section; leaflets small, (3.5–)15–20(–27) × (2–)3–7 mm ..... 19. *S. pachycarpa*
- 4b. Legume tardily dehiscent, seed 1 per loment section; leaflets large, 1.5–6 × 1–2 cm.
- 5a. Branches and leaflets densely hairy; flowers in dense racemes; keel mucronate at apex ..... 10. *S. alopecuroides*
- 5b. Branches and leaflets glabrous or pilose when young; flowers in lax racemes; keel obtuse at apex ..... 11. *S. flavescens*
- 3b. Small trees, shrubs, or climbing shrubs; flowers white-yellow or purple, or, if herbs, flowers yellow; inflorescence terminal, opposite or alternate with leaves.
- 6a. Plants spiny; stipules spinescent.
- 7a. Stems villous; flower ca. 2 cm, blue-purple ..... 8. *S. moorcroftiana*
- 7b. Stems glabrous; flower ca. 1.5 cm, white or creamy white, rarely blue-purple ..... 9. *S. davidii*
- 6b. Plants without spines; stipules not spinescent.
- 8a. Legume winged; plants flowering before leaves expand; some terminal leaflets changed to tendrils ..... 12. *S. mollis*
- 8b. Legume wingless; plants flowering after leaves expand; terminal leaflets normal.
- 9a. Stipules absent or very small.
- 10a. Legume slightly curved; leaflets obviously smaller toward base; stipules very small; standard shorter than other petals ..... 7. *S. tonkinensis*
- 10b. Legume straight; leaflets not obviously smaller toward base; stipules absent; standard equal to other petals.
- 11a. Shrubs or small trees, 2–4 m tall; leaflets large, 2.5–5 × 2–3.5 cm; flowers large, ca. 15 mm, yellow or creamy white ..... 13. *S. tomentosa*
- 11b. Subshrubs, 0.2–1 m tall; leaflets small, 1–2.5 × 0.7–1.5 cm; flowers small, ca. 10 mm, purple ..... 18. *S. praetorulosa*
- 9b. Stipules subulate, 4–10 mm.
- 12a. Legume dehiscent into 4 limbs; calyx compressed campanulate or cup-shaped, teeth small or not obvious.
- 13a. Leaflet veins not obvious adaxially; seed 1 per legume, gray-brown.
- 14a. Inflorescence terminal; leaflets oblong or ovate-oblong, reflexed at margin; corolla ca. 10 mm ..... 14. *S. franchetiana*
- 14b. Inflorescence alternate or opposite a leaf; leaflets ovate or ovate-elliptic, not reflexed at margin; corolla ca. 15 mm ..... 15. *S. wilsonii*
- 13b. Leaflet veins obvious adaxially; seeds 2–4 per legume, red.
- 15a. Leaflets papery to nearly leathery, ovate-elliptic, ovate, or long elliptic, acute or shortly acuminate at apex ..... 16. *S. prazeri*
- 15b. Leaflets papery, ovate-oblong or ovate-lanceolate, long acuminate or caudate-acuminate at apex ..... 17. *S. benthamii*
- 12b. Legume dehiscent into 2 limbs; calyx campanulate, teeth obvious, unequal.
- 16a. Leaflets small, less than 20 mm, ovate or elliptic-ovate, densely long hairy on both surfaces ..... 4. *S. yunnanensis*
- 16b. Leaflets large, (15–)20–40(–50) mm, usually ovate-lanceolate, or other shapes except ovate and elliptic-ovate, pilose adaxially or glabrous.
- 17a. Inflorescence terminal, rarely opposite a leaf; flowers dense, yellow; seeds green ..... 6. *S. xanthoantha*
- 17b. Inflorescence opposite a leaf, pseudo-terminal or axillary; flowers sparse, white or purple-red; seeds yellow, yellow-brown, or red-brown.
- 18a. Flowers white; seeds long ovoid, 7–8 mm ..... 5. *S. albescens*
- 18b. Flowers purple-red; seeds oblong or long ovate, 5–9 mm.
- 19a. Fine veins on leaflets impressed adaxially; seeds long ovate, 5–6 mm ... 2. *S. dunnii*
- 19b. Fine veins on leaflets not impressed adaxially; seeds oblong, elliptic, or long ovate, 6–9 mm.

- 20a. Legume slender; seeds long ovate or elliptic, ends rounded,  
6–7 mm ..... 3. *S. microcarpa*  
20b. Legume thick, slightly compressed; seeds oblong-reniform,  
ends acute to rounded, 7–9 mm, yellow or yellow-brown ..... 1. *S. velutina*

**1. *Sophora velutina*** Lindley, Bot. Mag. 14: t. 1185. 1828.

短绒槐 *duan rong huai*

Shrubs, ca. 2 m high. Young branches, rachis, young branches of flower, and leaf densely velutinous. Leaves 15–20 cm; stipules linear, 6–7 mm, villous; leaflets 13–41, opposite or nearly opposite, ovate-lanceolate, elliptic, elliptic-lanceolate, oblong, or ovate-oblong, 1–4 × 0.5–2 cm, papery, hairy on both surfaces, glabrous, or glabrous adaxially, midvein raised, base rounded or obtuse, apex acuminate or acute with mucro. Racemes opposite with leaf or pseudo-opposite, 15–20(–30) cm. Flowers many, widely spaced; bracts similar to stipule, 6–8 mm, hairy; pedicel short, 2–3 mm. Calyx campanulate, ca. 13 mm; teeth 5, unequal, dark brown hairy. Standard reflexed, obovate-lanceolate or obovate-oblong, ca. 16 × 3–5 mm, apex retuse, narrowing to base; wings oblong, less than 15 mm, base auriculate; keel falcate, slightly shorter than wings. Stamens 10, free or slightly fused at base. Ovary terete, densely yellow pubescent, stalked; ovules 4–6; style straight, glabrous; stigma capitate, very small. Legumes moniliform, slightly compressed, 6–10 × 0.7–1 cm, hairy or nearly glabrous. Seeds 2–4, yellow or yellow-brown, oblong-reniform, ends acute to rounded. Fl. and fr. Apr–Aug.

Forests, mountain forests, valleys, riverbanks, rocky places; 500–2500 m. Guangxi, Guizhou, Sichuan, Yunnan [Bangladesh, Bhutan, India, Myanmar].

- 1a. Leaflets hairy on both surfaces; legumes densely hairy ..... 1a. var. *velutina*  
1b. Leaflets glabrous or nearly glabrous adaxially; legumes sparsely hairy or nearly glabrous.  
2a. Inflorescence terminal; leaflets (19–)25–35(–41), small, 10–15 × 5–6 mm ..... 1b. var. *multifoliolata*  
2b. Inflorescence opposite with leaf; leaflets fewer than 21, large, 2–4 × 1.5–2 cm.  
3a. Midvein of leaflets raised; fruit neck long, 2–4 cm ..... 1c. var. *dolichopoda*  
3b. Midvein of leaflets impressed; fruit neck short, less than 1.5 cm.  
4a. Erect shrubs; legumes nearly glabrous ..... 1d. var. *cavaleriei*  
4b. Climbing shrubs or woody vines; legumes pilose ..... 1e. var. *scandens*

**1a. *Sophora velutina* var. *velutina***

短绒槐(原变种) *duan rong huai* (*yuan bian zhong*)

*Sophora glauca* Leschenault ex Candolle.

Shrubs, ca. 2 m high. Leaflets hairy on both surfaces. Legumes densely hairy.

Valleys, riverbanks; 1000–2500 m. Guizhou, Sichuan, Yunnan [Bangladesh, India, Myanmar].

**1b. *Sophora velutina* var. *multifoliolata*** C. Y. Ma, Acta Phytotax. Sin. 20: 466. 1982.

多叶槐 *duo ye huai*

Leaflets (19–)25–35(–41), elliptic or lanceolate-elliptic, 1–1.5(–2.5) cm × 5–6 mm, glabrous adaxially or pilose near midvein. Inflorescence terminal. Fruit neck 2–4 cm or more.

- Mountain forests; 1100–1600 m. Yunnan (Menghai).

**1c. *Sophora velutina* var. *dolichopoda*** C. Y. Ma, Acta Phytotax. Sin. 20: 465. 1982.

长颈槐 *chang jing huai*

Leaflets fewer than 21, 2–4 × 1.5–2 cm, glabrous adaxially. Inflorescence opposite with leaf. Fruit neck long, 2–4 cm.

- Forests, valleys; 500–2000 m. Guizhou, Yunnan.

**1d. *Sophora velutina* var. *cavaleriei*** (H. Léveillé) Brummitt & J. B. Gillett, Kirkia 5: 621. 1966.

光叶短绒槐 *guang ye duan rong huai*

*Sophora cavaleriei* H. Léveillé, Fl. Kouy-Tchéou, 242. 1914–1915; *S. velutina* subsp. *cavaleriei* (H. Léveillé) Yakovlev.

Leaflets glabrous. Legumes almost glabrous.

- Forests, valleys; 1000–2000 m. Guangxi, Guizhou, Yunnan.

**1e. *Sophora velutina* var. *scandens*** C. Y. Ma, Acta Phytotax. Sin. 20: 465. 1982.

攀援槐 *pan yuan huai*

Woody vines or climbing shrubs. Leaflets 13–17, rarely 21, retuse at midvein. Legumes pilose.

- Valleys, rocky places; 1500–2000 m. Sichuan, Yunnan.

**2. *Sophora dunnii*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 466. 1897.

柳叶槐 *liu ye huai*

*Sophora dispar* Craib.

Shrubs, ca. 2 m high. Branchlets dark yellow hairy. Leaves to 20 cm; stipules linear, ca. 10 mm, hairy; petiole hairy; leaflets 15–23, opposite, ovate-lanceolate or elliptic-lanceolate, 25–35(–50) × 10–15 mm, papery, veins obvious abaxially, base rounded or obtuse, apex mucronate. Racemes ca. 20 cm, opposite a leaf or appearing opposite. Flowers many; pedicel short, ca. 5 mm, hairy; bract similar to stipule, longer than pedicel. Calyx campanulate; teeth 5, orbicular or triangular, unequal, upper 2 nearly fused to bilabiate, brown hairy. Corolla purple-red; standard obovate-oblong or obovate-elliptic, ca. 15 mm, retuse at apex, 2-auriculate at middle, narrowing to a claw at base;

wings slightly shorter than standard, falcate, unequally auriculate at base; keels ca. 13 mm, long ovate. Stamens 10, slightly fused at base. Ovary densely yellow-brown hairy; ovules 4–6. Legumes moniliform, 10–15 cm, darkly brown pilose, dehiscent along sutures. Seeds 2 or 3, long ovate, yellow-brown or brown. Fl. Mar–Jun, fr. May–Aug.

Valleys and forests on slopes; 1000–2000 m. Guizhou, Sichuan, Yunnan [Myanmar, Thailand].

**3. *Sophora microcarpa*** C. Y. Ma, Acta Phytotax. Sin. 20: 466. 1982.

细果槐 xi guo huai

Shrubs, 1–2 m high, few branched. Branches gray-white pubescent. Leaves 15–20 cm; stipules linear, ca. 10 mm; petiole gray-brown pubescent; leaflets 19–25, subopposite or nearly opposite, ovate-lanceolate or long elliptic, 30–35 × ca. 10 mm, papery, pubescent on both surfaces, base rounded, slightly oblique, apex acuminate, mucronate; petiolule less than 1 mm, hairy. Racemes terminal; rachis sulcate, gray-white pubescent. Flowers many, dense; pedicel 4–5 mm; bract linear, equal to pedicel in length, hairy. Calyx campanulate, ca. 6 mm; teeth 5, unequal. Corolla purple-red; standard oblong, ca. 6 × 4 mm, 2-auriculate at middle; wings hastate, slightly rugose; keel slightly shorter than standard, falcate, apex rounded, 1-auriculate at base. Stamens 10, 1 free and other 9 fused at base. Ovary terete, hairy; ovules many; stigma capitate, very small. Legumes moniliform, slender, 6–10 cm, gray-white pubescent, dehiscent along sutures. Seeds 3–6, brown-red, long ovate or elliptic. Fl. and fr. Feb–Aug.

• Mountain forests; 1000–1700 m. Guizhou, Yunnan.

**4. *Sophora yunnanensis*** C. Y. Ma, Acta Phytotax. Sin. 20: 467. 1982.

云南槐 yun nan huai

Shrubs or small trees. Stem gray-white pubescent when young; branches densely hairy. Leaves 10–15 cm; stipules subulate, ca. 3.5 mm, tomentose; leaflets 13–21, opposite, ovate or elliptic-ovate, 15–20 × 8–10 mm, papery, densely hairy on both surfaces, veinlets obscure, apex rounded; petiolule short, ca. 1 mm, hairy. Racemes opposite a leaf or appearing terminal. Flowers dense; bracts subulate, ca. 6 mm, hairy. Calyx campanulate, ca. 10 mm; teeth 5, subequal, triangular, hairy. Corolla white; standard oblong, retuse, obcordate, narrowing to a claw, 2-auriculate at middle; wings hastate; keel ovate-oblong, claw slender, equal to petal. Stamens 10, 1 free, others somewhat fused at base. Ovary gray-brown hairy, stalk short; ovules 4–6; style slender, ca. 2.5 mm, glabrous; stigma small, capitate, slightly hairy. Fl. Mar.

• Mountain scrub. Yunnan.

**5. *Sophora albescens*** (Rehder) C. Y. Ma, Acta Phytotax. Sin. 20: 468. 1982.

白花槐 bai hua huai

*Sophora glauca* Leschenault ex Candolle var. *albescens* Rehder in Sargent, Pl. Wilson. 3: 447. 1917; *S. velutina* Lindley var. *albescens* (Rehder) P. C. Tsoong.

Shrubs, 1–2 m. Branchlets gray-white pubescent. Leaves 15–20(–25) cm; stipules linear, 3–4 mm, caducous; leaflets 17–25, ovate-lanceolate or ovate-oblong, 2–3(–4) × 1–1.5 cm, papery, pubescent abaxially, glabrous adaxially, base rounded or obtuse, apex cuspidate. Racemes opposite a leaf or appearing terminal; bracts linear, 6–8 mm, hairy. Calyx campanulate, ca. 10 mm; teeth 5, short, hairy. Corolla white; standard reflexed, obovate-lanceolate, ca. 16 × 3–5 mm, 2-auriculate at middle, apex retuse; wings oblong or broadly linear, 13–14 mm, unequally 2-auriculate at base, claw slender, ca. 6 mm; keel obovate or falcate. Stamens 10, slightly fused and sparsely pubescent at base. Ovary gray-brown hairy, stalk short; style straight, glabrous. Legumes moniliform, 6–15 cm, constricted between seeds, beaked, gray-white pubescent or subglabrous. Seeds 2–4(–6), yellow-brown or red-brown, long ovoid. Fl. and fr. Mar–Aug.

• Shady damp places in valleys; 1100–2500 m. Sichuan, Yunnan.

The name “*Sophora albescens* J. St.-Hil. (1806) Duham. Arb. 3: 86,” as cited in Zhu et al. (Legumes China, 580. 2007), does not exist and is an error picked up from various indices.

**6. *Sophora xanthoantha*** C. Y. Ma, Acta Phytotax. Sin. 20: 468. 1982.

黄花槐 huang hua huai

Herbs or subshrubs, less than 1 m. Stem and branches densely golden velutinous. Leaves 15–20 cm; stipules caducous; leaflets 17–25, opposite, oblong or long elliptic, 2.5–3.5 × 1–1.5 cm, papery, densely golden velutinous abaxially, especially on midrib and petiole, sparsely gray-white hairy adaxially, both ends obtuse; veinlets evident abaxially. Racemes terminal, 6–8 cm. Flowers dense; bracts subulate, equal to calyx. Calyx campanulate, ca. 7 mm; teeth 5, triangular, unequal, pilose. Corolla yellow; standard oblong or nearly oblong, ca. 11 mm, apex retuse, 2-auriculate at middle, narrowing to claw, ca. 3 mm; wings equal to standard, hastate, apex beaked; keel slightly shorter than wings, 1-auriculate. Stamens 10, slightly fused and sparsely very shortly hairy at base. Ovary densely brown hairy on both sides; ovules many; style straight, glabrous; stigma very small, capitate, sometimes shortly hairy. Legumes moniliform, 8–13 × 0.8–1 cm, villous, beak 1–2 cm, base with neck 1.5–4 cm, 2-dehiscent. Seeds 2–4, green, long elliptic, 9–10 × 4–5 mm, rounded at one end, acute at other end.

• Hill meadows; 500–1800 m. Yunnan.

**7. *Sophora tonkinensis*** Gagnepain, Notul. Syst. (Paris) 3: 18. 1914.

越南槐 yue nan huai

Shrubs to 1.3 m. Stems slender; branches green, glabrous, much branched; branchlets gray hairy. Leaves 10–15 cm; stipules very small or nearly absent; petiole 1–2 cm, inflated at base; leaflets 11–33(–39), opposite or nearly alternate; petiolule 1–2 mm, slightly inflated; blades oblong, elliptic, ovate-oblong, or lanceolate, 15–25 × 10–15 mm, leathery, terminal one largest, 30–40 × ca. 20 mm, gray-brown hairy abaxially, glabrous or sparsely pubescent adaxially, midrib obvious abaxially, base rounded or slightly cordate, apex cuspidate. Inflorescence a ra-

cence or branched into a panicle from base, terminal, 10–30 cm; rachis and peduncle hairy; bracts small, subulate, hairy. Flowers 10–12 mm; pedicel ca. 5 mm. Calyx cup-shaped, ca. 2 × 3–4 mm; teeth small, gray-brown hairy. Corolla yellow or dark purple; standard orbicular, ca. 6 × 5 mm, shortly stipitate; wings slightly longer than standard, oblong or ovate-oblong, 1-auriculate at base; keel longer, obovate, ca. 9 × 4 mm, 1-auriculate at base. Stamens 10, slightly fused at base. Ovary hairy; ovules 4; style straight, glabrous; stigma hairy. Legumes moniliform, 3–5 cm, sparsely pubescent, dehiscent along both sutures. Seeds 1–3, ovoid, black. Fl. May–Jul, fr. Aug–Dec.

Forests on sunny slopes, scrub on stony mountains, calcareous or sandstone hill slopes; 1000–2000 m. Guangxi, Guizhou, Yunnan [Vietnam].

- 1a. Leaflets (25–)27–33(–39), lanceolate ... 7c. var. *polyphylla*  
 1b. Leaflets 11–19, elliptic, oblong, or ovate-oblong.  
 2a. Corolla yellow ..... 7a. var. *tonkinensis*  
 2b. Corolla dark purple ..... 7b. var. *purpurascens*

### 7a. *Sophora tonkinensis* var. *tonkinensis*

越南槐(原变种) yue nan huai (yuan bian zhong)

*Cephalostigmaton tonkinense* (Gagnepain) Yakovlev; *Sophora subprostrata* Chun & T. C. Chen.

Leaflets 11–19, elliptic, oblong, or ovate-oblong. Corolla yellow.

Scrub on stony mountains; 1000–2000 m. Guangxi, Guizhou, Yunnan [Vietnam].

**7b. *Sophora tonkinensis* var. *purpurascens*** C. Y. Ma, Acta Phytotax. Sin. 20: 469. 1982.

紫花越南槐 zi hua yue nan huai

Leaflets 11–19, elliptic, oblong, or ovate-oblong. Corolla dark purple.

- Forests on sunny slopes; 1100–1200 m. Guizhou.

**7c. *Sophora tonkinensis* var. *polyphylla*** S. Z. Huang & Z. C. Zhou, Acta Phytotax. Sin. 22: 487. 1984.

多叶越南槐 duo ye yue nan huai

Leaflets (25–)27–33(–39), lanceolate, pubescent abaxially.

- Calcareous or sandstone hill slopes. Guangxi.

**8. *Sophora moorcroftiana*** (Benth) Benth ex Baker in J. D. Hooker, Fl. Brit. India 2: 249. 1876.

砂生槐 sha sheng huai

*Caragana moorcroftiana* Benth in Royle, III. Bot. Himal. Mts. 198. 1835.

Shrubs, ca. 1 m high, densely branched. Branchlets densely hairy. Leaves 4–6 cm; stipules subulate, 4–7 mm, spinescent, persistent; leaflets 11–15, obovate, ca. 10 × 6 mm, hairy on both surfaces, base cuneate or rounded, apex obtuse or retuse, usually mucronate. Racemes terminal at branchlets, 3–5 cm. Flowers large. Calyx blue, shortly campanulate; teeth 5, ca.

7 × 3–5 mm, glabrous. Corolla blue-purple; standard ovate-oblong, ca. 9 × 5 mm, reflexed, apex retuse, narrowing to a claw, claw equal to blade; wings obovate-elliptic, ca. 16 mm, 1-auriculate at base, claw ca. 6 mm; keel ovate-falcate, auriculate on one side, claw slender, ca. 18 mm. Stamens 10, unequal, slightly fused at base. Ovary shorter than stamens, yellow-brown hairy; ovules many. Legumes not obviously moniliform, slightly compressed, ca. 6 × 0.7 cm, 2-valvate along sutures. Seeds 1–4(or 5), light yellow, ellipsoidal, ca. 4.5 mm. Fl. May–Jul, fr. Jul–Oct.

Valley forests; 3000–4500 m. Xizang [Bhutan, India, Myanmar].

**9. *Sophora davidii*** (Franchet) Skeels, U.S.D.A. Bur. Pl. Industr. Bull. 282: 68. 1913.

白刺槐 bai ci huai

Shrubs or small trees, 1–2 m high, rarely 3–4 m. Branches glabrous; sterile branches spiny at tip, some spines branched. Leaves 2–6.5(–8) cm; stipules subulate, some becoming spiny, sparsely pubescent, persistent; leaflets 11–19, usually elliptic-ovate or obovate-oblong, 5–20 mm, sparsely villous abaxially, glabrous adaxially, apex rounded or retuse, usually with mucro. Racemes terminal at branchlets. Flowers small, ca. 15 mm or less. Calyx campanulate, blue-purple, unequally 5-toothed, glabrous. Corolla white or light yellow, some red-purple on standard, rarely blue-purple; standard obovate-oblong, ca. 14 × 6 mm, rounded at apex, with slender claw at base, reflexed; wings equal to standard, obovate-oblong, ca. 3 mm wide, auriculate on one side; keel slightly shorter than wings, falcate-obovate, auriculate. Stamens 10, equal, slightly fused at base. Ovary longer than stamens, densely yellow-brown hairy, many ovuled; style curved, glabrous. Legumes slightly compressed, 6–8 × 0.6–0.7 cm, 2-valvate along sutures, sparsely hairy. Seeds 3–5, dark brown, ovoid, ca. 4 mm. Fl. Mar–Aug, fr. Jun–Oct.

- Valley scrub, hill slopes, sandy places in valleys; below 3400 m. Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang.

- 1a. Leaflets large, 15–20 mm, oblong, lateral veins obvious; legume long constricted between seeds ..... 9c. var. *liangshanensis*  
 1b. Leaflets small, 5–15 mm, elliptic-ovate to broadly ovate, lateral veins not obvious; legume shortly or not obviously constricted between seeds.  
 2a. Corolla white or light yellow; leaflets 10–15 mm, elliptic-ovate or obovate-oblong ..... 9a. var. *davidii*  
 2b. Corolla blue-purple; leaflets very small, 5–6 mm, usually broadly ovate ..... 9b. var. *chuansiensis*

### 9a. *Sophora davidii* var. *davidii*

白刺槐(原变种) bai ci huai (yuan bian zhong)

*Sophora moorcroftiana* (Benth) Baker var. *davidii* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 5: 253; Pl. David. 1: 101. 1883; *Caragana chamlago* B. Meyer (1909), not C.

*chamlagu* Lamarck (1785); *S. moorcroftiana* subsp. *viciifolia* Yakovlev; *S. viciifolia* Hance (1881), not Salisbury (1796).

Leaflets 11–19, elliptic-ovate or obovate-oblong, 10–15 mm, lateral veins not obvious. Corolla white or creamy white. Legumes slightly compressed, not obviously constricted between seeds. Seeds 3–5.

• Valley scrub, hill slopes; below 2500 m. Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Sichuan, Yunnan, Zhejiang.

**9b. *Sophora davidii* var. *chuansiensis*** (C. Y. Ma) C. Y. Ma ex B. J. Bao & Vincent, **comb. nov.**

川西白刺槐 *chuan xi bai ci huai*

Basionym: *Sophora viciifolia* Hance var. *chuansiensis* C. Y. Ma, Acta Phytotax. Sin. 20: 469. 1982.

Leaflets very small, usually obovate, 5–6 × 2–4 mm, lateral veins not obvious. Corolla blue-purple. Legumes shortly constricted between seeds.

• Dry hill slopes, sandy places in valleys; 2500–3400 m. Sichuan, Xizang, Yunnan.

**9c. *Sophora davidii* var. *liangshanensis*** (C. Y. Ma) C. Y. Ma ex B. J. Bao & Vincent, **comb. nov.**

凉山白刺槐 *liang shan bai ci huai*

Basionym: *Sophora viciifolia* Hance var. *liangshanensis* C. Y. Ma, Acta Phytotax. Sin. 20: 470. 1982.

Leaflets large, oblong, 15–20 mm, lateral veins obvious, gray-white pilose. Legumes moniliform, long constricted between seeds. Seeds 2 or 3, rarely 5.

• 700–800 m. Sichuan.

**10. *Sophora alopecuroides*** Linnaeus, Sp. Pl. 1: 373. 1753.

苦豆子 *ku dou zi*

Herbs or subshrubs, ca. 1 m high, densely branched. Branches white villous or patulous-tomentose. Leaves 15–30 × 4–9 cm; stipules subulate, ca. 5 mm, caducous; petiole 1–2 cm; leaflets 11–27, lanceolate-oblong or elliptic-oblong, 15–40 × 5–14 mm, papery, densely hairy abaxially, pilose adaxially, lateral veins not obvious. Racemes terminal. Flowers many, dense; pedicel 3–5 mm; bracts subulate, caducous. Calyx compressed campanulate; teeth 5, unequally triangular-ovate. Corolla white or creamy white; standard varying in shape, usually oblong-ob lanceolate, 15–20 × 3–4 mm, apex rounded or obcordate, narrowing to claw; wings ca. 16 mm, ovate-oblong, 1-auriculate; keel similar to wings, claw slender, ca. 1/2 as long as blade. Stamens 10, slightly fused at base, shortly hairy where fused. Ovary densely white hairy; stigma very small, pilose. Legumes moniliform, straight, 8–13 cm. Seeds many, brown or light brown, ovoid. Fl. May–Jun, fr. Aug–Oct.

Grasslands, deserts. Gansu, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Xinjiang, Xizang [Afghanistan, India, Pakistan; C and SW Asia].

1a. Branches and leaflets appressed villous ..... 10a. var. *alopecuroides*

1b. Branches and leaflets densely patulous-tomentose ..... 10b. var. *tomentosa*

**10a. *Sophora alopecuroides* var. *alopecuroides***

苦豆子(原变种) *ku dou zi* (*yuan bian zhong*)

*Goebelia alopecuroides* (Linnaeus) Bunge ex Boissier; *Pseudosophora alopecuroides* (Linnaeus) Sweet; *Sophora orientalis* Pallas; *S. pallida* Salisbury; *Vexibia alopecuroides* (Linnaeus) Yakovlev.

Branches white villous. Leaflets appressed villous, densely so abaxially.

Near grasslands, deserts. Gansu, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Xinjiang, Xizang [India; C and SW Asia].

**10b. *Sophora alopecuroides* var. *tomentosa*** (Boissier) Bornmüller, Bot. Centralbl. Beih. 27: 347. 1910.

毛苦豆子 *mao ku dou zi*

*Goebelia alopecuroides* var. *tomentosa* Boissier, Fl. Orient. 2: 629. 1872; *Sophora alopecuroides* subsp. *tomentosa* (Boissier) Yakovlev; *Vexibia alopecuroides* var. *tomentosa* (Boissier) Yakovlev.

Branches and leaflets densely patulous-tomentose.

Xinjiang [Afghanistan, Pakistan; SW Asia (Iran)].

**11. *Sophora flavescens*** Aiton, Hort. Kew. 2: 43. 1789.

苦参 *ku shen*

Herbs or subshrubs, 1–2 m. Stem striped, pilose when young. Leaves 20–25(–30) cm; stipules lanceolate, 6–8 mm, acuminate; leaflets 13–25, elliptic, ovate, or lanceolate, 3–4(–6) × (0.5–)1.2–2 cm, papery, pilose or glabrescent abaxially, glabrous adaxially, base cuneate or slightly cordate, apex obtuse or acute. Racemes terminal, 15–25 cm. Flowers many, widely spaced; pedicel slender, ca. 7 mm; bracts linear, ca. 2.5 mm. Calyx campanulate, oblique; teeth not obvious, sparsely pubescent. Corolla white, pale yellow, purple-red, or red; standard obovate-spatulate, 14–15 × 6–7 mm, apex rounded or retuse, narrowing to a claw; wings rugose, claw equal to blade, ca. 13 mm; keel similar to wings, slightly broader, ca. 4 mm wide. Stamens 10, free or slightly fused at base. Ovary nearly sessile, hairy; ovules many; style slightly curved. Legumes 5–10 cm, slightly constricted between seeds, slightly quadrangular, sparsely or densely pubescent or glabrescent, 4-valvate. Seeds 1–5, red-brown or purple-brown, long ovoid, slightly compressed. Fl. Jun–Aug, fr. Jul–Oct.

Scrub, hill slopes, farm fields; below 1500 m. All provinces [India, Japan, Korea, Russia].

1a. Corolla purple-red or red ..... 11c. var. *galegoides*

1b. Corolla white or pale yellow.

2a. Branchlets and leaflets pilose or glabrescent; legume sparsely hairy ..... 11a. var. *flavescens*

2b. Branchlets and leaflets densely brown villous; legume densely hairy ..... 11b. var. *kronei*

**11a. *Sophora flavescens* var. *flavescens***

苦参(原变种) ku shen (yuan bian zhong)

*Sophora angustifolia* Siebold & Zuccarini; *S. flavescens* f. *angustifolia* (Siebold & Zuccarini) Yakovlev; *S. flavescens* var. *angustifolia* (Siebold & Zuccarini) Kitagawa; *S. flavescens* var. *stenophylla* Hayata.

Branchlets and leaflets pilose or glabrescent. Corolla white or pale yellow. Legume sparsely pubescent or glabrescent.

Scrub, hill slopes, farm fields; below 1500 m. All provinces [India, Japan, Korea, Russia].

**11b. *Sophora flavescens* var. *kroni* (Hance) C. Y. Ma, Acta Phytotax. Sin. 20: 470. 1982.**

毛苦参 mao ku shen

*Sophora kroni* Hance, Ann. Sci. Nat., Bot., sér. 4, 18: 219. 1862.

Branchlets and leaflets densely brown villous. Legume densely hairy.

• Scrub, hill slopes, farm fields; below 1000 m. Gansu, Hebei, Henan, Hubei, Jiangsu, Shaanxi, Shandong, Shanxi.

**11c. *Sophora flavescens* var. *galeoides* (Pallas) Candolle, Prodr. 2: 96. 1825.**

红花苦参 hong hua ku shen

*Sophora galeoides* Pallas, Sp. Astragal. 118. 1803.

Corolla purple-red or red.

• Anhui, Guizhou, Zhejiang.

This taxon is similar to *Sophora flavescens* var. *flavescens* but is distinguished by its purple-red corolla.

**12. *Sophora mollis* (Royle) Baker in J. D. Hooker, Fl. Brit. India 2: 251. 1876.**

翅果槐 chi guo huai

*Edwardsia mollis* Royle, Ill. Bot. Himal. Mts. 196. 1835; *E. hortensis* Boissier & Buhse; *Keyserlingia buxbaumii* Bunge ex Boissier; *K. hortensis* (Boissier & Buhse) Yakovlev.

Shrubs, ca. 1 m high. Branchlets gray-white hairy. Leaves 12–25 cm; petiole base slightly inflated; leaflets (11–)19–35, ovate, elliptic, oblong, or lanceolate, (10–)15–22(–27) × 5–9(–15) mm, leathery, sparsely hairy or glabrescent, base cuneate to rounded, apex rounded or retuse. Racemes 5–10 cm. Flowers 20–26 mm; pedicel 5–20 mm; bracts linear-lanceolate to ovate, 2–3(–3.5) mm. Calyx sparsely hairy; teeth short to absent. Standard rounded, claw equal to 1/2 of petal; wings oblong, rugose in upper part; keel similar to wings, 1-auriculate. Stamens 10, free. Legumes winged, obviously constricted, quadrangular. Seeds 1–7, red-brown, oblong, ca. 8 mm.

Yunnan [Afghanistan, India, Kashmir, Nepal, Pakistan; SW Asia (Iran)].

**13. *Sophora tomentosa* Linnaeus, Sp. Pl. 1: 373. 1753.**

绒毛槐 rong mao huai

Shrubs or small trees, 2–4 m high. Branches shortly tomentose. Leaves 12–18 cm; stipules absent; leaflets 11–15(–19),

oval or rounded, rarely ovate, 2.5–5 × 2–3.5 cm, nearly leathery, densely gray-white tomentose abaxially, glabrous adaxially, lateral veins obscure, base rounded, apex rounded or retuse. Racemes terminal, 10–20 cm, gray-white tomentose. Flowers dense; pedicel equal to calyx, 15–17 mm; bracts linear. Calyx campanulate, 5–6 mm, shortly tomentose. Corolla yellow or creamy white; standard broadly ovate, ca. 17 × 10 mm, claw ca. 3 mm; wings long elliptic, 1-auriculate, claw slender, ca. 5 mm; keel similar to wings, slightly shorter. Stamens 10, free. Ovary densely pubescent; style short, less than 2 mm. Legumes moniliform, 7–10 × 0.9–1 cm, shortly hairy. Seeds many, brown, globose, lustrous. Fl. Aug–Oct, fr. Sep–Dec.

Sand dunes, seashores. Guangdong, Hainan, Taiwan [seashores throughout the tropics].

**14. *Sophora franchetiana* Dunn, J. Linn. Soc., Bot. 38: 358. 1908.**

闽槐 min huai

Shrubs or small trees, 1–3 m. Branchlets densely brown tomentose. Leaves 10–15 cm; stipules subulate, ca. 4 mm; petiole 1–2 cm; leaflets 11–15, elliptic-oblong or ovate-oblong, 3–4 × 1.5–2 cm, papery, tomentose abaxially, glabrous and light green adaxially, lateral veins obscure, base rounded or narrowed, apex acute or acuminate. Racemes terminal, ca. 6 cm, densely tomentose; rachis ca. 2 cm. Flowers 12–15 mm. Calyx 2–3 × 4–5 mm, densely tomentose; teeth 5, equal, triangular. Corolla white; standard obovate-oblong or orbicular, ca. 10 × 6 mm, base abruptly clawed, apex retuse; wings oblong, petal ca. 7 × 3.5 mm, auricle nearly absent, claw slender; keel nearly falcate, obtuse at apex, petal ca. 6 × 4 mm, claw ca. 3 mm. Stamens 10, free or slightly fused at base. Ovary sparsely brown hairy; ovules 4. Legumes terete, 4–6 cm, brown hairy, slenderly beaked, constricted between seeds if more than 1. Seeds 1, rarely 2 or 3, yellow, ovoid, ca. 8 mm, lustrous. Fl. and fr. Apr–Sep.

Valley scrub; below 1000 m. Fujian, Guangdong, Hunan, Zhejiang [Japan].

**15. *Sophora wilsonii* Craib in Sargent, Pl. Wilson. 2: 94. 1914.**

瓦山槐 wa shan huai

Shrubs, 1–2 m high. Branches sparsely golden pubescent; branchlets densely hairy. Leaves 10–12 cm; stipules subulate, ca. 4.5 mm, persistent; leaflets 9–15; petiolule ca. 1 mm; blades elliptic, 15–25 × 7–12 mm, papery, densely brown hairy abaxially, glabrous adaxially, lateral veins obscure, base cuneate, apex obtuse, mucronate. Racemes alternate with leaves. Bracts subulate, 2–3 mm, caducous. Calyx campanulate, obviously oblique, 6–7 mm; teeth 5. Corolla white or pale yellow; standard linear-obovate, ca. 15 × 5 mm, apex retuse; wings oblong, equal to standard in length, claw ca. equal to petal; keel similar to wings, shorter, 1-auriculate. Stamens 10, slightly fused at base, sparsely hairy at fused parts. Ovary sparsely hairy; style and stigma glabrous. Legumes dark brown, terete, 7.5–8.5 × 1–1.2 cm, rigid, sparsely pubescent, base slender necked, apex beaked. Seed 1, dark brown, large, oblong, ca. 13 mm, obtuse at both ends. Fl. and fr. May–Oct.

• Valley scrub; 500–1700 m. Gansu, Guizhou, Sichuan, Yunnan.

**16. *Sophora prazeri*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 466. 1897.

锈毛槐 xiu mao huai

*Millettia esquirolii* H. Léveillé; *Sophora duclouxii* Gagnepain; *S. mairei* Pampanini; *S. prazeri* subsp. *mairei* (Pampanini) Yakovlev; *S. prazeri* var. *mairei* (Pampanini) P. C. Tsoong.

Shrubs, 1–3 m high. Branches brown; branchlets red-brown tomentose. Leaves 7–11 × 3–4 cm; stipules setaceous, hairy; petiole sulcate adaxially; leaflets 7–15, usually ovate-elliptic, ovate, or long elliptic, rigidly papery; terminal leaflet ca. 8 × 4 cm, base cuneate to broadly cuneate, apex acute to broadly acute; middle leaflets oblong-lanceolate or ovate, 3–5 × 2–3.5 cm; basal leaflets smaller, veinlets obvious on both surfaces, densely hairy abaxially, lustrous adaxially. Racemes lateral, alternate with leaves, 5–20 cm. Pedicel 3–6 mm; bracts setaceous, caducous. Calyx obliquely campanulate; teeth 5, 8–9 × 5–7.5 mm, hairy. Corolla white or pale yellow; standard obovate or oblong-obovate, 15–17 × ca. 5 mm, apex retuse, narrowing to claw from middle; wings oblong, equal to standard in length, 1-auriculate, claw slender; keel shorter, obovate-oblong, 1-auriculate. Stamens 10, slightly fused at base. Ovary densely red-brown hairy. Legumes moniliform, 4–10 cm, apex beaked, neck densely hairy, constricted between seeds. Seeds 2–4, dark red or light red, ovoid or elliptic, ca. 8 mm, both ends acute. Fl. and fr. Apr–Sep.

Mountain forests, valleys, wet slopes; below 2000 m. Guangxi, Guizhou, Yunnan [Myanmar].

**17. *Sophora benthamii*** Steenis, Bull. Jard. Bot. Buitenzorg, sér. 3, 17: 428. 1948.

尾叶槐 wei ye huai

*Sophora acuminata* Benthham ex Baker.

Shrubs, 1–3 m high. Branches light brown pubescent, becoming glabrous. Leaves 15–25 cm; stipules setaceous, brown pubescent; leaflets 9–19; petiolules ca. 1 mm; blades papery, ovate-oblong or ovate-lanceolate, rarely obovate, terminal leaflet largest, to 10 cm, lateral leaflets smaller, veinlets obvious, base cuneate or rounded, apex acuminate, mucronate. Racemes slender, sometimes curved, 10–15 cm, opposite leaves. Bracts setaceous, gray-brown hairy. Calyx obliquely campanulate; teeth 5, obtuse. Corolla white or pale yellow; standard oblong or obovate-lanceolate, ca. 16 × 6 mm, apex retuse, narrowing to claw from middle; wings ovate-oblong, 1-auriculate, rugose; keel shorter than wings, 1-auriculate, claw equal to blade. Stamens 10, somewhat fused at base. Ovary stalked, gray-brown hairy; ovules many. Legumes moniliform, 12–16 × 1–1.2 cm, pubescent, densely so where constricted, beak long. Seeds (1 or) 2–4 (or 5), dark red or red, ca. 12 × 7 mm, acute at both ends. Fl. and fr. Apr–Sep.

Valleys; 1300–2500 m. Xizang, Yunnan [Bhutan, India, Myanmar].

**18. *Sophora praetorulosa*** Chun & T. C. Chen, Acta Phytotax. Sin. 7: 28. 1958.

疏节槐 shu jie huai

Subshrubs, 20–100 cm high. Stem yellow-brown, gla-

brous, much branched from base. Leaves many and dense, 10–15 cm; stipules absent; leaflets 11–17, opposite, variable in shape, elliptic, orbicular, ovate, or obovate-oblong, 10–25 × 7–15 mm, nearly leathery, hairy when young, becoming glabrous, usually glandular-punctate, base rounded, apex obtuse or mucronate. Racemes terminal, ca. 12 cm. Flowers widely spaced; bracts subulate, less than 1 mm, persistent; pedicel ca. 5 mm. Calyx obliquely campanulate, pilose; teeth 5, unequal. Corolla purple; standard obovate, 5–7 × 3–4 mm, apex retuse, narrowing to claw; wings linear-oblong, 2-auriculate, claw ca. 1.5 mm; keel falcate, incurved. Stamens 10, slightly fused at base. Ovary pilose, shortly stalked; ovules 6; style glabrous. Legumes moniliform, glabrescent, apex beaked. Seeds 2 or 3, dark brown, elliptic, ca. 6 mm, lustrous. Fl. Jul–Aug.

• Dry wastelands. Hainan.

**19. *Sophora pachycarpa*** Schrenk ex C. A. Meyer in Fischer & Avé-Lallemant, Index Sem. Hort. Petrop. 9: 89. 1843.

厚果槐 hou guo huai

*Goebelia pachycarpa* (Schrenk ex C. A. Meyer) Bunge ex Boissier; *Vexibia pachycarpa* (Schrenk ex C. A. Meyer) Yakovlev.

Herbs or subshrubs, 30–60 cm; plant gray hairy. Leaves (5–)9–15(–20) cm; leaflets 13–33, opposite, lanceolate to oblong-lanceolate, (3.5–)15–20(–27) × (2–)3–7 mm, papery. Racemes terminal, to 20 cm, narrow. Calyx obliquely campanulate, ca. 8 × 4.5 mm, 5-lobed, pubescent. Corolla white to creamy yellow; standard oblong-obovate, apex obcordate, narrowing to claw, claw equal to blade in length; wings unequal, auriculate, claw shorter than blade; keel falcate, auriculate. Stamens 10, fused at base. Ovary densely gray-brown pubescent; ovules many. Legumes indehiscent, 4–5 × 0.8–0.9 cm. Seeds red-brown, 5–6 × 4–4.5 mm, lustrous.

• Gansu.

**20. *Sophora japonica*** Linnaeus, Mant. Pl. 1: 68. 1767.

槐 huai

*Anagyris chinensis* Sprengel; *Macrotripis foetida* Candelolle; *Ormosia esquirolii* H. Léveillé; *Pongamia chinensis* Candelolle; *Robinia mitis* Loureiro (1790), not Linnaeus (1763); *Sophora angustifoliola* Q. Q. Liu & H. Y. Ye [“*angustifolia*”]; *S. japonica* f. *columnaris* Schwerin; *S. japonica* f. *hybrida* Carrière; *S. japonica* f. *oligophylla* Franchet; *S. japonica* f. *pendula* Loudon; *S. japonica* var. *praecox* Schwerin; *S. japonica* var. *pubescens* (Tausch) Bosse; *S. japonica* f. *variegata* Nichols; *S. japonica* var. *vestita* Rehder; *S. japonica* var. *violacea* Carrière; *S. mairei* H. Léveillé (1915), not Pampanini (1910); *S. pubescens* Tausch; *S. sinensis* Forrester; *S. vaniotii* H. Léveillé; *Styphnolobium japonicum* (Linnaeus) Schott.

Trees, to 25 m. Bark gray-brown, longitudinally striate; branches of current year green, glabrous. Leaves 15–25 cm; stipules ovate to linear, caducous; petiole inflated at base, bud hidden; leaflets 9–15; stipules subulate; blades ovate-lanceolate or ovate-oblong, 2.5–6 × 1.5–3 cm, papery, glaucous and sparsely to densely pubescent abaxially, usually becoming glabrate, base broadly cuneate or rounded, apex acuminate, mucro-

nate. Panicles terminal, to 30 cm; bracteole subulate. Calyx shortly campanulate, 3.5–4.5 mm; teeth 5, obtuse, pubescent. Corolla white or creamy yellow, rarely purple-red; standard broadly ovate, claw short, base cordate, apex retuse; wings ovate-oblong, ca. 10 × 4 mm; keel similar to wings, but broader. Stamens 10, unequal, free, persistent. Ovary glabrescent. Legumes green, moniliform, 2.5–5 × ca. 1 cm, obviously constricted between seeds, indehiscent, fleshy. Seeds 1–6, yellow-green, black-brown when dry, ovoid. Fl. Jul–Aug, fr. Aug–Oct.

Cultivated throughout China [native to Japan and Korea; widely cultivated elsewhere].

Many intergrading varieties and horticultural forms exist that are not worthy of recognition at this level. *Sophora angustifoliola* appears to be merely a narrow-leaved form of this species.

**21. *Sophora brachygyna*** C. Y. Ma, Acta Phytotax. Sin. 20: 472. 1982.

短蕊槐 duan rui huai

Trees, to 20 m or more. Bark gray-brown; branches of cur-

rent year green. Leaves to 20 cm; stipules caducous; petiole obviously inflated at base, bud hidden; leaflets 9–15; stipels subulate; petiolule ca. 3 mm; blades gray-white abaxially, green adaxially, ovate-lanceolate or ovate-oblong, 2.5–4(–6) × 1.5–2(–2.5) cm, glabrescent on both surfaces, base obtuse, apex acuminate. Panicles large, to 25 cm. Bractlets caducous. Calyx shortly campanulate, ca. 4 × 4 mm; teeth absent or obscure, gray-white ciliate. Corolla white or pale yellow; standard ovate, ca. 13 × 11 mm, base cordate, apex retuse, claw ca. 3 mm; wings oblong, ca. 11 × 4 mm, 2-auriculate, claw slender, ca. 4 mm; keel similar to wings, broader, 2-auriculate. Stamens 10, nearly free. Ovary shorter than 1/2 of stamens, white pilose; style curved. Legumes moniliform, sturdy, 4–6 × ca. 1.5 cm, obviously constricted between seeds, apex beaked, neck 1–2 cm, glabrous, indehiscent. Seeds 1 or 2(–4), brown-black, ovoid, compressed, ca. 11 × 7 mm. Fl. Aug–Nov, fr. Oct–Jan.

• Hill slopes, roadsides; ca. 300 m. Guangxi, Hunan, Jiangxi, Zhejiang.

This species may prove to be synonymous with *Sophora japonica*.

### 43. CLADRASTIS Rafinesque, Cincinnati Lit. Gaz. 1(8): 60. 1824.

香槐属 xiang huai shu

Bao Bojian (包伯坚); Michael A. Vincent

Trees, deciduous, rarely woody lianas; bud enclosed within inflated base of petiole. Leaves imparipinnate; stipules absent; stipels present or absent; leaflets alternate or subopposite, membranous, entire. Paniculate racemes terminal; bracts and bracteoles caducous. Calyx campanulate; teeth 5. Corolla white (or pink); petals subequal. Stamens 10, free; filaments distinct or slightly joined at base; anthers versatile. Ovary linear-lanceolate, shortly stalked; ovules few to many; style incurved; stigmas small. Legume compressed, winged or not, tardily dehiscent. Seeds 1 to many.

Eight species: SE Asia and E North America; six species (five endemic) in China.

See the synopsis of *Cladrastis* by Duley and Vincent (Rhodora 105: 205–239. 2003).

- 1a. Leaflets dark green adaxially, paler abaxially, stipels and bracteoles absent; legumes wingless.
- 2a. Leaflets ovate-lanceolate or oblong-lanceolate, broadest near rounded base; flowers up to 1.5 cm; ovary pilose ..... 2. *C. delavayi*
- 2b. Leaflets ovate or oblong-ovate, broadest at or above middle, base acute; flowers ca. 2 cm; ovary densely sericeous ..... 6. *C. wilsonii*
- 1b. Leaflets concolorous, stipels present; bracteoles usually caducous; legume margins winged.
- 3a. Leaflets less than 4 cm, nearly membranous; panicle less than 10 cm ..... 3. *C. parvifolia*
- 3b. Leaflets more than 4 cm, papery; panicle 15–20 cm.
- 4a. Wooden lianas or climbing shrubs; wings and keels smaller than standard ..... 5. *C. scandens*
- 4b. Trees; wings and keels larger than standard.
- 5a. Stipels simple, subulate, 1 on each side of pulvinus; fruit apex and base acute; leaflets typically 11 or more ..... 4. *C. platycarpa*
- 5b. Stipels branched and/or 2 or more on each side of pulvinus; fruit apex and base rounded; leaflets typically 9 or fewer ..... 1. *C. chingii*

**1. *Cladrastis chingii*** Duley & Vincent, Rhodora 105: 217. 2003.

秦氏香槐 qin shi xiang huai

Trees, to 13 m tall; bark gray or gray-brown, smooth, lenticellate. Leaves imparipinnately compound; leaflets 9 or fewer, alternate; stipels 1 or 2 or more on each side of pulvinus, simple or branched; petiolule 3–5 mm, white hairy when young, then glabrous; blades ovate to elliptic, 3.9–7.8 × 1.2–3.5 cm, somewhat leathery, glabrous to sparsely white pilose along main vein abaxially, yellow-green and glabrous adaxially, veins

raised on both surfaces, base rounded to broadly cuneate, apex acute-acuminate. Panicle terminal, to 30 cm, erect; bracteoles caducous. Calyx campanulate, 4.5–4.8 mm, rusty brown tomentose. Corolla white; standard elliptic or ovate-elliptic, ca. 5.6 × 5.1 mm, rounded at apex, claw ca. 1.5 mm; wings sagittate, ca. 6 × 3.4 mm, auriculate at base, obtuse at apex; keels lanceolate, ca. 6 × 3.4 mm, auriculate at base. Ovary sessile, densely white sericeous; ovules 3–6; style slightly curved, glabrous. Legumes oblong, flat, 6–8 cm, rounded to acute at apex, winged, with 1–3 seeds. Fl. Apr–May, fr. Jun–Aug.

• Hill forests. Guangxi, Hunan, Yunnan, Zhejiang.

**2. *Cladrastis delavayi*** (Franchet) Prain, Ann. Roy. Bot. Gard. (Calcutta) 10: 109. 1904.

小花香槐 xiao hua xiang huai

*Dalbergia delavayi* Franchet, Pl. Delavay. 186. 1890; *Cladrastis sinensis* Hemsley.

Trees, to 20 m tall. Young branches gray-brown hairy. Leaves imparipinnate, to 20 cm; leaflets 9–13, alternate; stipels absent; petiolule 1–3 mm; blades ovate-lanceolate or oblong-lanceolate, 3.9–11.3 × 1.7–3.8 cm, gray-white hairy abaxially, dark green and glabrous adaxially, veins obviously raised abaxially with obvious veinlets, base obtuse or slightly cordate, apex acuminate or obtuse. Panicle terminal, 12–30 cm; bracts caducous. Calyx campanulate, 4.6–6.9 mm, with 5 semiorbicular teeth, densely whitish rusty brown pubescent. Corolla white or light yellow, rarely pink; standard obovate or orbicular, 6.4–14.4 mm, retuse at apex, narrowing to claw at base, claw 0.6–3.2 mm; wings sagittate, 6.4–9.6 mm, claw 2.1–4 mm; keels lanceolate, 6.2–10.5 mm, auriculate at base. Ovary linear, light yellow pilose, 6–10-ovuled. Legumes flat, elliptic or long elliptic, wingless, 3–8 × 1–2 cm, with 1–3(–5) seeds. Seeds brown, ovoid, compressed, ca. 4 × 2 mm. Fl. Jun–Aug, fr. Aug–Oct.

• Warm hill forests; 1000–2500 m. Fujian, Gansu, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

**3. *Cladrastis parvifolia*** C. Y. Ma, Bull. Bot. Res., Harbin 2(1): 110. 1982.

小叶香槐 xiao ye xiang huai

Trees; bark gray-white or brown, lenticellate. Young branches green, glabrous. Leaves imparipinnate, 10–15 cm; petiole gray-brown pilose; leaflets 3- or 4-paired; stipel subulate, glabrous; petiolule ca. 4 mm, brown pubescent; blades ovate, 2–4 × ca. 2 cm, membranous, pilose along veins abaxially, veins obviously raised abaxially with obvious veinlets, base obtuse, apex acuminate. Panicle terminal; rachis slender, 5–10 cm, gray-brown hairy. Flowers ca. 7 mm; pedicel short, ca. 4 mm, pubescent. Calyx cup-shaped, with 2 caducous bracts at base, unequally toothed, hairy. Corolla white; standard oblong, ca. 7 × 3.5 mm, rounded at apex, narrowing to claw at base, claw ca. 1.5 mm; wings ovate-oblong, claw ca. 2 mm; keels similar to wings. Ovary densely gray-white sericeous; style erect. Legumes narrowly winged on both sides, pilose. Fl. Oct.

• Guangxi.

This taxon is doubtfully a species of *Cladrastis*, and according to Duley and Vincent (Rhodora 105: 234–235. 2003), based on the descriptions, it may be conspecific with *Maackia fauriei* (H. Léveillé) Takeda (*Cladrastis fauriei* H. Léveillé), described from Korea.

**4. *Cladrastis platycarpa*** (Maximowicz) Makino, Bot. Mag. (Tokyo) 15: 62. 1901.

翅荚香槐 chi jia xiang huai

*Sophora platycarpa* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 18: 398. 1873; *Cladrastis yungchunii* Xiang W. Li & G. S. Fan; *Platyosprion platycarpum* Maximowicz.

Trees, to 30 m tall, 80–120 cm d.b.h.; bark dark gray,

many lenticellate. Leaves imparipinnately compound; leaflets (7–)13(–15); stipels 1 on either side of pulvinus, unbranched, subulate, to 2 mm, glabrous; petiolule 3–5 mm, densely gray-brown hairy; blades long elliptic or ovate-oblong, smaller toward base, 2–10 × 1–3.5 cm, pilose near midrib or glabrous abaxially, glabrous adaxially, veins obviously raised abaxially with obvious veinlets, base obtuse or broadly cuneate, apex acuminate. Panicle 9–30 cm, to 15 cm in diam. Pedicel slender, 7–11 mm. Calyx campanulate, densely white-yellow sericeous, triangular toothed. Corolla white, with yellow spot in throat; standard oblong, 5.3–8.2 × 5.3–8.6 mm, rounded or retuse at apex, claw 1.2–4.8 mm; wings lanceolate-ovate, 5.9–9.3 × 3.2–5.4 mm, slightly auriculate, claw 2.9–5.1 mm; keels lanceolate, 6.4–9.9 × 3.5–5.9 mm, base auriculate. Ovary linear, yellow-white pubescent, 5–7-ovuled; style slightly curved. Legumes long elliptic or oblong, 5–8 × 1.5–2 cm, winged on both sides, indehiscent. Seeds 1–3, dark brown or black, oblong, ca. 8 mm. Fl. Apr–Jun, fr. Jul–Oct.

Forests in valleys and on slopes; below 1000 m. Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Yunnan, Zhejiang [Japan].

**5. *Cladrastis scandens*** C. Y. Ma, Bull. Bot. Res., Harbin 2(1): 111. 1982.

藤香槐 teng xiang huai

Lianas or climbing shrubs; stem lenticellate. Leaves imparipinnate; leaflets 4-paired, alternate; stipel subulate, glabrous; petiolule ca. 2 mm, glabrous; blades elliptic or oblong, terminal one larger, ca. 9 × 6 cm, smaller toward base, usually 3–6 × 2–4 cm, papery, glabrous, veins obviously raised abaxially and with obvious veinlets, base obtuse, apex rounded or acute. Panicle terminal and large. Pedicel 6–8 mm, brown-gray pubescent. Calyx cup-shaped, equally and triangular toothed, hairy. Corolla white; standard oblong, rounded at apex, narrowing to claw at base, claw ca. 3 mm; wings triangular-ovate, claw ca. 4 mm; keels similar to wings, slightly broad, ca. 3.5 mm, one auriculate at base. Ovary linear, white pilose, 6–8-ovuled; style slightly curved; stigma very small.

• Hill scrub; ca. 1200 m. Guizhou.

According to Duley and Vincent (Rhodora 105: 234. 2003), based on the description, it is highly probable that this species is conspecific with *Cladrastis platycarpa*.

**6. *Cladrastis wilsonii*** Takeda, Notes Roy. Bot. Gard. Edinburgh 8: 103. 1913.

香槐 xiang huai

*Cladrastis lichuanensis* Q. W. Yao & G. G. Tang.

Trees, to 16 m tall; bark gray or gray-brown, smooth, lenticellate. Leaves imparipinnately compound; leaflets 8–11, alternate; stipels absent; petiolule 4–5 mm, white hairy when young, then glabrous; blades ovate or oblong-ovate, terminal one larger, usually 3.5–14.3 × 1.8–6.5 cm, papery, golden pilose along main vein abaxially, dark green and glabrous adaxially, veins raised on both surfaces, base broadly cuneate, apex acute. Panicle terminal or axillary, 10–28 cm; bracts caducous. Calyx campanulate, 7.2–8 mm, triangular toothed, yellow-brown tomentose. Corolla white; standard elliptic or ovate-elliptic, 9.3–

15.2 × 9–13 mm, rounded or retuse at apex, claw 2.3–5.1 mm; wings sagittate, 9.3–14.4 mm, auriculate at base, obtuse at apex; keels falcate, 8.8–14.9 × 4.8–7.2 mm, auriculate at base. Ovary sessile, densely yellow-white sericeous; ovules (1–)3–5; style slightly curved, glabrous. Legumes oblong, flat, 4.5–8 × 0.8–1

cm, beaked at apex, wingless. Seeds 1–5, gray-brown, reniform. Fl. May–Jul, fr. Aug–Sep.

• Hill forests; 1000–1500 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Shanxi, Sichuan, Yunnan, Zhejiang.

#### 44. SALWEENIA E. G. Baker, J. Bot. 73: 134. 1935.

冬麻豆属 *dong ma dou shu*

Sun Hang (孙航); Michael A. Vincent

Shrubs, evergreen, 0.5–2 m tall. Leaves imparipinnate; stipules herbaceous; leaflets opposite, linear and entire, conduplicate; stipels absent. Flowers clustered at ends of branches; bracts and bractlets small, bractlets well below calyx; pedicel present. Calyx campanulate; teeth 5, deltoid, upper 2 partially connate; disk adnate to calyx base. Petals all clawed; standard obovate, apex emarginate; wings oblong; keel boat-shaped. Stamens diadelphous; anthers homomorphic, dorsifixed. Ovary with long stalk. Legumes linear-oblong, compressed, stalked, 2-valved; segments thinly papery. Seeds ovate, compressed.

• One species: China.

##### 1. *Salweenia wardii* E. G. Baker, J. Bot. 73: 135. 1935.

冬麻豆 *dong ma dou*

Stems erect, greenish yellow to dark brown. Young branches longitudinally ridged when dry, densely appressed gray-whitish villous; bud scales triangular, apex acute to tapering, persistent. Leaves 1.2–3 cm; stipules triangular, 1–2 mm, appressed gray-white villous, persistent; petiole and rachis appressed gray-white villous, grooved above; leaflets 7–19, sessile, 1–2.7 × 0.2–0.35 cm, straight to curved, densely appressed adnate gray-whitish pubescent, becoming glabrate adaxially, lateral veins inconspicuous, margin entire, apex acute or blunt. Flowers 3–7, clustered at end of branchlets; bracts persistent, ovate-triangular, 3–5 mm, appressed gray-whitish villous abaxially, glabrous adaxially, apex acute; pedicels 5–7 mm, ap-

pressed gray-whitish pubescent; bractlets 2, acicular, 2–3 mm. Calyx campanulate, 8–9 mm; teeth 1–2 mm, appressed gray-whitish pubescent. Corolla yellow; standard obovate to broadly ovate, 1.6–1.8 × 1.3–1.5 cm, apex emarginate; wings oblong, 11–12 × 4–5 mm, claw 7.5–8 mm; keel boat-shaped, 11–12 mm, claw 7.5–8 mm. Stamen filaments 1.4–1.8 cm. Ovary densely appressed villous; carpopodium 4–6 mm; ovules 6–8. Legumes linear-oblong, 5.5–9 × 0.8–1.2 cm, apex beaked; stalk 6–8 mm, densely appressed gray-whitish villous; calyx persistent; segments brittle, sparsely appressed pubescent. Seeds 3–7; funicle slender, 0.8–1 mm.

• Dry shrublands or gravelly slopes in valleys of Lancang Jiang, Nu Jiang, and Yalong Jiang; 2700–3600 m. W Sichuan (Jiulong), E Xizang.

#### 45. MAACKIA Ruprecht, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 15: 143. 1856.

马鞍树属 *ma an shu shu*

Bao Bojian (包伯坚); Michael A. Vincent

Trees or shrubs; buds axillary, exposed, bud scales imbricate. Leaves imparipinnately compound, alternate, estipulate, petiolate, deciduous; leaflets opposite or nearly opposite, entire, estipellate; petiolule short. Racemes simple or branched at base, terminal. Flowers many, dense; bracteoles caducous. Calyx inflated, campanulate or cylindrical, 5-toothed. Corolla white to greenish white; standard obovate, long elliptic-obovate, or obovate-cuneate, reflexed; wings oblique-oblong, hastate at base; keels slightly incurved, partially fused ventrally. Stamens 10; filaments slightly fused at base; anthers versatile, elliptic. Ovary subsessile, densely hairy, few ovuled; style slightly incurved; stigmas small, terminal. Legume flat, long elliptic to linear or ovate, straight or curved, narrowly winged along ventral suture or not. Seeds 1–5, long elliptic, flat.

Twelve species: E Asia; seven species (six endemic) in China.

- 1a. Leaflets 3–5(–7); legume slightly curved to falcate; fruit neck slender, 5–15 mm; flowers ca. 20 mm ..... 1. *M. tenuifolia*  
 1b. Leaflets (7–)9–15; legume not falcate; fruit neck absent; flowers less than 12 mm.  
 2a. Legume winged along ventral suture; wing 2–6 mm wide.  
   3a. Leaflets lanceolate-elliptic or long ovate-elliptic, acuminate at apex; flowers 7–8 mm; legume wing 1–4 mm wide ..... 6. *M. taiwanensis*  
   3b. Leaflets ovate or ovate-elliptic, obtuse at apex; flowers ca. 10 mm; legume wing 2–6 mm wide ..... 7. *M. hupehensis*  
 2b. Legume ± wingless along ventral suture, rarely winged to 1 mm.  
   4a. Leaves sparsely pubescent abaxially.  
     5a. Flowers ca. 10 mm; small trees; leaflets acute at apex ..... 4. *M. hwashanensis*  
     5b. Flowers ca. 6 mm; shrubs; leaflets acuminate at apex ..... 5. *M. chekiangensis*

4b. Leaves glabrous abaxially, rarely hairy at base of main vein.

6a. Legume 3–7 cm, length usually 3–6 × width; flowers ca. 10 mm ..... 2. *M. amurensis*

6b. Legume less than 3.5 cm, length less than 3 × width; flowers 6–7 mm ..... 3. *M. australis*

**1. *Maackia tenuifolia*** (Hemsley) Handel-Mazzetti, Symb. Sin. 7: 544. 1933.

光叶马鞍树 *guang ye ma an shu*

*Euchresta tenuifolia* Hemsley, J. Linn. Soc., Bot. 23: 200. 1887; *Maackia honanensis* L. H. Bailey.

Shrubs or trees, 2–7 m tall; stem gray; buds densely brown hairy. Leaves 12–16.5 cm; rachis sparsely gray-white pubescent; leaflets 3–5(–7); petiolule very short; terminal leaflet obovate or elliptic, ca. 10 × 6 cm, base cuneate or rounded, apex acuminate; lateral leaflets elliptic or long elliptic, 4–9.5 × 2–4.5 cm, hairy along main vein, base cuneate, apex acuminate. Racemes terminal, 6–10.5 cm. Flowers 1.8–2.1 cm; pedicel 8–12 mm, slender. Calyx cylindric, ca. 8 mm; teeth short, gray pubescent at margin. Corolla green-white. Ovary densely yellow-brown pubescent, ca. 12 mm, stalked; style ca. 1 mm. Legumes brown, linear, 5.5–10 × 0.9–1.4 cm, slightly curved to falcate, compressed, densely villous, wingless; fruit neck 5–15 mm; fruit stalk ca. 1 cm. Seeds 2–4, light red to scarlet, reniform, compressed. Fl. Apr–May, fr. Aug–Sep.

• Forests, hill slopes. Henan, Hubei, Jiangsu, Jiangxi, Shaanxi, Zhejiang.

**2. *Maackia amurensis*** Ruprecht, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 15: 128, 143. 1856.

朝鲜槐 *chao xian huai*

*Cladrastis amurensis* (Ruprecht) Benth.

Trees deciduous, to 15 m tall, to 60 cm d.b.h.; bark green-brown, scaly; branches purple-brown, lenticellate, hairy when young, then glabrous; buds glabrous. Leaves 15–23 cm; leaflets 7–9(–11); petiolule 3–6 mm; blades ovate to obovate-elliptic, 3.5–6.8(–9.7) × (1–)2–3.5(–5) cm, papery, densely hairy when young, becoming glabrate, rarely sparsely villous near main vein abaxially, base broadly cuneate or cuneate, apex acute to acuminate. Racemes 5–9 cm; rachis densely brown hairy. Flowers 0.8–1.2 cm; pedicel (3.2–)4–6(–10) mm. Calyx campanulate, 2.1–4 mm; teeth short, densely yellow-brown appressed pubescent. Corolla white, 7–11 mm; standard obovate, apex emarginate, narrowing to claw at base; wings oblong, 2-auriculate at base. Ovary linear, densely yellow-brown hairy. Legumes dark brown, linear, 3–7 × 1–1.2 cm, pubescent or subglabrous, wing 0.4–1.2 mm; stalk 5–10 mm. Seeds 1–4, yellow to yellow-brown, long elliptic, 6–8 mm. Fl. Jun–Jul, fr. Sep–Oct.

Forests on hill slopes; 300–900 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shandong [Korea, Russia].

**3. *Maackia australis*** (Dunn) Takeda, Notes Roy. Bot. Gard. Edinburgh 8: 102. 1913.

华南马鞍树 *hua nan ma an shu*

*Cladrastis australis* Dunn, Bull. Misc. Inform. Kew, Addit. Ser. 10: 86. 1912; *Maackia elliptocarpa* Merrill.

Shrubs or small trees, to 2 m tall; branchlets ± glabrous. Leaves 13.8–22 cm; leaflets 7–11, ovate to ovate-elliptic, 2.5–7.6 × 1.3–4.1 cm, glabrous, base cuneate or rounded, apex acute or acuminate. Racemes 10–20 cm. Flowers 6–7 mm; pedicels 2.5–5 mm. Calyx campanulate, 2.1–2.4 mm; teeth to 1 mm. Corolla white, 5–6 mm; standard elliptic-obovate, apex slightly emarginate, narrowed to a short claw; wings narrowly elliptic, auricles short. Ovary narrowly elliptic, densely hairy. Legumes flat, oval or ovate, 2.8–3.5 × 1.2–1.7 cm, pubescent to nearly glabrous, at least slightly golden glandular, wing 0.4–1.1 mm, rarely absent; fruit neck absent. Seeds 1–3, yellow, flat, oval, 7–9 mm. Fl. Jul.

• Scrub. Guangdong.

**4. *Maackia hwasanensis*** W. T. Wang ex C. W. Chang, Fl. Tsinling. 1(3): 444. 1981.

华山马鞍树 *hua shan ma an shu*

Trees small, to 2 m tall; branchlets gray-brown; buds ovoid, hairy. Leaves 18–24(–27) cm; leaflets 9–11; petiolule 2–3 mm, densely white pubescent; blades elliptic-ovate or ovate-oblong, 3.5(–7.7) × 1.6–4 cm, adnate gray hairy abaxially, glabrous adaxially, base broadly cuneate or rounded, apex acute to acuminate. Racemes 3.4–4.5 cm; rachis brown hairy. Flowers 1–1.2 cm; pedicel 4–8 mm. Calyx campanulate, 4–6 mm; teeth to 2.5 mm. Corolla white, 9–11 mm; standard broadly elliptic, slightly emarginate at apex, abruptly narrowed to a narrow claw; wings narrowly elliptic, auricles small. Ovary narrowly elliptic, pubescent. Legumes long elliptic or ovate-elliptic, 3.5–5.5 × 1.3–1.5 cm, beaked at apex; stalk 6–7 mm, pubescent. Seeds reddish brown to yellow-brown, reniform, 8–10 × 5–5.3 mm. Fl. Jul–Aug, fr. Aug–Sep.

• Forests in valleys and on hill slopes; 100–2100 m. Henan, Shaanxi.

**5. *Maackia chekiangensis*** S. S. Chien, Contr. Biol. Lab. Sci. Soc. China, Bot. Ser. 8: 132. 1932.

浙江马鞍树 *zhe jiang ma an shu*

Shrubs, 1–1.5 m tall; branchlets gray-brown, lenticellate, smooth, glabrous. Leaves 13–20 cm; leaflets 9–11, opposite; petiolule 1–2 mm; blades ovate-lanceolate or elliptic-ovate, 2.1–6.3 × 1.1–3 cm, sparsely light brown hairy abaxially, glabrous adaxially, base cuneate, apex acuminate. Racemes 8–14 cm; rachis light brown pubescent. Flowers dense; pedicel slender, 2–3.5 mm; bracteoles subulate, 1.3–2 mm. Calyx campanulate, 2.1–2.4 mm; teeth to 1.3 mm, brown adnate hairy. Corolla white; standard oblong, 3–5 × 1.2–1.7 mm, slightly emarginate at apex, claw ca. 0.6 mm; keels oval-oblong, spurred at base. Ovary narrowly oblong, shortly stalked, densely brown hairy. Legumes elliptic, ovate, or oblong, 2.7–4 × 1.1–1.5 cm, beaked at apex, narrowly winged along sutures, brown pubescent; fruit neck absent; stalk ca. 3 mm. Seed 1, yellow-brown. Fl. Jun, fr. Sep.

• Forests; below 500 m. Anhui, Guangdong, Jiangxi, Zhejiang.

6. *Maackia taiwanensis* Hoshi & H. Ohashi, J. Jap. Bot. 62: 98. 1987.

多花马鞍树 duo hua ma an shu

*Maackia tashiroi* Makino var. *taiwaniana* Kanehira.

Trees, to 10 m tall; young branches densely pubescent, then dark gray or dark purple, glabrous; buds ovoid, glabrous or glabrescent. Leaves 10–16 cm; leaflets 11–15; petiolule 2–6 mm; blades lanceolate-elliptic or long ovate-elliptic, 2–4.2 × 1–2 cm, glabrous, base cuneate or rounded, apex acute. Racemes 8–10 cm, erect, yellow-brown hairy. Flowers 7–8 mm; pedicel 2–4 mm. Calyx campanulate; teeth short, densely yellow-brown hairy. Corolla white; standard obovate, apex emarginate. Ovary narrowly elliptic, shortly stalked, densely brown hairy. Legumes flat, elliptic, 3.3–6 × 1–1.5 cm, wing 1–4 mm, shortly hairy. Seeds 1 or 2, elliptic, 5–7 mm, brown-purple. Fl. Jul–Aug.

• Hills. Taiwan.

The Chinese record of *Maackia floribunda* (Miquel) Takeda (FRPS 40: 62. 1994) is referable to *M. taiwanensis*.

7. *Maackia huphensis* Takeda in Sargent, Pl. Wilson. 2: 98. 1914.

马鞍树 ma an shu

*Maackia chinensis* Takeda; *M. floribunda* (Miquel) Takeda var. *chinensis* (Takeda) Hatusima.

Trees, 5–23 m tall, 20–80 cm d.b.h.; bark green-gray or gray-brown, smooth; young branches and buds hairy, old branches purple-brown, glabrous. Leaves 12–20 cm; leaflets 9–13, opposite distally, sometimes subopposite proximally, ovate, ovate-elliptic, or elliptic, 2–8 × 1.5–2.8 cm, pubescent, base cuneate or rounded, apex obtuse or acute. Racemes 3.5–8 cm; rachis densely brown hairy. Flowers 8–10 mm; pedicel 2–4 mm, slender, densely hairy. Calyx 1.6–3.3 mm, campanulate; teeth to 1.6 mm, densely yellow-brown hairy. Corolla white; standard ovate or obovate, 4–6 mm, claw to 2 mm. Ovary densely villous, linear-oblong. Legumes brown, narrowly ovate to elliptic, flat, 4.5–8.5 × 1.6–2.5 cm; wing 2–6 mm; stalk 5–7 mm. Seeds 2 or 3, yellow-brown, lustrous, elliptic. Fl. Jun–Jul, fr. Aug–Sep.

• Hill slopes, valleys, streamsides; 500–2300 m. Anhui, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Zhejiang.