

## 4. Tribe CAESALPINIEAE

云实族 yun shi zu

Chen Dezha (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Ding Hou, Kai Larsen, Supee Saksuwan Larsen

Leaves bipinnate or rarely pinnate. Flowers bisexual or unisexual, actinomorphic or zygomorphic. Receptacle discoid. Sepals (3–)5(or 6), inserted on margin of receptacle, often unequal, lowest larger, on outside, hooded or navicular. Petals usually 5, rarely 4, slightly unequal. Stamens (4–)10(–20), free, subequal; anthers basifixed or dorsifixed, opening by lateral slits. Ovary or ovary stipe inserted at base of receptacle; ovules 2 to numerous, rarely 1.

About 55 genera and 420–450 species: distributed in the tropics and subtropics; 11 genera (four introduced) and 37 species (ten endemic, eight introduced) in China.

- 1a. Leaves pinnate; petals absent ..... 13. *Ceratonia*
- 1b. Leaves usually bipinnate; petals present.
  - 2a. Flowers polygamous or dioecious; deciduous trees.
    - 3a. Plants unarmed; flowers larger, in terminal panicles; legume turgid ..... 14. *Gymnocladus*
    - 3b. Plants often armed with branched spines; flowers smaller, in axillary spicate racemes; legume flat ..... 15. *Gleditsia*
  - 2b. Flowers bisexual; trees or climbers.
    - 4a. Plants unarmed; trees.
      - 5a. Flowers more than 7 cm in diam., showy ..... 18. *Delonix*
      - 5b. Flowers not more than 3 cm in diam.
        - 6a. Stamens 5; flowers scarlet; legume narrowly winged along ventral suture ..... 16. *Acrocarpus*
        - 6b. Stamens 10; flowers yellow or yellowish green; legume not as above.
          - 7a. Legume with broad wings on both sutures; flowers more than 15 mm in diam.; stamens slightly shorter than petals ..... 17. *Peltophorum*
          - 7b. Legume without wings; flowers less than 5 mm in diam.; stamens ca. 2 × as long as petals ..... 23. *Erythrophleum*
    - 4b. Plants usually armed with prickles; climbers or trees.
      - 8a. Flowers irregular, zygomorphic; ovules 2 or more.
        - 9a. Legume ovate, oblong, or lanceolate, smooth or spiny, leathery or woody; albumen absent ..... 19. *Caesalpinia*
        - 9b. Legume linear, torulose, thinly leathery; seeds with endosperm ..... 22. *Parkinsonia*
      - 8b. Flowers subregular; ovules 1.
        - 10a. Ovary sessile; legume winged, indehiscent ..... 20. *Pterolobium*
        - 10b. Ovary shortly stalked; legume not winged, splitting along middle of valves (cultivated) ..... 21. *Haematoxylum*

### 13. CERATONIA Linnaeus, Sp. Pl. 2: 1026. 1753.

长角豆属 chang jiao dou shu

Chen Dezha (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen, Supee Saksuwan Larsen

*Ceratia* Adanson.

Trees, evergreen, small or medium-sized, with a dense crown. Leaves abruptly pinnate; stipules small or absent; leaflets 2–4 pairs. Flowers small, polygamous or plants dioecious, in short, solitary or fasciculate racemes. Inflorescence lateral on current-year branchlets; bracts and bracteoles caducous, scalelike, minute. Calyx tube turbinate; lobes 5, deciduous, toothlike, short, imbricate. Petals absent. Stamens 5; filaments filiform; anthers ovoid, versatile. Disk within stamens, horizontally spreading. Ovary shortly stalked, at middle of disk; ovules numerous; style very short; stigma peltate. Legume compressed, elongated, thickly leathery, indehiscent, between seeds by pulpy areas continuous with endocarp. Seeds numerous.

One species: native to the Mediterranean region, introduced and cultivated elsewhere including China.

#### 1. *Ceratonia siliqua* Linnaeus, Sp. Pl. 2: 1026. 1753.

长角豆 chang jiao dou

Trees, 15–16 m tall. Leaves 8–17 cm; leaflets 2–4 pairs, shiny, obovate or suborbicular, 3.5–5.5 × 3–3.5 cm, leathery, glabrous, lateral veins conspicuously raised, base cuneate or broadly cuneate, margin entire, apex rounded, emarginate, or

conspicuously cordate depressed. Raceme with rachis densely yellowish brown pubescent. Flowers reddish. Legume curved, 10–25 × ca. 2.5 cm. Fl. Nov.

Cultivated in Guangdong (Guangzhou) [native to the E Mediterranean; widely cultivated and naturalized].

The dried legumes are rich in sugar; the seeds contain a useful gum, tragacanth.

## 14. GYMNOCLADUS Lamarck, Encycl. 1: 733. 1785, nom. cons.

肥皂荚属 fei zao jia shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen

Trees, deciduous, unarmed. Branches robust. Leaves abruptly bipinnate; stipules caducous, small. Inflorescences racemes or corymbose panicles, terminal. Flowers whitish, actinomorphic, polygamous or plants dioecious. Receptacle discoid. Sepals 5, subequal, narrow. Petals 4 or 5, slightly longer than sepals, oblong, imbricate, innermost one sometimes absent. Stamens 10, free, shorter than corolla, alternately shorter and longer; filaments thick, slightly villous; anthers dorsifixed, opening by lateral slits. Ovary in male flowers reduced or absent, in female or bisexual flowers sessile, 7- or 8-ovuled; style straight, slightly thick and compressed; stigma oblique. Legume sessile, turgid, subterete, 2-valved, full of pulp inside between seeds. Seeds large; testa leathery; radicle erect, short.

Three or four species: North America and S Asia; one species (endemic) in China.

### 1. *Gymnocladus chinensis* Baillon, Bull. Mens. Soc. Linn. Paris 1: 34. 1875.

肥皂荚 fei zao jia

*Gymnocladus guangxiensis* P. C. Huang & Q. W. Yao.

Trees, 5–12 m tall. Bark grayish brown, with conspicuous whitish lenticels. Branchlets of current year ferruginous or whitish puberulent, glabrescent. Leaves 20–25 cm, without stipules; rachis sulcate, puberulent; pinnae opposite, subopposite, or alternate, 5–10 pairs; leaflets alternate, 8–12 pairs, subsessile, with subulate stipules; blades oblong, 2.5–5 × 1–1.5 cm, both surfaces silky pubescent, both ends rounded, base slightly oblique, apex sometimes emarginate. Racemes puberulent.

Flowers polygamous, pendulous, whitish or tinged with purple, long pedicellate. Bracts small or absent. Receptacle deeply concave, 5–6 mm, puberulent. Sepals subulate, slightly shorter than receptacle. Petals oblong, slightly longer than sepals, hairy, apex obtuse. Filaments pubescent. Ovary sessile, glabrous, 4-ovuled; style short, thick; stigma capitate. Legume oblong, 7–10 × 3–4 cm, compressed or turgid, glabrous, apex shortly beaked. Seeds 2–4, blackish, subglobose, slightly compressed, ca. 2 cm in diam., glabrous. Fr. Aug.  $2n = 28^*$ .

• Slopes, mountain sides, mixed forests, sides of rocks, near villages, beside houses; 100–1500 m. Anhui, Fujian, Guangdong, Guangxi, ?Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, ?Yunnan, Zhejiang.

## 15. GLEDITSIA Linnaeus, Sp. Pl. 2: 1056. 1753.

皂荚属 zao jia shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen

Trees or shrubs, deciduous. Trunk and branches usually with stout, simple or branched spines. Leaves alternate, often clustered, simply paripinnate and bipinnate often on same plant; stipules caducous, small; rachis of leaves and pinnae sulcate; leaflets numerous, subopposite or alternate, base oblique or subsymmetrical, margin serrulate or crenate, rarely entire. Inflorescences axillary, rarely terminal, spikes or racemes, rarely panicles. Flowers polygamous or plants dioecious, light green or greenish white. Receptacle campanulate, outside pubescent. Calyx 3–5-lobed; lobes subequal. Petals 3–5, slightly unequal, ca. as long as or slightly longer than calyx lobes. Stamens 6–10, exerted, slightly flat, broad, with crisped hairs from middle downward; anthers dorsifixed. Ovary sessile or shortly stalked; ovules 1 to numerous; style short; stigma terminal. Legume ovoid or elliptic, flat or subterete.

About 16 species: C and SE Asia, North and South America; six species (three endemic, one introduced) in China.

*Gleditsia medogensis* C. C. Ni (Acta Phytotax. Sin. 25: 231. 1987), described from SE Xizang (Médog), could not be treated here because no material was seen by the present authors. Judging from the protologue, it may be conspecific with the variable *G. japonica*.

- 1a. Leaflets 6–24 mm, margin entire, upper leaflets smaller than those in lower part; legume 3–6 cm, with 1–3 seeds ..... 1. *G. microphylla*
- 1b. Leaflets more than 25 mm, margin irregularly serrate; legume more than 6 cm, with numerous seeds.
- 2a. Legume densely yellowish green velutinous ..... 6. *G. japonica*
- 2b. Legume glabrous or puberulent.
- 3a. Leaflets obliquely oblong or rhombic-lanceolate, midvein conspicuous at base; calyx lobes and petals 5; stamens 10; ovary densely silky.
- 4a. Leaves pinnate or bipinnate; leaflets with reticulate veinlets adaxially obscure; racemes often comprising panicles; legume 6–12 cm, swollen opposite seeds ..... 2. *G. australis*
- 4b. Leaves pinnate; leaflets with reticulate veinlets conspicuously raised; racemes simple; legume 13.5–26 cm, not swollen opposite seeds ..... 3. *G. fera*
- 3b. Leaflets ovate, ovate-lanceolate, or oblong, midvein at middle or slightly oblique; calyx lobes and petals 3 or 4; stamens 6–8(or 9); ovary not silky.
- 5a. Leaflets 11–18 pairs, elliptic-lanceolate, apex acute; ovary hoary ..... 4. *G. triacanthos*

- 5b. Leaflets 3–10 pairs, ovate or elliptic, apex obtuse or emarginate; ovary glabrous or only sutures and base pubescent.
- 6a. Spines terete; leaflets with reticulate veinlets adaxially conspicuously raised, margin densely finely serrate; ovary pubescent at base and along sutures; legume thick, not twisted, straight, or curved ..... 5. *G. sinensis*
- 6b. Spines flat at least at base; leaflets with reticulate veinlets obscure, margin entire or sparsely shallowly crenate; ovary glabrous; legume flat, irregularly twisted or curved, falcate ..... 6. *G. japonica*

**1. *Gleditsia microphylla*** D. A. Gordon ex Isely, Mem. New York Bot. Gard. 25: 214. 1975.

野皂荚 ye zao jia

Shrubs or small trees, 2–4 m tall. Branches grayish white to light brown; young branchlets puberulent, glabrescent when old. Spines not robust, long needlelike, 1.5–6.5 cm, with few, short branches. Leaves pinnate or bipinnate (pinnae 2–4 pairs), 7–16 cm; petiolules short, ca. 1 mm, puberulent; leaflets 5–12 pairs, obliquely ovate to oblong, 6–24 × 3–10 mm, thinly leathery, upper leaflets much smaller than lower ones, abaxially puberulent, adaxially glabrous, veins obscure on both surfaces, base oblique, broadly cuneate, margin entire, apex rounded. Flowers polygamous, greenish white, subsessile, fascicled, in spikes or terminal panicles. Inflorescence 5–12 cm, puberulent; bracts 3, lowest lanceolate, ca. 1.5 mm, upper 2 ovate, ca. 1 mm, pubescent. Male flowers: ca. 5 mm in diam.; receptacle ca. 1.5 mm.; sepals 3 or 4, lanceolate, 2.5–3 mm; petals 3 or 4, ovate-oblong, ca. 3 mm, as calyx lobes puberulent outside, villous inside; stamens 6–8. Bisexual flowers: ca. 4 mm in diam.; calyx lobes 4, triangular-lanceolate, 1.5–2 mm, both sides puberulent; petals 4, ovate-oblong, ca. 2 mm, outside puberulent, inside villous; stamens 4, opposite to sepals; ovary long stalked, glabrous, 1–3-ovuled. Legume reddish brown to deep brown, obliquely elliptic or obliquely oblong, flat, thin, 3–6 × 1–2 cm, glabrous, with slender beak at apex; stipe 1–2 cm. Seeds 1–3, brownish, compressed, ovoid or oblong, 7–10 × 6–7 mm, smooth. Fl. Jun–Jul, fr. Jul–Oct.

• Sunny slopes, roadsides; 100–1300 m. Anhui, ?Guizhou, Hebei, Henan, Jiangsu, Shaanxi, Shandong, Shanxi.

**2. *Gleditsia australis*** Hemsley, J. Linn. Soc., Bot. 23: 208. 1887.

小果皂荚 xiao guo zao jia

*Gleditsia microcarpa* F. P. Metcalf.

Trees, 3–20 m tall. Branches brownish gray, with robust spines. Spines brownish purple, conical, 3–5 cm, branched. Leaves pinnate or bipinnate (pinnae 2–6 pairs), 10–18 cm; petiolules ca. 1 mm; leaflets 5–9 pairs, adaxially shiny, obliquely elliptic to rhombic-oblong, 2.5–4 × 1–2 cm, papery to thinly leathery, abaxially glabrous, adaxially slightly puberulent on veins, reticulate veinlets slightly lax, obscure, base obliquely acute or obliquely cuneate, margin obtusely serrate or subentire, apex rounded, often emarginate. Flowers polygamous, pale green or greenish white; pedicels 1–2.5 mm. Male flowers: 4–5 mm in diam., several fascicled or in cymules, cymules in dense racemes again, several racemes comprising a panicle to 28 cm, puberulent, axillary or terminal; sepals 5, lanceolate, ca. as long as receptacle, outside densely puberulent; petals 5, elliptic, ca. 2 mm, outside densely puberulent, inside pubescent. Bisexual

flowers: 7–9 mm in diam.; inflorescence as male inflorescence, with scattered flowers; calyx tube ca. 2 mm, glabrous; calyx lobes 5 or 6, lanceolate, ca. 3 mm, outside puberulent, inside as petals densely light brown crisped pubescent; petals 5 or 6, elliptic, outside velutinous. Stamens 5, not exerted. Ovary sessile, densely light brown silky. Legume subsessile, brownish black when dry, compressed, strap-shaped, (4–)6–12 × 1–2.5 cm, straight or slightly curved, valve leathery, conspicuously swollen opposite seeds, apex mucronate. Seeds 5–12, deep brown to brownish black, slightly compressed, elliptic to oblong, 7–11 × 4–5 mm, smooth. Fl. Jun–Oct, fr. Nov–Apr.

Gentle slopes, mountain valleys, forests, near roads, by streams, sunny places. Guangdong, Guangxi [Vietnam].

**3. *Gleditsia fera*** (Loureiro) Merrill, Philipp. J. Sci., C, 13: 141. 1918.

华南皂荚 hua nan zao jia

*Mimosa fera* Loureiro, Fl. Cochinch. 2: 652. 1790; *Gleditsia formosana* Hayata; *G. thorelii* Gagnepain.

Trees, 3–24 m tall. Branches grayish brown. Spines robust, branched, terete at base, to 13 cm. Leaves pinnate, 11–18 cm; rachis sulcate, glabrous or pilose; petiolules ca. 1 mm; leaflets 5–9 pairs, adaxially deep brown, shiny, obliquely elliptic to rhombic-oblong, 2–7(–12) × 1–3(–5) cm, papery to thinly leathery, abaxially glabrous, adaxially glabrous or sometimes pubescent on midvein, midvein inclined to one side at base of blade, reticulate veinlets crowded, slender, conspicuously raised, base obliquely cuneate or rounded and oblique, margin crenate, sometimes shallowly, obtusely serrate, apex rounded and emarginate. Flowers several in cymules, polygamous, greenish white, cymules in axillary or terminal racemes 7–16 cm. Male flowers: 6–7 mm in diam.; receptacle ca. 2.5 mm; sepals 5, triangular-lanceolate, 2.5–3 mm, outside densely puberulent; petals 5, oblong, both sides puberulent; stamens 10; rudimentary pistil linear-terete, 4–5 mm, villous. Bisexual flowers: 8–10 mm in diam.; calyx and petals similar to those of male flowers, but calyx with a villous ring inside at base; stamens 5 or 6; anthers acute at apex; ovary densely brownish yellow silky, many ovuled. Legume compressed, 13.5–26(–41) × 2.5–3(–6.5) cm, straight or slightly curved, occasionally twisted, valves leathery, densely brownish yellow puberulent when young, glabrescent and becoming deep brown to blackish brown when old, apex with beak 2–5 mm; stipe 5–10 mm. Seeds numerous, brown to blackish brown, compressed or lenticular, ovoid to oblong, 8–11(–14) × 5–6(–11) mm, smooth. Fl. Apr–May, fr. Jun–Dec.

• Gentle slopes, mountain valleys, forests, beside villages, near roads, sunny places, occasionally cultivated; 300–1000 m. Fujian, Guangdong, Guangxi, ?Guizhou, ?Hainan, Hunan, Jiangxi, Taiwan, ?Yunnan.

The records of *Gleditsia rolfei* S. Vidal from Taiwan (Fl. Taiwan 3: 293. 1977; ed. 2, 3: 182. 1993) are referable to *G. fera*.

The fruit contains saponin that can be used as soap and as an insecticide.

#### 4. *Gleditsia triacanthos* Linnaeus, Sp. Pl. 2: 1056. 1753.

美国皂荚 mei guo zao jia

Trees or small trees, to 45 m tall. Bark grayish black, 1–2 cm thick, with deep cracks and narrow, long ridges. Branchlets deep brown, rough, slightly sulcate, with small, orbicular lenticels. Spines deep brown, slightly flat, robust, often branched, 2.5–10 cm, rarely branchlets unarmed. Leaves pinnate or bipinnate (pinnae 4–14 pairs), 11–22 cm; petiolules ca. 1 mm, pubescent; leaflets 11–18 pairs, abaxially yellowish green, adaxially dark green, shiny, elliptic-lanceolate, 1.5–3.5 cm × 4–8 mm, papery, abaxially puberulent on midvein, adaxially glabrous, base cuneate or slightly rounded and oblique, margin sparsely undulate-dentate, apex acute, sometimes slightly obtuse. Flowers yellowish green. Pedicels 1–2 mm. Male flowers: 6–7 mm in diam., solitary or several clustered in racemes; inflorescences terminal or often several fascicled in axils of leaves, 5–13 cm, puberulent; receptacle ca. 2 mm; sepals 2 or 3, lanceolate, 2–2.5 mm; petals 3 or 4, ovate or ovate-lanceolate, ca. 2.5 mm, as sepals puberulent on both surfaces; stamens 6–9. Female flowers: in slender, few-flowered racemes, racemes solitary and ca. as long as male inflorescence; ovary hoary. Legume compressed, strap-shaped, 30–50 cm, falcately curved or irregularly twisted, valves thin and rough, dark brown, pilose. Seeds numerous, compressed, ovoid or elliptic, ca. 8 mm, divided by thick pulp. Fl. Apr–Jun, fr. Oct–Dec.  $2n = 28$ .

Along streams on moist sites, fertile soils. Cultivated in Hong Kong and Shanghai [native to the Americas].

This species is cultivated in temperate regions as an ornamental and used as a wayside tree and hedge. The wood is durable and used for buildings and for props.

#### 5. *Gleditsia sinensis* Lamarck, Encycl. 2: 465. 1788.

皂荚 zao jia

*Gleditsia horrida* Willdenow; *G. macracantha* Desfontaines; *G. officinalis* Hemsley.

Trees or small trees, to 30 m tall. Branches grayish to deep brown. Spines robust, terete, conical, to 16 cm, often branched. Leaves pinnate, 10–18(–26) cm; petiolules 1–2(–5) mm, puberulent; leaflets (2 or) 3–9 pairs, ovate-lanceolate to oblong, 2–8.5(–12.5) × 1–4(–6) cm, papery, abaxially slightly pubescent on midvein, adaxially puberulent, reticulate veinlets conspicuously raised on both surfaces, base rounded or cuneate, sometimes slightly oblique, margin serrate, apex acute or acuminate, tip rounded, mucronate. Flowers polygamous, yellowish white, in axillary or terminal, puberulent racemes 5–14 cm. Male flowers: 9–10 mm in diam.; pedicels 2–8(–10) mm; receptacle deep brown, 2.5–3 mm, outside pubescent; sepals 4, triangular-lanceolate, ca. 3 mm, both sides pubescent; petals 4, oblong, 4–5 mm, puberulent; stamens (6–)8; rudimentary pistil ca. 2.5 mm. Bisexual flowers: 10–12 mm in diam.; pedicels 2–5 mm; sepals and petals similar to those of male flowers but longer;

stamens 8; ovary hairy at base and on sutures; ovules numerous; stigma 2-lobed. Legume brown or reddish brown, curved, strap-shaped, 12–37 × 2–4 cm, straight or twisted, with slightly thick pulp, swollen on both surfaces, some legumes shorter and smaller, ± terete, 5–13 × 1–1.5 cm, without seeds; stipe 1–3.5 cm; valves leathery, often farinose. Seeds numerous, brown, shiny, oblong or elliptic, 11–13 × 8–9 mm. Fl. Mar–May, fr. May–Dec.  $2n = 28^*$ .

• Mountain slopes, forests, valleys, near roads; 200–2500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Shaanxi, Shanxi, Sichuan, Yunnan, Zhejiang.

Specimens from Sichuan called “zhu ya zao,” named as *Gleditsia officinalis*, with curved, small fruit without seeds, are an abnormal type and are referable to this species.

#### 6. *Gleditsia japonica* Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 54. 1867.

山皂荚 shan zao jia

Trees or small trees, to 25 m tall. Branchlets purplish brown or grayish green when bark falls off, slightly ribbed, with scattered whitish lenticels, smooth and glabrous. Spines purplish brown to brownish black, slightly flat, robust, 2–15.5 cm, often branched. Leaves pinnate or bipinnate (pinnae 2–6 pairs), 11–25 cm; petiolules very short; leaflets 3–10 pairs, adaxially sometimes shiny, ovate-oblong or ovate-lanceolate to oblong, 2–7(–9) × 1–3(–4) cm (leaflets of bipinnate leaves obviously smaller), papery to thickly papery, abaxially puberulent on midvein and at base, glabrescent when old, adaxially puberulent or glabrous, slightly scabrous, reticulate veinlets obscure, base broadly cuneate or rounded, slightly oblique, margin entire or repand-crenate, apex rounded, sometimes emarginate. Flowers yellowish green, in axillary or terminal, puberulent spikes. Male inflorescence 8–20 cm; female inflorescence 5–16 cm. Male flowers: 5–6 mm in diam.; receptacle deep brown, ca. 1.5 mm, outside densely brown puberulent; sepals 3 or 4, triangular-lanceolate, ca. 2 mm, both surfaces pubescent; petals 4, elliptic, ca. 2 mm, pubescent; stamens 6–8(or 9). Female flowers: 5–8(–9) mm in diam.; receptacle ca. 2 mm; sepals and petals 4 or 5, similar to those of male flowers in shape, ca. 3 mm, both surfaces densely pubescent; staminodes 4–8; ovary glabrous; ovules numerous; style short, incurved; stigma inflated, 2-lobed. Legume brown or brownish black, compressed, strap-shaped, 20–54 × 2–7 cm, irregularly twisted or falcate, apex with beak 5–15 mm; stipe 1.5–3.5(–5) cm; valves leathery, often bullate, glabrous or velutinous, shiny. Seeds numerous, deep brown, elliptic, 9–10 × 5–7 mm, smooth.  $2n = 28^*$ .

Sunny slopes, valleys, streamsides, near roads, forests; 100–2500 m. Anhui, Guizhou, Hebei, Henan, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Yunnan, Zhejiang [Japan, Korea].

- 1a. Legume densely yellowish green velutinous ..... 6b. var. *velutina*
- 1b. Legume glabrous.
  - 2a. Legume 20–35 × 2–4 cm, female flowers 5–6 mm in diam. .... 6a. var. *japonica*
  - 2b. Legume 30–54 × 4.5–7 cm; female flowers 7–8(–9) in diam. .... 6c. var. *delavayi*

**6a. *Gleditsia japonica* var. *japonica***

山皂荚(原变种) shan zao jia (yuan bian zhong)

*Fagara horrida* Thunberg; *Gleditsia melanacantha* Tang & F. T. Wang.

Female flowers 5–6 mm in diam. Legume 20–35 × 2–4 cm, glabrous.

Sunny slopes, valleys, streamsides, near roads; 100–1000 m. Anhui, Hebei, Henan, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Zhejiang [Japan, Korea].

This species is commonly cultivated in China. The heartwood has a beautiful pink color; the wood is durable and can be used for props, carpentry work, and building. The seeds are used medicinally, and the young leaves are edible.

**6b. *Gleditsia japonica* var. *velutina*** L. C. Li, Acta Phytotax. Sin. 20: 228. 1982.

绒毛皂荚 rong mao zao jia

*Gleditsia horrida* Willdenow subsp. *velutina* (L. C. Li) Paclt; *G. vestita* Chun & F. C. How ex B. G. Li.

Legume densely yellowish green velutinous.

• Mountain slopes, open forests, near roads; ca. 1000 m. Hunan (Hengshan).

**6c. *Gleditsia japonica* var. *delavayi*** (Franchet) L. C. Li, Acta Phytotax. Sin. 20: 228. 1982.

滇皂荚 dian zao jia

*Gleditsia delavayi* Franchet, Pl. Delavay. 189. 1890; *G. horrida* subsp. *delavayi* (Franchet) Paclt.

Female flowers 7–8(–9) mm in diam. Legume 30–54 × 4.5–7 cm, glabrous.

• Mountain slopes in forests, beside villages, near roads; 1200–2500 m. Guizhou, Yunnan.

This taxon is occasionally cultivated.

**16. ACROCARPUS** Wight ex Arnott, Mag. Zool. Bot. 2: 547. 1838.

顶果木属 ding guo mu shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Ding Hou

Trees, buttressed, to 50 m tall or more, unarmed. Leaves alternate, abruptly bipinnate; pinnae opposite; leaflets opposite, petiolulate. Inflorescences racemes, solitary in axils of leaves, or 2 or 3 at apices of short branches; bracts and bracteoles caducous, small. Flowers hermaphroditic. Receptacle campanulate. Sepals 5, subequal, imbricate. Petals 5, equal in size, ca. 2 × as long as sepals. Stamens 5; filaments straight and much more exerted from corolla; anthers dorsifixed, opening by lateral slits. Ovary stalked; ovules numerous; style incurved, short; stigma terminal, small. Legume long stipitate, compressed, strap-shaped, narrowly winged along ventral suture. Seeds numerous, flat, obovoid, with endosperm.

About two species: S and SE Asia; one species in China.

**1. *Acrocarpus fraxinifolius*** Arnott, Mag. Zool. Bot. 2: 547. 1838.

顶果木 ding guo mu

*Acrocarpus fraxinifolius* var. *guangxiensis* S. L. Mo & Y. Wei.

Trees, large, to 30 m tall before tree forks. Leaves 30–40 cm, lower leaves with 3–8 pairs of pinnae, leaves at apices of branches pinnate; rachis of leaves and of pinnae yellowish brown puberulent, glabrescent; leaflets 4–8 pairs, ovate or ovate-oblong, 7–13 × 4–7 cm, subleathery, lateral veins 8–12 pairs, base slightly oblique, broadly cuneate or rounded, margin

entire, apex acuminate or acute. Racemes axillary, 20–25 cm, densely flowered; rachis pubescent at apex. Flowers erect at first, drooping later, scarlet, large. Pedicels 6–8 mm, pubescent. Petals lanceolate, ca. 2 × as long as and alternate with sepals, as receptacles and sepals yellowish brown puberulent. Stamens alternate with petals; filaments long, ca. 2 × as long as and much more exerted from corolla. Ovary long stalked, compressed. Legume purplish brown, flat, 8–15 × 1–2 cm, narrowly winged along ventral suture; wing 3–5 mm wide. Seeds 14–18, light brown.  $2n = 24^*$ .

Sparse forests; 1000–1200 m. Guangxi, Yunnan [Bangladesh, Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand; introduced in tropical Africa (Tanzania, Uganda)].

**17. PELTOPHORUM** (Vogel) Bentham, J. Bot. (Hooker) 2: 75. 1840, nom. cons.

盾柱木属 dun zhu mu shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Ding Hou

*Caesalpinia* sect. *Peltophorum* Vogel, Linnaea 11: 406. 1837.

Trees, deciduous, unarmed. Leaves abruptly bipinnate; pinnae opposite; leaflets numerous, sessile. Inflorescences panicles or racemes, axillary or terminal; bracts caducous or persistent, small; bracteoles absent. Flowers hermaphroditic, yellow; receptacle short. Sepals 5, subequal. Petals 5, as sepals imbricate. Stamens 10, free; filaments slightly exerted, with pilose tuft at bases; anthers oblong, dorsifixed. Ovary sessile, free from receptacle, 2- or more ovuled; style filiform, long, or discoid; stigma broadly peltate, capitate, or discoid, large. Legume compressed, lanceolate-oblong, rarely elongated, indehiscent, veined at middle, with broad wing on each suture. Seeds 2–8, compressed, without endosperm.

About 12 species: tropical regions; two species (one introduced) in China.

- 1a. Pedicels nearly as long as flower buds; stipules entire; flowers in panicles; stigma 3-lobed; legume veined on whole valve when mature ..... 1. *P. pterocarpum*  
 1b. Pedicels ca. 2 × as long as flower buds; stipules lobed; flowers in racemes; stigma entire; legume not veined at middle of valve when mature ..... 2. *P. tonkinense*

**1. *Peltophorum pterocarpum*** (Candolle) Backer ex K. Heyne, Nutt. Pl. Ned.-Ind., ed. 2, 2: 755. 1927.

盾柱木 *dun zhu mu*

*Inga pterocarpa* Candolle, Prodr. 2: 441. 1825; *Caesalpinia ferruginea* Decaisne; *C. inermis* Roxburgh; *Peltophorum ferrugineum* (Decaisne) Benth; *P. inerme* (Roxburgh) Naves ex Fernández-Villar; *P. roxburghii* (G. Don) O. Degener; *Poinciana roxburghii* G. Don.

Trees, 4–15 m tall. Young shoots, petioles, and inflorescences ferruginous hairy; old branches with yellowish, small lenticels. Leaves 30–42 cm; petiole robust; rachis 25–35 cm; pinnae 7–15 pairs, opposite, 8–12 cm; leaflets (7–)10–21 pairs, crowded together, oblong-obovate, 1.2–1.7 cm × 5–7 mm, leathery, abaxially pale green, adaxially deep green, base oblique, margin entire, apex rounded, mucronate. Panicles terminal or axillary, densely ferruginous puberulent; bracts caducous, 5–8 mm. Pedicels ca. 5 mm, ca. as long as flower buds, 5–7 mm from one another. Flower buds globose, 5–8 mm in diam. Sepals ovate, 5–8 × 4–7 mm, outside ferruginous tomentose. Petals obovate, 1.5–1.7 cm × 8–10 mm, densely ferruginous pubescent at middle of both surfaces, long clawed. Filaments ca. 1.2 cm, hirsute at base; anthers ca. 3 mm, sagittate at base. Ovary stalked, hairy, 3- or 4-ovuled; style filiform, much longer than ovary, smooth; stigma discoid, 3-lobed. Legume winged, compressed, fusiform, narrowed to both ends, longitudinally veined at middle part; wings 4–5 mm wide. Seeds 2–4.  $2n = 26$ .

Cultivated in Guangdong (Guangzhou), Guangxi, Yunnan [Bhutan (cultivated), India, Indonesia, Malaysia, Sri Lanka, Thailand, Vietnam; Australia, N Oceania; introduced in E Africa and many other tropical countries].

**2. *Peltophorum tonkinense*** (Pierre) Gagnepain in Lecomte, Fl. Indo-Chine 2: 192. 1913.

银珠 *yin zhu*

*Baryxylum tonkinense* Pierre, Fl. Forest. Cochinch. t. 391C. 1899; *Peltophorum dasyrhachis* (Miquel) Kurz ex Baker var. *tonkinense* (Pierre) K. Larsen & S. S. Larsen.

Trees, 12–20 m tall. Young parts and inflorescences densely ferruginous hairy, glabrescent; old branches with small ferruginous lenticels. Leaves 15–35 cm; rachis 8–25 cm; petiole robust, 3–15 cm; pinnae 6–13 pairs, opposite as leaflets; rachis 4–9 cm, sulcate, inflated at base; leaflets 5–14 pairs, abaxially pale green, adaxially deep green, oblong, 1.5–2 × 0.6–1 cm, adaxially smooth, ferruginous hairy on midvein at first, glabrescent, base attenuate, oblique, apex rounded, emarginate, or mucronate. Racemes subterminal, 8–10 cm. Flowers fragrant, yellowish, large. Pedicels 1–1.5 cm, ferruginous hairy. Receptacle discoid. Sepals subequal, oblong, 8–9 mm, lowest one narrower. Petals obovate-orbicular, ca. 1.5 cm, clawed, margin undulate, ferruginous villous on midvein on both surfaces. Filaments ca. 1 cm, inflated at base, densely ferruginous hairy; anthers oblong, ca. 3.5 mm. Ovary with short stalk, compressed, ferruginous hairy, 2- or 3-ovuled; style filiform, 2–3 × as long as ovary; stigma capitate. Legume reddish brown, fusiform, 8–13 cm, 2.5–3 cm at middle part, thinly leathery, asymmetric at both ends, acuminate, hairy at first, smooth and glabrous when old, winged on both sides; wings 5–7 mm wide. Seeds 3 or 4, yellowish when mature, compressed, obliquely obovoid, ca. 14 × 6 mm. Fl. Mar–Jul, fr. Apr–Oct.

Sparse forests, mountain slopes; 300–400 m. Fujian, Hainan [Cambodia, Laos, Vietnam].

## 18. *DELONIX* Rafinesque, Fl. Tellur. 2: 92. 1837.

凤凰木属 *feng huang mu shu*

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen, Supee Saksuwan Larsen

Trees, unarmed. Leaves large, abruptly bipinnate, stipulate; pinnae many pairs; leaflets numerous, small. Inflorescences corymbose racemes, terminal. Flowers bisexual, white, orange, or red, large, showy. Bracts caducous, small. Receptacle discoid or turbinate. Sepals 5, obovate, subequal, valvate. Petals 5, alternating with sepals, orbicular, margin crispate, clawed. Stamens 10, free, declined. Ovary sessile; ovules numerous; style filiform; stigma truncate. Legume pendulous, compressed, strap-shaped, 2-valved; valves thickly woody, hard. Seeds transverse, oblong.

Two or three species: from E Africa and Madagascar to tropical Asia; one species (introduced) in China.

**1. *Delonix regia*** (Bojer) Rafinesque, Fl. Tellur. 2: 92. 1837.

凤凰木 *feng huang mu*

*Poinciana regia* Bojer, Bot. Mag. 56: t. 2884. 1829.

Trees, deciduous, large, to 20 m tall. Bark grayish brown, rough; crown hemispherical. Branches numerous, spreading;

branchlets puberulent, with conspicuous lenticels. Leaves 20–60 cm; stipules in lower part conspicuously pinnatipartite, in upper part setiform; petiole 7–12 cm, glabrous to puberulent, sulcate, inflated at base; petiolules short; pinnae opposite, 15–20 pairs, 5–10 cm; leaflets 25 pairs, crowded, opposite, oblong, 4–8 × 3–4 mm, midvein conspicuous, both surfaces silky, base oblique, margin entire, apex obtuse. Corymbose racemes termi-

nal or axillary. Flowers bright red to orange-red, 7–10 cm in diam.; pedicels 4–10 cm. Receptacle discoid or shortly turbinate. Sepals reddish inside, margin greenish yellow. Petals reflexed after anthesis, red, tinged with yellow and white spotted, spatulate, 5–7 × 3.7–4 cm; claw long, ca. 2 mm, slender. Stamens curved upward, red, unequal in length, 3–6 cm; filaments thick, woolly in lower part; anthers red, ca. 5 mm. Ovary ca. 1.3 cm; stigma small. Legume dark reddish brown, blackish brown when mature, slightly curved, 30–60 × 3.5–5 cm, apex with

persistent style. Seeds 20–40, yellowish tinged with brown spots, ca. 15 × 7 mm, smooth, hard. Fl. Jun–Jul, fr. Aug–Oct.

Cultivated in Fujian, Guangdong, Guangxi, Taiwan, Yunnan [native to Madagascar; often cultivated in the tropics].

This species is widely cultivated in botanical gardens and city parks in S China as an ornamental tree. The resin is soluble in water. The wood is light, soft, and springy, with a special grain, and is used for craft materials.

## 19. CAESALPINIA Linnaeus, Sp. Pl. 1: 380. 1753.

云实属 yun shi shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Ding Hou

*Guilandina* Linnaeus; *Mezonevron* Desfontaines.

Trees, shrubs, or climbers, usually with prickles. Leaves alternate, bipinnate; leaflets alternate or opposite, small or large. Inflorescences racemes or panicles, axillary or terminal. Flowers yellow or orange-yellow, medium-large or large. Receptacle concave. Sepals separate, imbricate, lowest one larger. Petals 5, often clawed, spreading, 4 usually orbicular, sometimes oblong, uppermost smaller, different in color, shape, and pubescence from others. Stamens 10, in 2 whorls; filaments thickened and hairy at bases; anthers ovoid or elliptic, dorsifixed and versatile. Ovary 1–7-ovuled; style terete; stigma truncate or hollow at center. Legume compressed or swollen, ovoid, oblong, or lanceolate, sometimes falcate, winged or not, smooth or spiny, leathery or woody, rarely fleshy, dehiscent or indehiscent. Seeds ovoid or globose; albumen absent.

About 100 species: pantropical distribution; 20 species (six endemic, two introduced) in China.

### Key based on flowering specimens

- 1a. Leaflets 2 pairs per pinna.
  - 2a. Leaflets glabrous ..... 18. *C. yunnanensis*
  - 2b. Leaflets abaxially hairy over whole surface or only on midvein.
    - 3a. Leaflets elliptic, 4.5–8 cm wide, apex rounded, rarely obtuse ..... 19. *C. elliptifolia*
    - 3b. Leaflets ovate-lanceolate, 2.5–3.5 cm wide, apex acuminate, acute, or obtuse ..... 6. *C. sinensis*
- 1b. Leaflets 3–30 pairs per pinna.
  - 4a. Pedicels 4.5–7 cm; filaments 5–6 cm ..... 12. *C. pulcherrima*
  - 4b. Pedicels less than 4 cm; filaments less than 2 cm.
    - 5a. Leaflets 4–15 × 2.5–7 cm.
      - 6a. Leaflets with apex obtuse-rounded, or very obtuse, abaxially puberulent ..... 5. *C. magnifoliolata*
      - 6b. Leaflets with apex acuminate, abaxially glabrous ..... 15. *C. cucullata*
    - 5b. Leaflets usually much smaller.
      - 7a. Stipules large, leaflike, lobed, lobes up to 2 cm, leaflets pubescent on both surfaces ..... 1. *C. bonduc*
      - 7b. Stipules much smaller, not lobed, or absent.
        - 8a. Leaflets leathery.
          - 9a. Pinnae 8–16 pairs; leaflets usually ovate-lanceolate, 1.2–2.5 cm × 6–12 mm, abaxially sparsely velutinous, apex acute ..... 8. *C. vernalis*
          - 9b. Pinnae 2 or 3(or 4) pairs; leaflets ovate or elliptic, 3–6 × 1.5–3 cm, glabrous, apex obtuse-rounded ..... 7. *C. crista*
        - 8b. Leaflets papery or membranous.
          - 10a. Leaflets abaxially farinose-brown when dry ..... 9. *C. caesia*
          - 10b. Leaflets not as above.
            - 11a. Leaflets 3 or 4 pairs per pinna, slightly rhombic ..... 20. *C. rhombifolia*
            - 11b. Leaflets more pairs per pinna, usually oblong, rarely linear.
              - 12a. Leaflets linear ..... 14. *C. tortuosa*
              - 12b. Leaflets usually oblong.
                - 13a. Pedicels 3–4 cm ..... 11. *C. decapetala*
                - 13b. Pedicels much shorter, 1.2–2 cm.
                  - 14a. Leaflets pilose, ferruginous hairy, or pubescent on both surfaces.
                    - 15a. Leaflets 15–20 pairs per pinna ..... 4. *C. millettii*
                    - 15b. Leaflets 5–9 pairs per pinna.

- 16a. Leaflets 5 or 6 pairs per pinna, 15–20 × ca. 10 mm; ovary 5–7-ovuled ..... 17. *C. hymenocarpa*  
 16b. Leaflets 7–9 pairs per pinna, 6–9 × ca. 3 mm; ovary 2–4-ovuled ..... 13. *C. digyna*  
 14b. Leaflets not as above.  
 17a. Leaflets less than 1 cm, abaxially and marginally with bristles; ovary 1- or 2-ovuled ..... 3. *C. mimosoides*  
 17b. Leaflets 1–4 cm, without bristles; ovary 3–8-ovuled.  
 18a. Leaflets with apex shortly acuminate; petals white, tinged with purple spots, ca. 18 mm ..... 2. *C. minax*  
 18b. Leaflets with apex retuse or obtuse-rounded; petals yellow, 8–9 mm.  
 19a. Leaflets papery; upper petal with apex entire ..... 10. *C. sappan*  
 19b. Leaflets membranous; upper petal with apex 2-lobed ..... 16. *C. enneaphylla*

### Key based on fruiting specimens

- 1a. Legume winged, wings 5–10 mm wide (*C. subg. Mezonevron* (Desfontaines) J. E. Vidal ex Herendeen & Zarucchi).  
 2a. Leaflets usually more than 4 cm; pinnae usually 2–5 pairs; petals smooth, glabrous, inner one broad and short, shortly clawed; legume samara-like, oblong, zygomorphic, 1-seeded at central part ..... 15. *C. cucullata*  
 2b. Leaflets usually not more than 2.5 cm; pinnae usually 6–10 pairs; petals hairy, inner one with long claw; legume 3–7-seeded.  
 3a. Leaflets glabrous; seeds swollen-ridged at middle; legume conspicuously swollen opposite each seed ..... 16. *C. enneaphylla*  
 3b. Leaflets hairy, especially densely so abaxially; legume and seeds not as above ..... 17. *C. hymenocarpa*  
 1b. Legume wingless or narrowly winged; wing less than 5 mm wide (*C. subg. Caesalpinia*).  
 4a. Legume fleshy, indehiscent.  
 5a. Rachis of leaves 17–23 cm; pinnae 3–6 cm; leaflets adaxially hairy, not shiny ..... 13. *C. digyna*  
 5b. Rachis of leaves 30–40 cm; pinnae 5–16 cm; leaflets adaxially glabrous or shortly hairy, shiny ..... 14. *C. tortuosa*  
 4b. Legume not fleshy.  
 6a. Legume spiny or bristly.  
 7a. Legume obovoid, falcate, 4–5 × ca. 1 cm, much longer than wide, setose, 1- or 2-seeded ..... 3. *C. mimosoides*  
 7b. Legume oblong, 5–13 × 4–5 cm, densely spiny, 2–8-seeded.  
 8a. Stipules large, leaflike, parted or lobed; bracts subulate; petals yellow; legume 5–7 × 4–5 cm, ca. as long as wide; seeds subglobose ..... 1. *C. bonduc*  
 8b. Stipules subulate; bracts elliptic; petals whitish, tinged with red spots; legume 7.5–13 × 4–4.5 cm; seeds terete ..... 2. *C. minax*  
 6b. Legume without spines and setae.  
 9a. Legume ovoid, elliptic, ± oblong, or lanceolate-oblong.  
 10a. Leaflets abaxially farinose-brown when dry; legume ventral sutures narrowly winged, apex without beak ..... 9. *C. caesia*  
 10b. Leaflets abaxially not farinose-brown; legume ventral sutures narrowly winged or not winged, apex with or without beak.  
 11a. Legume oblong-ligulate or oblanceolate-oblong, 6–9-seeded or more; pedicels 3.5–7 cm.  
 12a. Climbers with copious prickles; legume oblong-ligulate, 2.5–3 cm wide, narrowly winged along ventral suture, dehiscent ..... 11. *C. decapetala*  
 12b. Small trees, without or with scattered, sparse prickles; legume oblanceolate-oblong, 1.5–2 cm wide, not winged along ventral suture, indehiscent ..... 12. *C. pulcherrima*  
 11b. Legume suboblong, oblong to elliptic, or oblong-obovoid, 1–4-seeded; pedicels to ca. 2 cm.  
 13a. Leaflets 10–17 pairs per pinna, papery, 10–20 × 5–7 mm; legume woody ..... 10. *C. sappan*  
 13b. Leaflets 2 pairs per pinna, leathery, 60–130 × 25–80 mm; legume leathery.  
 14a. Leaflets 2.5–3 cm wide, glabrous, apex acuminate; legume dehiscent ..... 18. *C. yunnanensis*  
 14b. Leaflets 4.5–8 cm wide, abaxially brown hairy, apex rounded or obtuse; legume indehiscent ..... 19. *C. elliptifolia*  
 9b. Legume compressed, suborbicular, ± obliquely broadly ovoid, or obliquely oblong.  
 15a. Leaflets 7–13 mm; legume leathery, winged along ventral suture ..... 4. *C. millettii*  
 15b. Leaflets 15–150 mm; legume woody or leathery, winged or not winged along ventral suture.

- 16a. Leaflets 6–10 pairs, ovate-lanceolate, apex acuminate, abaxially glaucous; legume without reticulate veins ..... 8. *C. vernalis*
- 16b. Leaflets 2–6 pairs, elliptic, ovate, oblong, or broadly ovate; legume with conspicuous reticulate veins.
- 17a. Legume woody; leaflets to 15 cm ..... 5. *C. magnifoliolata*
- 17b. Legume leathery; leaflets not more than 9 cm.
- 18a. Apices of leaflets acuminate; legume with wings ca. 3 mm wide, along ventral sutures ..... 6. *C. sinensis*
- 18b. Apices of leaflets obtuse-rounded, sometimes emarginate, rarely acute; legume not winged or wings obscure.
- 19a. Leaflets 4–6 pairs per pinna, ovate or elliptic, 3–6 × 1.5–3 cm ..... 7. *C. crista*
- 19b. Leaflets 3 or 4 pairs per pinna, slightly rhombic, 1.5–2 × 0.8–1.2 cm ..... 20. *C. rhombifolia*

**1. *Caesalpinia bonduc*** (Linnaeus) Roxburgh, Fl. Ind., ed. 1832, 2: 362. 1832.

刺果苏木 *ci guo su mu*

*Guilandina bonduc* Linnaeus, Sp. Pl. 1: 381. 1753; *G. bonducella* Linnaeus; *Caesalpinia bonducella* (Linnaeus) Fleming.

Climbers, prickly, yellowish pubescent throughout. Prickles straight or somewhat recurved. Leaves 30–45 cm; rachis with recurved prickles; pinnae 6–9 pairs, opposite; stipules deciduous, large, leaflike, usually lobed, lobes to 2 cm; leaflets 6–12 pairs, oblong, 1.5–4 × 1.2–2 cm, membranous, both surfaces pubescent, base oblique, apex rounded to acute, mucronate. Racemes axillary, long pedunculate, densely flowered in upper part and sparsely so in lower part; bracts caducous at anthesis, reflexed, subulate, 6–8 mm, pubescent. Pedicels 3–5 mm. Sepals 5, ca. 8 mm, both sides ferruginous hairy. Petals yellowish; standard tinged with red spots, oblanceolate, clawed. Filaments short, hairy in basal part. Ovary hairy. Legume oblong, 5–7 × 4–5 cm, leathery, apex rounded and with beak, swollen, with dense, slender spines 5–10 mm. Seeds 2 or 3, grayish, shiny, ovoid to globose. Fl. Feb, Jul–Oct, fr. Oct–May.

Thickets, roadsides, near seashores; near sea level to 200 m. Guangdong, Guangxi, Hainan, Taiwan [pantropical].

**2. *Caesalpinia minax*** Hance, J. Bot. 22: 365. 1884.

喙荚云实 *hui jia yun shi*

*Caesalpinia morsei* Dunn.

Climbers, prickly, puberulent throughout. Leaves to 45 cm; stipules subulate, hard; pinnae 5–8 pairs; leaflets 6–12 pairs, elliptic or oblong, 2–4 × 1.1–1.7 cm, puberulent on midvein, base rounded and slightly oblique, apex obtuse-rounded or acute. Racemes or panicles terminal; bracts ovate-lanceolate, apex shortly acuminate. Pedicels ca. 1.5 cm. Sepals 5, ca. 1.3 cm, densely yellowish velutinous. Petals whitish, tinged with purple spots, obovate, ca. 1.8 × 1.2 cm, abaxially and marginally hairy, contiguous at base, apex obtuse-rounded. Stamens 10, slightly shorter than petals, densely pubescent in lower part. Ovary with dense, small spines, 7- or 8-ovuled; style slightly longer than stamens, glabrous. Legume oblong, 7.5–13 × 4–4.5 cm, densely spiny, apex obtuse-rounded, with beak 5–25 mm. Seeds 4–8, elliptic, slightly concave on one side, ca. 1.8 × 1 cm, with cyclic veins. Fl. Mar–May, Jul, Sep, Nov, fr. Apr–Dec.

Mountain valleys, by streams, among bushes; below 100–1500 m. Fujian (cultivated), Guangdong, Guangxi, Guizhou, Sichuan, Taiwan, Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

**3. *Caesalpinia mimosoides*** Lamarck, Encycl. 1: 462. 1785.

含羞云实 *han xiu yun shi*

Climbers, woody. Branchlets densely ferruginous glandular hairy, with recurved prickles. Leaves 22–36 cm; pinnae opposite, 13–23 pairs, ca. 3.5 cm; leaflets opposite, 7–14 pairs, oblong, ca. 9 × 4 mm, abaxially and marginally with bristles. Racemes terminal, lax. Flowers large, more than 50 per inflorescence; pedicels unequal in length, 1.5–2 cm in upper part and 3–3.5 cm in lower part of inflorescence. Sepals 5, ca. 10 × 8 mm. Petals bright yellow, suborbicular, upper one smaller, ca. 8 mm wide, others larger, ca. 1.7 × 1.3 cm. Stamens 10; filaments ca. 1.8 cm, densely cottony in lower part. Ovary ca. 5 mm, densely hairy, 1- or 2-ovuled; style 1.4–1.5 cm, pilose; stigma truncate. Legume obovoid, falcate, 4–5 × ca. 2.5 cm, setose, dehiscent. Seeds 1 or 2, oblong. Fl. Nov–Dec, fr. Feb–Mar.

Among bushes, near roads; 600–700 m. Yunnan (Xishuangbanna) [Bangladesh, India, Laos, Myanmar, Thailand, Vietnam].

**4. *Caesalpinia milletii*** Hooker & Arnott, Bot. Beechey Voy. 182. 1833.

小叶云实 *xiao ye yun shi*

*Pterolobium subvestitum* Hance.

Climbers, prickly, ferruginous puberulent throughout. Leaves 19–20 cm; rachis with recurved prickles in pairs; pinnae 7–12 pairs; leaflets 15–20 pairs, alternate, oblong, 7–13 × 4–5 mm, both surfaces ferruginous hairy, much denser abaxially, base obliquely truncate, apex obtuse-rounded. Panicles axillary, to 30 cm. Flowers numerous, compact in upper part, sparse in lower part of inflorescence; pedicels ca. 1.5 cm, sparsely puberulent. Sepals 5, lowest one ca. 8 mm, others ca. 5 mm. Petals yellowish, suborbicular, ca. 8 mm wide, upper one smaller, ca. 4 mm wide, clawed. Stamens ca. 1 cm; filaments pilose in lower part. Pistil slightly longer than stamens, ca. 1.3 cm; ovary and lower part of style pubescent; stigma truncate, hairy. Legume obovoid, adaxial suture straight, narrowly winged, puberulent; valves leathery, unarmed, dehiscent along dorsal suture when mature. Seed solitary, brownish red, shiny, reniform, ca. 11 × 6 mm, with cyclic veins. Fl. Aug–Sep, fr. Apr, Sep–Dec.

• Among bushes, foothills, by streams; 200–800 m. Guangdong, Guangxi, S Hunan, S Jiangxi.

**5. *Caesalpinia magnifoliolata*** F. P. Metcalf, *Lingnan Sci. J.* 19: 553. 1940.

大叶云实 da ye yun shi

Climbers, prickly. Branchlets ferruginous puberulent. Leaves with pinnae 2 or 3 pairs; petioles and petiolules puberulent; leaflets 4–6 pairs, adaxially shiny, oblong, 4–15 × 2.5–7 cm, leathery, abaxially puberulent, adaxially glabrous, both ends obtuse-rounded or apex very obtuse. Racemes axillary or panicles terminal. Flowers yellow; pedicels 9–10 mm. Sepals 5, ca. 5 × 3 mm. Petals ca. 10 × 5 mm, shortly clawed. Stamens 10; filaments ca. 1 cm, puberulent in lower part. Ovary subsessile, 2- or 3-ovuled, glabrous; style ca. 1 cm; stigma truncate. Legume compressed, suborbicular, 3.5–4 × ca. 3.5 cm, dorsal suture extending to both sides and forming a carinate narrow wing; valves brown, woody, with robust reticulate veins. Seed solitary, brownish black, compressed, suborbicular, ca. 2 cm in diam. Fl. Feb, Apr, Jul, fr. May–Jun, Aug, Oct–Nov.

• Forests, among bushes; 400–1800 m. Guangdong, Guangxi, S Guizhou, S Yunnan.

**6. *Caesalpinia sinensis*** (Hemsley) J. E. Vidal, *Bull. Mus. Natl. Hist. Nat., Sér. 3, Bot.* 27: 90. 1976, nom. cons., not *C. chinensis* Roxburgh (1832).

鸡嘴勒 ji zui le

*Mezonevron sinense* Hemsley, *J. Linn. Soc., Bot.* 23: 204. 1887; *Caesalpinia parvifolia* Steudel; *C. stenoptera* Merrill; *C. tsoongii* Merrill; *M. sinense* var. *parvifolium* Hemsley.

Climbers. Stems and branchlets with scattered, robust, recurved prickles. Young shoots ± ferruginous pubescent, glabrescent or subglabrous when old. Leaves bipinnate; rachis with recurved prickles; petiolules short; pinnae 2 or 3 pairs, ca. 30 cm; leaflets 2 pairs, adaxially light green to olive-green, slightly shiny, oblong to ovate, 6–9 × 2.5–3.5 cm, leathery, abaxially hairy on midvein, adaxially glabrous, lateral veins ca. 20 pairs, conspicuous, base rounded or oblique, apex acuminate, acute, or obtuse. Panicles axillary or terminal. Pedicels ca. 5 mm. Sepals 5, ca. 4 × 3 mm. Petals 5, yellow, ca. 7 mm, with claw ca. 3 mm. Stamens 10; filaments ca. 1 cm, ferruginous pubescent in lower part. Pistil longer than stamens; ovary subsessile, pubescent or subglabrous, 1- or 2(–4)-ovuled. Legume chestnut-brown, compressed, suborbicular, ca. 4.5 × 3.5 cm, leathery, conspicuously reticulate, ventral suture slightly curved, narrowly winged, wing ca. 3 mm wide, apex with beak ca. 3 mm. Seed solitary, compressed, suborbicular, ca. 2 cm in diam. Fl. Mar–May, fr. Mar–Apr, Jul–Oct.

Forests, among bushes; 100–900 m. Guangdong, Guangxi, Guizhou, Hubei, Yunnan [Laos, Myanmar, N Vietnam].

**7. *Caesalpinia crista*** Linnaeus, *Sp. Pl.* 1: 380. 1753.

华南云实 hua nan yun shi

*Caesalpinia kwangtungensis* Merrill; *C. nuga* (Linnaeus) Aiton; *C. szechuenensis* Craib; *Guilandina nuga* Linnaeus.

Climbers, woody, to 10 m tall. Bark blackish, with few recurved prickles. Leaves 20–30 cm; rachis with blackish recurved prickles; pinnae 2 or 3(or 4) pairs, opposite; leaflets 4–6 pairs, opposite, with short petiolules, adaxially shiny, ovate or elliptic, 3–6 × 1.5–3 cm, leathery, both surfaces glabrous, base broadly cuneate or obtuse, apex obtuse-rounded, sometimes emarginate, rarely acute. Racemes 10–20 cm, arranged in terminal, lax, large panicles. Flowers fragrant; pedicels 5–15 mm, slender. Sepals 5, lanceolate, ca. 6 mm, glabrous. Petals unequal: 4 yellow, ovate, glabrous, slightly conspicuously shortly clawed; upper one tinged with red stripes, attenuate to claw, inside hairy at central part. Stamens slightly extended; filaments inflated and hairy at base. Ovary hairy, 2-ovuled. Legume obliquely ovoid, 3–4 × 2–3 cm, swollen, leathery, reticulate, apex beaked. Seed solitary, compressed. Fl. Apr–Jul, fr. Jul–Dec.  $2n = 24$ .

Mountain slopes, forests; 400–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Taiwan, Yunnan [Cambodia, India, Indonesia, Japan (Ryukyu Islands), Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia, Polynesia].

**8. *Caesalpinia vernalis*** Champion ex Bentham, Hooker's *J. Bot. Kew Gard. Misc.* 4: 77. 1852.

春云实 chun yun shi

Climbers, prickly, ferruginous velutinous throughout. Leaves with 25–30 cm, pubescent, prickly rachis; pinnae 8–16 pairs, 5–8 cm; petiolules 1.5–2 mm; leaflets 6–10 pairs, abaxially glaucous, adaxially deep green and shiny, ovate-lanceolate, ovate, or elliptic, 1.2–2.5 cm × 6–12 mm, leathery, abaxially sparsely ferruginous velutinous, adaxially glabrous, base rounded, apex acute. Panicles in axils of upper leaves or terminal, with abundant flowers. Pedicels 7–9 mm. Sepals obovate-oblong, ciliate, lower one larger than others, ca. 1 cm. Petals yellow, upper one smaller, revolute, with red stripes. Stamens apically descending, lower part of filaments pubescent. Ovary with short stalk, puberulent, 2-ovuled; style thick; stigma obliquely truncate. Legume blackish purple, obliquely oblong, 4–6 × 2.5–3.5 cm, woody, wrinkled, without reticulate veins, apex beaked. Seeds 2, shiny, axe-shaped, ca. 1.7 × 2 cm, truncate and slightly concave on one end. Fl. Apr, fr. Dec.

• Moist sandy soils, beside rocks along valleys, thickets; ca. 600 m. S Fujian, Guangdong, S Zhejiang.

**9. *Caesalpinia caesia*** Handel-Mazzetti, *Oesterr. Bot. Z.* 85: 215. 1936.

粉叶苏木 fen ye su mu

*Caesalpinia hypoglauca* Chun & F. C. How.

Climbers. Branchlets with sparse recurved prickles, puberulent. Leaves 15–20 cm; pinnae 5–8 pairs; rachis of leaves and pinnae pilose; leaflets 8–12 pairs, opposite, dispersed, subsessile, abaxially farinose-brown when dry, adaxially brown, shiny, oblong, 8–15 × 4–6 mm, papery, both surfaces glabrous, base obliquely truncate, apex truncate or obtuse-rounded, emarginate. Panicles axillary, 10–15 cm, brown puberulent. Pedicels 4–7 mm, jointed at apex. Flowers ca. 8 mm in diam. at anthesis. Sepals 5, glabrous, lowest one cucullate-lanceolate, ca. 6 mm, apex obtuse, other 4 ovate-oblong, slightly shorter, 3.5–4 mm.

Petals obovate-oblong, 3.5–4 mm, pubescent, shortly clawed. Stamens 10; filaments ferruginous pilose at base. Ovary elliptic, glabrous, 2-ovuled. Legume blackish when dry, ovoid or elliptic, ca.  $5 \times 2.3$ –3 cm, thin, swollen at maturity, concave, ventral suture narrowly winged, 1-seeded. Fl. Jul–Sep, fr. Aug.

- Sparse forests along rivers; 200–1000 m. Guangxi, Hainan.

**10. *Caesalpinia sappan*** Linnaeus, Sp. Pl. 1: 381. 1753.

苏木 su mu

Trees, small, to 6 m tall,  $\pm$  puberulent except on old branches and legumes. Branches with dense, conspicuous lenticels. Leaves 30–45 cm; pinnae 7–13 pairs, opposite, 8–12 cm; leaflets 10–17 pairs, closely spaced, sessile, oblong to oblong-rhombic, 1–2 cm  $\times$  5–7 mm, papery, both surfaces glabrous or sparsely hairy, lateral veins slender, conspicuous on both surfaces, contiguous near margin, base oblique, inserted at oblique angles to rachis of pinnae, apex retuse or rounded. Panicles terminal or axillary, ca. as long as leaves; bracts caducous, lanceolate, large. Pedicels ca. 1.5 cm, puberulent. Receptacle shallowly campanulate. Sepals 5, slightly unequal, lower one larger than others, cucullate. Petals yellow, broadly obovate, ca. 9 mm, uppermost one entire at apex, tinged pink at base, clawed. Stamens slightly exerted; filaments densely pubescent at lower part. Ovary grayish velutinous, stalked, 3–6-ovuled; style slender, hairy; stigma truncate. Legume reddish brown, shiny, slightly compressed, suboblong to oblong-obovoid, ca.  $7 \times 3.5$ –4 cm, woody, attenuate to base, apex obliquely truncate, upper margin with a sharp beak. Seeds 3 or 4, light brown, slightly compressed, oblong. Fl. May–Oct, fr. Jul–Mar.  $2n = 24$ .

Cultivated in Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan [native origin unknown; Cambodia, India, Laos, Malaysia, Myanmar, Sri Lanka, Vietnam; Africa, America].

The heartwood contains a red dye and is used medicinally to relieve pain.

**11. *Caesalpinia decapetala*** (Roth) Alston in Trimen, Handb. Fl. Ceylon 6(Suppl.): 89. 1931.

云实 yun shi

*Reichardia decapetala* Roth, Nov. Pl. Sp. 212. 1821; *Caesalpinia decapetala* var. *japonica* (Siebold & Zuccarini) H. Ohashi; *C. decapetala* var. *pubescens* (Tang & F. T. Wang) P. C. Huang; *C. japonica* Siebold & Zuccarini; *C. sepiaria* Roxburgh; *C. sepiaria* var. *japonica* (Siebold & Zuccarini) Gagne-pain; *C. sepiaria* var. *pubescens* Tang & F. T. Wang.

Climbers, with copious prickles. Bark dull red. Branches, rachis of leaves, and inflorescence with recurved prickles and pubescent. Leaves 20–30 cm; pinnae 3–10 pairs, opposite, with prickles in pairs at base; stipules obliquely ovate, apex acuminate, caducous; leaflets 8–12 pairs, oblong, 1–2.5 cm  $\times$  6–12 mm, membranous, both surfaces puberulent, glabrescent when old, both ends obtuse-rounded. Racemes terminal, 15–30 cm, with abundant flowers; rachis densely prickly. Pedicels 3–4 cm, hairy, jointed at apex so flowers easily fall off. Sepals 5, oblong, puberulent. Petals reflexed at anthesis, yellow, orbicular or obovate, 1–1.2 cm, membranous, base shortly clawed. Stamens subequal to petals in length; filaments compressed at base, lanate in

lower part. Ovary glabrous. Legume chestnut-brown, shiny, oblong-ligulate, 6–12  $\times$  2.5–3 cm, fragile-leathery, glabrous, dehiscent and thickened to a narrow wing along ventral suture when ripe, apex prolonged into a sharp beak. Seeds 6–9, brown, elliptic, ca. 11  $\times$  6 mm. Fl. and fr. Apr–Oct.  $2n = 22^*$ ,  $24^*$ .

Among bushes on mountain slopes, ravines, plains, hills, by riversides; near sea level to 1800 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam].

The roots, stems, and legumes are used medicinally for relieving pain.

**12. *Caesalpinia pulcherrima*** (Linnaeus) Swartz, Observ. Bot. 166. 1791.

金凤花 jin feng hua

*Poinciana pulcherrima* Linnaeus, Sp. Pl. 1: 380. 1753.

Shrubs or small trees. Branches green or farinose-green, smooth, with scattered, sparse prickles. Leaves 12–26 cm; pinnae 4–8 pairs, opposite, 6–12 cm; petiolules short; leaflets 7–11 pairs, oblong or obovate, 1–2 cm  $\times$  4–8 mm, base oblique, apex emarginate, sometimes acute. Racemes subcorymbose, terminal or axillary, lax, to 25 cm. Pedicels unequal in length, 4.5–7 cm. Receptacle concave to turbinate, glabrous. Sepals 5, glabrous, lowest one ca. 1.4 cm, others ca. 1 cm. Petals orange-red or yellow, orbicular, 1–2.5 cm, margin wavy, with claw subequal to limb in length. Stamens very far exerted; filaments red, 5–6 cm, thick and hairy in basal part. Ovary glabrous; style orange-yellow, long, 5–6.5 mm. Legume blackish brown when ripe, oblanceolate-oblong, narrow and thin, 6–10  $\times$  1.5–2 cm, not winged, glabrous, indehiscent, apex rounded, upper suture ending in a sharp beak. Seeds 6–9. Fl. and fr. year-round.  $2n = 24, 28$ .

Cultivated in Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [native to South America; cultivated throughout the tropics].

This species is a valuable ornamental of tropical regions.

**13. *Caesalpinia digyna*** Rottler, Neue Schriften Ges. Naturf. Freunde Berlin 4: 200. 1803.

肉荚云实 rou jia yun shi

Climbers, large, with recurved prickles. Bark deep brown. Leaves 12–20 cm; rachis 17–23 cm, with recurved prickles, puberulent or glabrous; pinnae 6–9 pairs, 3–6 cm, with stipuliform prickles in pairs at base; leaflets 7–9 pairs, subsessile, closely spaced, oblong, 6–9  $\times$  ca. 3 mm, papery, both surfaces pilose at first, base obliquely rounded, apex obtuse-rounded. Racemes terminal or axillary, ca. as long as or longer than leaves. Pedicels 1.2–2 cm, slender. Receptacle shallowly cup-shaped, glabrescent. Sepals 5, 6–8 mm. Petals yellow, suborbicular, ca. 1 cm, shortly clawed. Filaments slightly exerted, densely villous in lower part, thickened at base. Ovary glabrous. Legume brown, indehiscent, oblong, 3.5–5  $\times$  1.6–2 cm, fleshy, smooth. Seeds 2–4. Fl. Apr–Nov, fr. May–Mar.

Among bushes on mountain slopes, seashores; 200–300 m.

Hainan, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

**14. *Caesalpinia tortuosa*** Roxburgh, Fl. Ind., ed. 1832, 2: 365. 1832.

扭果苏木 niu guo su mu

Climbers, erect shrubs, or small trees, to 10 m tall. Branches glabrous, with scattered recurved prickles. Leaves with tomentose rachis 30–40 cm; stipules absent; pinnae 7–20 pairs, 5–16 cm, with prickles in pairs at base; leaflets 12–30 pairs, sessile, linear, ca. 15 × 5 mm, membranous, lateral veins conspicuous, 4–6 pairs, base obliquely truncate, apex obtuse-rounded. Racemes or panicles terminal or axillary, 20–60 cm, pubescent. Pedicels 8–20 mm, not jointed above base. Sepals 5, unequal, lowest one deeply cucullate, ca. 10 × 7 mm, other 4 ca. 6 × 4 mm, usually ciliate. Petals yellowish, often tinged with spots. Stamens 10; filaments 1–1.4 cm, hairy at lower part. Pistil 1–1.6 cm; ovary sessile, pubescent or glabrous, 4- or 5-ovuled; style inclined; stigma truncate, ciliate. Legume blackish when dry, indehiscent, often twisted, 3.5–9 × 2–3.5 cm, base rounded, apex obtuse, shortly beaked, both sutures thickened, often constricted between seeds, exocarp and endocarp adnate, swollen on seeds, transversely cleft when ripe. Seeds 1–5(–7), subglobose, ca. 1 cm in diam. Fl. Jun–Aug, fr. Jul–Aug.

Among bushes on mountain slopes; ca. 1400 m. Guangdong (Guangzhou, cultivated), Yunnan [India, Indonesia, Malaysia, Myanmar].

**15. *Caesalpinia cucullata*** Roxburgh, Fl. Ind., ed. 1832, 2: 358. 1832.

见血飞 jian xue fei

*Mezonevron cucullatum* (Roxburgh) Wight & Arnott.

Climbers, 3–5 m tall, with recurved prickles on old stems forming compressed orbicular corky knob. Branches and rachis of leaves with blackish brown recurved prickles. Leaf rachis 20–40 cm; pinnae 2–5 pairs, stalked; stipules absent; leaflets 3–6 pairs, abaxially grayish white, adaxially deep green and shiny, ovate, broadly ovate, or oblong, large, 4–12 × 2.5–5 cm, leathery, base broadly cuneate or obtuse-rounded, apex acuminate. Panicles terminal or racemes lateral, subequal to leaves in length. Flowers zygomorphic; pedicels 6–12 mm, jointed, glabrous. Receptacle deeply discoid or shallowly campanulate. Sepals 5, unequal, lowest one cucullate, others triangular-oblong, withered and falling after anthesis. Petals yellow, uppermost one short and broad, apex 2-lobed forming fishtail-shape, shortly clawed at base, other 4 yellowish tinged red striate, shiny, oblong, glabrous. Stamens 10, exserted, slightly thickened at base, brown pubescent. Ovary compressed, 1(or 2)-ovuled; style slender; stigma small, truncate. Legume reddish brown, shiny, compressed, elliptic-oblong, 8–12 × 2.5–3.5 cm, indehiscent, winged along ventral suture, wing 6–9 mm wide. Seed 1(or 2). Fl. Nov–Feb, fr. Mar–Oct.

Open forests, among bushes on mountain slopes; 500–1200 m. Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

**16. *Caesalpinia enneaphylla*** Roxburgh, Fl. Ind., ed. 1832, 2: 363. 1832.

九羽见血飞 jiu yu jian xue fei

*Mezonevron enneaphyllum* (Roxburgh) Wight & Arnott.

Climbers, large. Branches with scattered, blackish brown, recurved prickles. Leaves alternate; rachis 25–30 cm; pinnae 8–10 pairs, stalked, opposite, 6–8 cm, with blackish brown prickles in pairs at base; petiolules short; leaflets 8–12 pairs, opposite, oblong, (10–)15–25 × 5–8 mm, membranous, both ends obtuse-rounded. Panicles terminal or racemes axillary, 10–20 cm, pubescent. Flowers fragrant, papilionaceous, large; pedicels 1–2.5 cm. Receptacle discoid, persistent after anthesis. Sepals 5, glabrous, unequal, lowermost one cucullate. Petals yellow, upper one suborbicular, apex 2-lobed forming fishtail-shape. Stamens 10; filaments slender, thickened and densely yellowish brown villous from middle downward; anthers dull brown. Ovary subsessile, inserted at base of receptacle, glabrous, 3–7-ovuled; style long. Legume reddish brown, subsessile, compressed, broadly lanceolate or elliptic-oblong, 10–14 × 3–3.5 cm, smooth, without prickles, winged along ventral suture, wing 5–6 mm wide. Seeds 3–7, ovoid, with swollen ridge at middle. Fl. Sep–Oct, fr. Oct–Feb.

Among bushes on mountain slopes, at foot of mountains, open forests; ca. 600 m. S and SW Guangxi, Yunnan [Bangladesh, India, Indonesia, Malaysia, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam].

**17. *Caesalpinia hymenocarpa*** (Wight & Arnott ex Prain) Hattink, Reinwardtia 9: 35. 1974.

膜荚见血飞 mo jia jian xue fei

*Mezonevron hymenocarpum* Wight & Arnott ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 233, 472. 1897.

Climbers. Branches sparsely yellowish pubescent, with scattered, yellowish brown, recurved prickles. Leaves alternate; rachis 20–30 cm; pinnae 8–10 pairs, opposite; rachis of pinnae and leaves yellowish pubescent; petiolules short, with opposite, recurved prickles with stipules scalelike, ca. 0.5 mm; leaflets 5 or 6 pairs, abaxially yellowish green, adaxially deep green, oblong, 1.5–2 × ca. 1 cm, membranous, both surfaces yellowish pubescent, base broadly cuneate, apex obtuse-rounded. Racemes or panicles axillary or terminal, 30–50 cm. Pedicels 1–1.5 cm; bracts yellowish brown, lanceolate, densely yellowish pubescent, apex long acuminate. Receptacle discoid. Sepals 5, outside yellowish pubescent, lowest one cucullate, others oblong. Petals yellow, upper one orbicular, clawed, lateral 2 smaller, lowermost one folded and raised. Stamens 10; filaments thickened at lower part, densely brown villous, unequal, curved; anthers elliptic. Ovary smooth, 5–7-ovuled; style gradually inflated toward lower part; stigma praemorse. Legume compressed, thin, falcate, 10–15 × ca. 2.5 cm when ripe, winged along ventral suture, wing ca. 1 cm wide. Seeds 5–7, compressed, narrowly ovoid. Fl. Sep–Oct, fr. Dec–Feb.

Open forests, humid places; 300–800 m. W Guangxi (Baise), Yunnan [Bangladesh, Cambodia, India (Andaman Islands), Indonesia, Laos, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

**18. *Caesalpinia yunnanensis*** S. J. Li, D. X. Zhang & Z. Y. Chen, Novon 16: 78. 2006.

云南云实 yun nan yun shi

Lianas. Branchlets with recurved prickles. Stipules absent; leaf rachis ca. 20 cm, with recurved prickles; pinnae 3 pairs, opposite; petiolules 3–4 mm; leaflets 2 pairs per pinna, opposite, adaxially shiny, ovate-lanceolate, 6–9 × 2.5–3 cm, leathery, both surfaces glabrous, base slightly rounded or sometimes broadly cuneate, apex obtuse-acuminate. Flowers not seen. Legume oblong to elliptic, slightly asymmetric or obliquely asymmetric, 4–7 × 2.5–3 cm, leathery, base broadly cuneate, apex obtuse, beaked. Seed solitary, compressed. Fr. Oct.

• Thickets at riversides, sparse woodlands at roadsides; ca. 600 m. Yunnan (Xishuangbanna).

**19. *Caesalpinia elliptifolia*** S. J. Li, Z. Y. Chen & D. X. Zhang, *Nordic J. Bot.* 22: 349. 2003.

椭圆叶云实 tuo yuan ye yun shi

Lianas, to 15 m; young parts with dense, brown hairs. Branchlets occasionally with scattered, recurved prickles. Stipules absent; leaf rachis 20–30 cm, with recurved prickles; pinnae 1 or 2 pairs; petiolules 2–3 mm; leaflets opposite, 2 pairs per pinna, elliptic, 7–13 × 4.5–8 cm, leathery, abaxially with brown hairs especially on midvein, adaxially glabrous, base rounded, apex rounded, rarely obtuse. Racemes terminal and supra-axillary, aggregated into a panicle, 15–25 cm, all parts densely hairy; bracts caducous, lanceolate, 1–3 mm; pedicels 8–12 mm. Flowers yellow. Sepals oblong, ca. 6 × 2 mm. Petals unequal, 10–15 × 4–5 mm, shortly clawed. Stamens 10; filaments 9–14 mm, woolly from base to just above middle. Ovary subsessile, ca. 2 mm, hairy, 1- or 2-ovuled; style 7–10 mm,

occasionally as short as 2 mm; stigma truncate. Legume compressed, indehiscent, oblong-elliptic, subsymmetrical, ca. 5 × 2.5 cm, without narrow wing, leathery, with robust reticulate veins. Seeds 1 or 2, brownish black, compressed, suborbicular, ca. 1.5 cm in diam. Fl. Apr, fr. May–Jun.

• Beside ditches; ca. 100 m. Guangdong (Fengkai).

**20. *Caesalpinia rhombifolia*** J. E. Vidal, *Adansonia*, n.s., 15: 394. 1976.

菱叶云实 ling ye yun shi

Climbers, woody. Branches with few prickles. Leaf rachis ca. 15 cm, with prickles; pinnae 4–6 pairs, opposite; rachis 4–5 cm, with one pair of prickles at base; petiolules ca. 1 mm; leaflets 3 or 4 pairs, opposite, slightly rhombic, 1.5–2 × 0.8–1.2 cm, papery, both surfaces glabrous, base broadly cuneate, apex acute, rarely slightly emarginate. Racemes paniculate, terminal or axillary, 10–20 cm; pedicels 6–9 mm, glabrous or nearly so, jointed at apical part. Flower buds glabrous. Flowers yellow. Sepals glabrous, except with margin ciliate. Petals unequal, ca. 7 mm, inside hairy at base; upper one smaller, rounded at apex, contracted and hairy toward middle. Stamens with hairy filaments. Ovary glabrous, 1- or 2-ovuled; style ca. 1 cm. Legume obliquely semicircular, ca. 4 × 2.5 cm, leathery, ca. 1 cm stalked, apex beaked. Seed 1, broadly ellipsoid, ca. 2 × 1 cm. Fl. (not seen in China, based on original description) May–Jul, fr. unknown.

Thickets. S Guangxi (Dongxing) [Vietnam].

## 20. **PTEROLOBIUM** R. Brown ex Wight & Arnott, *Prodr. Fl. Ind. Orient.* 283. 1834, nom. cons., not Andrzejowski ex C. A. Meyer (1831).

老虎刺属 lao hu ci shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Ding Hou

*Cantuffa* J. F. Gmelin; *Reichardia* Roth (1821), not Roth (1787), nor Roth (1800).

Shrubs, climbing, tall, or woody climbers. Branches with recurved prickles. Leaves abruptly bipinnate, alternate; pinnae and leaflets numerous; stipules and stipels caducous, small or obscure. Racemes or panicles axillary or terminal; bracts caducous, subulate to linear. Flowers whitish or yellowish, small; bracteoles absent. Receptacle discoid. Sepals 5, imbricate, lowermost navicular, larger, emarginate. Petals 5, spreading, oblong or obovate, slightly unequal, with imbricate sepals. Stamens 10, free, subequal, declined; filaments sometimes villous at bases; anthers uniform, cells opening by lateral slits. Ovary sessile, ovoid, inserted at base of receptacle, free, 1- or 2-ovuled; style short or elongated and clavate at apex; stigma terminal, truncate or concave. Legume sessile, compressed, samaroid, indehiscent, upper part produced into an oblique oblong or falcate, membranous wing. Seed pendulous at apex of locules, without endosperm; cotyledons flat; radicle short, straight.

About ten species: tropical and subtropical Africa, mostly in Asia to Indonesia and the Philippines; two species in China.

- 1a. Flowers scattered; petals unequal; wings of fruit 4–4.5 × 1.8–2 cm, broadest at middle forming curved margin on one side; leaves with pinnae 4–6 pairs; leaflets 1.5–2 × 0.6–1 cm, usually 6–9 pairs, veins conspicuous, abaxially without blackish dots ..... 1. *P. macropterum*
- 1b. Flowers densely fascicled; petals homomorphic; wings of fruit not as above, 3–4 × 1.3–1.5 cm; leaves with pinnae 9–14 pairs; leaflets smaller and numerous, usually 19–30 pairs, veins obscure, abaxially with conspicuous or obscure blackish dots ..... 2. *P. punctatum*

**1. *Pterolobium macropterum*** Kurz, *J. Asiat. Soc. Bengal*, Pt. 2, Nat. Hist. 42: 71. 1873.

大翅老虎刺 da chi lao hu ci

*Pterolobium indicum* A. Richard var. *macropterum* (Kurz) Baker; *P. sinense* J. E. Vidal.

Climbers, woody, tall. Young branchlets striate, sparsely hairy; old branches glabrous, with blackish prickles in pairs at

bases of petioles. Leaf rachis 8–10 cm; pinnae 4–6 pairs, 8–10 cm; rachis of leaves and pinnae densely brownish hispidulous, articulate; leaflets 6–9 pairs, opposite, obliquely oblong, 1.5–2 × 0.6–1 cm, leathery, both surfaces glabrous, base asymmetric, apex rounded, cuspidate, or emarginate. Racemes or panicles terminal or supra-axillary; rachis 10–15 cm, hairy; bracts subulate. Pedicels 5–10 mm. Sepals unequal, thickly leathery, smooth. Petals whitish, outer 4 equal, ca. 5 mm, obovate, innermost one abruptly contracted into a broad claw from middle downward, blade ciliate on margin, apex undulate, auriculate. Stamens equal in length, exerted; filaments ca. 8 mm, inflated and densely hairy from middle downward; anthers oblong, ca. 1 mm. Ovary slightly puberulent, 2-ovuled; style filiform, glabrous; stigma funnel-shaped, ciliate. Legume indehiscent, 6–6.5 cm; wings oblique, 4–4.5 × 1.8–2 cm, part containing seed ovoid. Fr. May, Oct.

Dry thickets, forests, sunny slopes; 400–1600 m. Guangxi, Hainan, Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

**2. *Pterolobium punctatum*** Hemsley, J. Linn. Soc., Bot. 23: 207. 1887.

老虎刺 lao hu ci

*Caesalpinia aestivalis* Chun & F. C. How; *Pterolobium indicum* Hance; *P. rosthornii* Harms.

Climbers, woody, or climbing shrubs, 3–10 m tall. Branch-

lets angular, silvery white puberulent and light yellow hairy when young, glabrescent when old, with blackish, recurved, short prickles scattered or in pairs at bases of petioles. Leaf rachis 12–20 cm; petiole 3–5 cm, with paired blackish stipulaceous spines; pinnae 9–14 pairs, long and narrow; rachis of pinnae 5–8 cm, sulcate; petiolules short, articulate; leaflets 19–30 pairs, opposite, narrowly oblong, blades at middle 9–10 × 2–2.5 mm, both surfaces yellowish hairy, abaxially denser, abaxially with conspicuous or obscure blackish dots, veins obscure, base slightly oblique, apex rounded-cuspidate or emarginate. Racemes 8–13 × 1.5–2.5 cm, puberulent, supra-axillary or at apices of branches forming a panicle; bracts setiform, 3–5 mm. Pedicels 2–4 mm, slender, spaced at intervals of 1–2 mm. Flower buds obovoid, ca. 4.5 mm, tomentose. Sepals: lowest one longer, navicular, ca. 4 mm, ciliate; others oblong, ca. 3 mm. Petals equal, slightly longer than calyx, obovate, apex slightly praemorse. Stamens equal in length, exerted; filaments 5–6 mm, pubescent from middle downward; anthers broadly ovoid, ca. 1 mm. Ovary compressed, ciliate on one side, 2-ovuled; style glabrous; stigma funnel-shaped. Legume shiny, 4–6 cm, part containing seed rhomboid, 1.6–2 × 1–1.3 cm, wings straight on one side and curved on other side, 3–4 × 1.3–1.5 cm, with persistent style. Seed solitary, elliptic, ca. 8 mm. Fl. Jun–Aug, Oct, fr. Apr, Sep–Jan.

Sparse forests, sunny slopes, dry rocky hills, near roads, limestone mountains; 300–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang [Laos].

## 21. HAEMATOXYLUM Linnaeus, Sp. Pl. 1: 384. 1753.

采木属 cai mu shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen, Supee Saksuwan Larsen

Trees or shrubs. Leaves abruptly pinnate or bipinnate by lower pinnae again divided; stipules spinescent, deciduous; stipels absent. Flowers yellow, small, in axillary, short, sparse racemes. Receptacle short. Calyx 5-lobed; lobes unequal. Stamens 10, free; filaments hairy at bases; anthers uniform, opening by lateral slits. Ovary shortly stalked, 2- or 3-ovuled; style filiform; stigma terminal, capitate. Legume compressed, oblong or lanceolate, membranous, splitting along middle of valves. Seeds transversely oblong, without endosperm; radicles straight.

About three species: S Africa, tropical regions of Central and North America including the West Indies and Mexico; cultivated in tropical Asia; one species (introduced) in China.

**1. *Haematoxylum campechianum*** Linnaeus, Sp. Pl. 1: 384. 1753.

采木 cai mu

Trees, small, to 8 m tall, sometimes with spreading branches and shrubby. Trunk deeply sulcate. Bark light gray. Branchlets slender. Leaves 5–10 cm, shortly petiolate; leaflets 2–4 pairs, abaxially pale green, adaxially shiny, obovate to obcordate, 1–3 cm, papery, with fine veins, base cuneate, apex rounded or deeply emarginate. Racemes 2–5 cm, with several to numerous flowers; peduncles short. Pedicels 4–6 mm, slender.

Calyx 3–4 mm; lobes oblong-lanceolate, apex acute. Petals yellow, narrowly obovate, 5–6 mm, apex obtuse. Stamens ca. as long as petals. Legume lanceolate-oblong, 2–5 × 0.8–1.2 cm; valves thin, with fine veins.

Cultivated in Guangdong (Guangzhou), Taiwan, Yunnan [native to Central America; widely introduced elsewhere].

The heartwood of this species is blood-red. Haematoxylin, extracted from the wood and flowers, is an important dye used for morphological anatomy and pharmacological preparations. It is also used medicinally as an astringent for treating dysentery and diarrhea.

## 22. PARKINSONIA Linnaeus, Sp. Pl. 1: 375. 1753.

扁轴木属 bian zhou mu shu

Chen Dezhaoh (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen, Supee Saksuwan Larsen

Shrubs or trees, prickly or not. Leaves abruptly bipinnate; rachis very flattened; pinnae usually 2–4, appearing congested at first

sight; stipules small, scaly to spinescent; rachis of pinnae very long and flattened; leaflets reduced, inconspicuous, numerous, opposite or alternate, small. Racemes or cymes axillary; bracts caducous, small. Pedicels long, without bracteoles. Flowers bisexual. Receptacle discoid. Sepals 5, slightly unequal, imbricate or subvalvate, membranous. Petals 5, spreading, slightly unequal, shortly clawed, uppermost broader and long clawed. Stamens 10, free, not exserted; filaments villous at bases; anthers ovoid, versatile, cells opening by lateral slits. Ovary shortly stalked, inserted at bottom of receptacle, glabrous to  $\pm$  pubescent, many ovuled; style filiform, glabrous or pubescent; stigma truncate, ciliate or glabrous. Legume linear, torulose, not winged, indehiscent, thinly leathery. Seeds oblong; hilum small, near apex, with endosperm; cotyledons flat, fleshy; radicle straight.

About four species: mostly in dry regions of S Africa, tropical America, and Oceania; one species (introduced) in China.

**1. *Parkinsonia aculeata*** Linnaeus, Sp. Pl. 1: 375. 1753.

扁轴木 bian zhou mu

Shrubs or trees, to 6 m tall, prickly, with smooth, green bark. Leaf rachis and stipules becoming spines; pinnae 1–3 pairs, clustered at spinescent, very short rachis of leaves; rachis of pinnae green, to 40 cm; leaflets obovate-elliptic to obovate-

oblong or oblong, 2.5–8.5  $\times$  1–3.5 mm. Racemes sparsely flowered. Flowers yellow; pedicels 1.5–1.7 cm; bracts lanceolate. Sepals oblong, ca. 6 mm, apex obtuse. Petals spatulate, apex rounded, uppermost longer, ca. 11  $\times$  6 mm. Filaments villous at base. Legume 7.5–10.5 cm.

Cultivated in Hainan [native to tropical America; widely cultivated in tropical regions of the world].

**23. *ERYTHROPHLEUM*** Afzelius ex R. Brown in Denham & Clapperton, Narr. Travels Africa, 235. 1826.

格木属 ge mu shu

Chen Dezha (陈德昭 Chen Te-chao), Zhang Dianxiang (张奠湘); Kai Larsen

Trees. Leaves alternate, bipinnate; stipules caducous, small; pinnae few pairs, opposite; leaflets alternate, leathery. Flowers small, crowded together in terminal panicles of spicate racemes. Calyx campanulate, with 5 short subequal lobes; tube short. Petals 5, subequal. Stamens 10, free; filaments equal or alternately longer and shorter. Ovary stalked, hairy; ovules numerous; style short; stigma small. Legume compressed, long, thickly leathery, 2-valved dehiscent when ripe, pulpy within between seeds. Seeds transverse, oblong or obovoid, compressed, with endosperm.

About 15 species: tropical Africa, tropical and subtropical E Asia, and N Australia; one species in China.

**1. *Erythrophleum fordii*** Oliver, Hooker's Icon. Pl. 15: t. 1409. 1883.

格木 ge mu

Trees, ca. 10 m tall, sometimes to 30 m tall. Young shoots ferruginous puberulent. Leaves glabrous; pinnae usually 3 pairs, opposite or subopposite, 20–30 cm; petiolules 2.5–3 mm; leaflets 8–12, ovate to ovate-elliptic, 5–8  $\times$  2.5–4 cm, base rounded, oblique, margin entire, apex acuminate. Panicles 15–20 cm; peduncles ferruginous pubescent. Calyx outside pilose; lobes oblong, margin densely pubescent. Petals pale yellowish green,

longer than calyx lobes, oblanceolate, inside and marginally densely pubescent. Stamens ca. 2  $\times$  as long as petals, glabrous. Ovary oblong, densely yellowish white pubescent, 10–12-ovuled. Legume compressed, oblong, 10–18  $\times$  3.5–4 cm, with reticulate veins. Seeds blackish brown, slightly compressed, oblong, 2–2.5  $\times$  1.5–2 cm. Fl. May–Jun, fr. Aug–Oct.

Sparse or dense forests, mountain slopes. Fujian, Guangdong, Guangxi, Taiwan, Zhejiang [Vietnam].

The wood is dark brown, hard, and bright, with fine, close grain. A famous hardwood, it is used for ship building and for pillars of houses.