

## CELASTRACEAE

卫矛科 wei mao ke

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Trees, erect or scandent shrubs, lianas, evergreen or deciduous; stems sometimes producing rootlets (*Euonymus* spp.), sometimes thorny (*Maytenus* spp.), rarely with buttressed trunks. Leaves simple, alternate or opposite, petiolate; leaf blade laminar, venation pinnate, secondary veins reticulate, margins entire, crenate, serrate, or dentate; stipules small and caducous, or estipulate. Inflorescences axillary or terminal, few to many flowered, cymose, thyrsoid, racemose, fasciculate, or flowers solitary, rarely paniculate. Flowers actinomorphic, bisexual or unisexual; perianth (3 or)4- or 5-merous; sepals and petals free. Disk intrastaminal, stamens on disk, or extrastaminal, annular, margins upturned, pulvinate, or cupular, conspicuous, rarely obscure (*Microtropis* spp.), entire, lobed, or angular. Stamens 3–5, alternate with petals; anther (1 or)2-celled, basifixed to dorsifixed, dehiscent longitudinally or obliquely, introrse, extrorse, or latrorse. Ovaries 3–5, superior to half-inferior, often partially immersed in disk, completely or incompletely 2–5-locular, placentation axile, ovules erect, axile, or pendulous, ovules (1 or)2(or 3 or more) per locule; style terminal, simple, short to absent; stigma simple or lobed. Fruit a loculicidally dehiscent capsule, schizocarp of 2–5 indehiscent mericarps, drupe, berry, or samara with a single surrounding wing, rarely an indehiscent capsule or nut with lateral style, pericarp bony, leathery, chartaceous, or fleshy, capsules smooth, angular, deeply lobed, transversely flattened and lobed to base, or connate, rarely prickly, laterally winged. Seeds 1–12, smooth or occasionally furrowed, albuminous or exalbuminous, sometimes winged, wing membranous, basal, exarillate or aril basal to completely enveloping seed, aril membranous, fleshy, rarely mucilaginous; cotyledons flat, foliaceous or thick, connate, germination epigeous.  $2n = 8, 12, 14$ .

About 97 genera and 1194 species: mainly in the tropics and subtropics, some in temperate regions; 14 genera (one endemic, one introduced) and 192 species (120 endemic, two introduced) in China.

Some species are used as ornamentals (*Celastrus*, *Euonymus*, and *Tripterygium*) and/or medicines, including traditional Chinese medicines (*Celastrus*, *Euonymus*, *Maytenus*, and *Tripterygium*).

*Plagiopteron* Griffith is treated in this volume as a separate family, the Plagiopteraceae; see the comments under that family (p. 493). *Dipentodon* Dunn and *Perrottetia* Kunth are also treated in this volume (pp. 494–495) as comprising a separate family, the Dipentodontaceae, following Zhang and Simmons (Syst. Bot. 31: 122–137. 2006). On the other hand, *Bhesa* is included here in the Celastraceae, although Zhang and Simmons (loc. cit.) found that it belongs in the Malpighiales, where it comprises a separate lineage sister to the W African *Centroplacus*. Hippocrateaceae (*Loeseneriella*, *Pristimera*, and *Salacia*) are included here in the Celastraceae following Simmons et al. (Amer. J. Bot. 88: 313–325. 2001).

Pao Shih-ying. 1981. Hippocrateaceae. In: Fang Wen-pei, ed., Fl. Reipubl. Popularis Sin. 46: 1–14; Cheng Chingyung, Ma Jinshuang, Huang Puhua, Kao Tsoching, Ma Qisheng. 1999. Celastraceae (excluding *Dipentodon* and *Perrottetia*). In: Cheng Chingyung & Huang Puhua, eds., Fl. Reipubl. Popularis Sin. 45(3): ii–x, 1–218.

- 1a. Disk extrastaminal; flowers bisexual; fruit baccate with seeds surrounded by mucilaginous arils or capsules transversely flattened, 1–3-fascicled.
  - 2a. Fleshy or ligneous berry; seeds wingless; scandent often arboreous shrubs or small trees ..... 12. *Salacia*
  - 2b. Trilobed capsules, compressed, dehiscent into 2 valves; seeds winged; ligneous lianas.
    - 3a. Flowers large, petals at least 4 mm, recurved in bloom; disk conspicuous, cupular and protuberant ..... 13. *Loeseneriella*
    - 3b. Flowers small, petals up to 3 mm, erect in bloom; disk inconspicuous ..... 14. *Pristimera*
- 1b. Disk intrastaminal or stamens on disk; flowers unisexual or bisexual; fruit capsular, drupaceous, samaroid, or baccate.
  - 4a. Fruit samaroid, drupaceous, or baccate.
    - 5a. Samara, 3-winged at maturity; scandent shrubs ..... 10. *Tripterygium*
    - 5b. Drupe or berry; shrubs, small trees, or lianas ..... 11. *Pleurostylia*
  - 4b. Fruit capsular.
    - 6a. Sepals, petals, and ovaries 4- or 5-merous; disk unlobed, thick; seeds arillate.
      - 7a. Leaves alternate, stipulate; stipules long and fimbriate, persistent after blooming; petals persistent during fruiting, enlarging into 4 wings ..... 3. *Monimopetalum*
      - 7b. Leaves opposite, stipulate; stipules thin and small, caducous; petals caducous.
        - 8a. Flowers and fruit 4- or 5-merous; disk flat, not circling ovary; ovules 2–12 per locule; fruit axis splitting with valves when fruit dehisces; seeds 2 or more per cell, attached to top or base at inner angle; raphe not branched ..... 1. *Euonymus*

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- 8b. Flowers and fruit 4-merous only; disk lobes suberect, circling ovary; ovule 1 per locule; fruit axis splitting or not, free from valves when fruit dehisces; seeds only 1 per cell, hanging from top of persistent axis; raphe branch usually at base of seed, bands ascending on other side toward hilum ..... 2. *Glyptopetalum*
- 6b. Sepals and petals 4- or 5-merous, ovaries only 2- or 3-merous; disk lobed or nearly nonexistent; seeds typically arillate, sometimes aril absent.
- 9a. Leaves opposite; aril partially covering seed or absent.
- 10a. Aril decurrent in wing-form, partially covering seed (cultivated) ..... 8. *Catha*
- 10b. Aril absent (native) ..... 9. *Microtropis*
- 9b. Leaves alternate; aril covering seeds or incompletely so at base of seeds.
- 11a. Leaf blade veins regular in dense nets, petiole bent, enlarged; aril dry, white or brown ..... 7. *Bhesa*
- 11b. Leaf blade veins irregular in sparse nets, petiole erect, not enlarged; aril fleshy, reddish, yellow, or white.
- 12a. Typically scandent shrubs; carpels usually 3 in separate locules; stigma 3, each dividing, similar to 6 lobes; aril completely covering seeds ..... 4. *Celastrus*
- 12b. Typically erect small trees or shrubs; carpels 2 or 3 in 2 or 3 locules; stigma 2 or 3, slightly lobed; seeds only basally or lower half covered by arils.
- 13a. Plants usually thorny; twigs thornlike, bearing leaves and flowers, or twigs with needlelike thorns; leaf blade small, usually shorter than 7 cm ..... 5. *Gymnosporia*
- 13b. Twigs usually unarmed or few thorned, old branches often with sturdy thorns; leaf blade large, usually 7–25 cm ..... 6. *Maytenus*

## 1. EUONYMUS Linnaeus, Sp. Pl. 1: 197. 1753 [“*Evonymus*”], nom. cons.

卫矛属 wei mao shu

Ma Jinshuang (马金双); A. Michele Funston

Shrubs, sometimes small trees, ascending or clambering, evergreen or deciduous, glabrous, rarely pubescent. Leaves opposite, rarely also alternate or whorled, entire, serrulate, or crenate, stipulate. Inflorescences axillary, occasionally terminal, cymose. Flowers bisexual, 4(or 5)-merous; petals light yellow to dark purple. Disk fleshy, annular, 4- or 5-lobed, intrastaminal or stamens on disk; anthers longitudinally or obliquely dehiscent, introrse. Ovary 4- or 5-locular; ovules erect to pendulous, 2(–12) per locule. Capsule globose, rugose, prickly, laterally winged or deeply lobed, occasionally only 1–3 lobes developing, loculicidally dehiscent. Seeds 1 to several, typically 2 developing, ellipsoid; aril basal to enveloping seed.

Two subgenera and ca. 130 species: Asia, Australasia, Europe, Madagascar, North America; 90 species (50 endemic, one introduced) in China.

*Euonymus omeiensis* W. P. Fang (J. Sichuan Univ., Nat. Sci. Ed. 1: 38. 1955) was described from Sichuan (Emei Shan, Shishungou, ca. 1300 m). This putative species was misdiagnosed; it is a synonym of *Reevesia pubescens* Masters in the Sterculiaceae (see Fl. China 12: 317. 2007). The protologue describes the fruit as having bracts.

The placement of *Euonymus tibeticus* W. W. Smith (Rec. Bot. Surv. India 4: 264. 1911), described from Xizang (3000–3100 m) and also occurring in Bhutan (Lhakhang) and India (Sikkim), is unclear, as only a specimen with flower buds is available.

*Euonymus cinereus* M. A. Lawson (in J. D. Hooker, Fl. Brit. India 1: 611. 1875) was described from India. The occurrence of this species in China (FRPS 45(3): 24. 1999) has not been confirmed.

- 1a. Winter buds usually conical, very acute, large; stamens sessile, anthers 1-celled; capsule winged (*E. subg. Kalonymus*) ..... 1. *E. sect. Uniloculares*
- 1b. Winter buds usually ovoid, acute, small; stamens filamentous or subsessile, anthers 2-celled; capsule without wings (*E. subg. Euonymus*).
- 2a. Capsule 4-lobed almost to base, sometimes only 1–3 lobes developing ..... 3. *E. sect. Melanocarya*
- 2b. Capsule unlobed.
- 3a. Capsule prickly or tuberculate ..... 2. *E. sect. Echinococcus*
- 3b. Capsule smooth or rugose and angulate.
- 4a. Capsule smooth, rounded or globose ..... 4. *E. sect. Ilcifolii*
- 4b. Capsule usually rugose and angulate ..... 5. *E. sect. Euonymus*

### 1. *Euonymus* subg. *Kalonymus* R. Beck, Fl. Nied.-Oesterr. 2: 588. 1892.

翅果卫矛亚属 chi guo wei mao ya shu

Evergreen or deciduous shrubs to small trees; winter buds conical, large, 0.7–2 cm. Flowers 4- or 5-merous. Anthers sessile, of 1 theca. Ovaries 4- or 5-loculed. Capsule with wings, 4- or 5-lobed at maturity.

Sixteen species: Asia; 15 species (eight endemic) in China.

**1. *Euonymus* sect. *Uniloculares* Rouy & Foucaud, Fl. France 4: 159. 1897.**

翅果卫矛组 *chi guo wei mao zu*

Morphological characters and geographical distribution are the same as those of the subgenus.

- 1a. Flowers and fruit 4-merous only.
- 2a. Leaf blade entire, narrowly lanceolate ..... 7. *E. kweichowensis*
- 2b. Leaf blade crenulate to denticulate, ovate to elliptic, widest at mid-blade.
- 3a. Leaves sessile; leaf blade ovate-oblong, base cordate, margin large serrate ..... 14. *E. subcordatus*
- 3b. Leaves petiolate; leaf blade base not cordate, margin not serrate.
- 4a. Flowers red to purple.
- 5a. Wings of capsule short, less than 6 mm, obtuse at apex ..... 5. *E. frigidus*
- 5b. Wings of capsule long, more than 6 mm, sharp at apex ..... 6. *E. giraldii*
- 4b. Flowers green to yellow.
- 6a. Wings of capsule obtuse at apex ..... 13. *E. schensianus*
- 6b. Wings of capsule sharp at apex.
- 7a. Leaf blade ovate or obovate, 9–14 × 4–6 cm ..... 8. *E. macropterus*
- 7b. Leaf blade ovate-elliptic, 6–8 × 3–4 cm ..... 12. *E. sanguineus*
- 1b. Flowers and fruit usually 5-merous, sometimes combined with 4-merous.
- 8a. Capsule nearly without wing, subglobose, or with small angles at connection of locules ..... 9. *E. oxyphyllus*
- 8b. Capsule always with long and evident wings.
- 9a. Leaf blade linear or oblong, bamboolike, entire length of equal width ..... 2. *E. cornutus*
- 9b. Leaf blade ovate, elliptic, or lanceolate, widest at mid-blade.
- 10a. Leaf margin entire.
- 11a. Leaf blade broadly elliptic, ovate, or ovate-elliptic, 9–13 × 4–6 cm; capsule ca. 1.5 cm in diam., with obscure wings ..... 3. *E. ficoides*
- 11b. Leaf blade elliptic-ovate or obovate-elliptic, 6–9 × 2.5–4 cm; capsule 1.2–1.4 cm in diam., with wings less than 5 mm ..... 10. *E. rehderianus*
- 10b. Leaf margin crenulate to serrate.
- 12a. Flowers white, yellow, or greenish; capsule 4-winged, wings up to 1 cm, sometimes combined with 5-winged fruit ..... 4. *E. fimbriatus*
- 12b. Flowers pink, red to purple; capsule usually 5-winged.
- 13a. Leaf blade ovate-lanceolate, more than 5 × as long as wide ..... 1. *E. clivicola*
- 13b. Leaf blade ovate to elliptic, less than 3 × as long as wide.
- 14a. Flowers large, up to 1.2 cm in diam.; capsule with 5 wings developing ..... 15. *E. szechuanensis*
- 14b. Flowers small, 7–9 mm in diam.; capsule usually with 5 wings developing, sometimes only 3 or 4 wings developing ..... 11. *E. sachalinensis*

**1. *Euonymus clivicola* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 31. 1917.**

岩波卫矛 *yan bo wei mao*

*Euonymus clivicola* var. *rongchuensis* (C. Marquand & Airy Shaw) Blakelock; *E. elegantissimus* Loesener & Rehder; *E. rongchuensis* C. Marquand & Airy Shaw.

Deciduous shrubs, 2–3 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole ca. 4 mm; leaf blade thinly leathery or thickly papery, elliptic-lanceolate, 8–12 × 2–3 cm, widest at mid-blade, base subrotund, margin finely crenulate, apex acuminate; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle slender, 3–6 cm, 1 or 2 × dichotomously branched, several flowered; pedicel slender, 4–5 mm. Flowers 5-merous, 8–11 mm in diam.; sepals suborbicular, short; petals reddish to purple, ovate, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, 1–1.2 cm in diam., with 5 long

and thin wings, up to 1.2 cm when fully developed. Aril bright red. Fl. May–Jul, fr. Jul–Nov.

Mixed forests, scrub; 2400–3900 m. Hubei, ?Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, Myanmar, Nepal].

The distribution report from Qinghai has not been confirmed.

**2. *Euonymus cornutus* Hemsley, Bull. Misc. Inform. Kew 1893: 209. 1893.**

角翅卫矛 *jiao chi wei mao*

*Euonymus cornutoides* Loesener; *E. cornutus* var. *quinquecornutus* (H. F. Comber) Blakelock; *E. frigidus* Wallich var. *cornutoides* (Loesener) C. Y. Cheng; *E. quinquecornutus* H. F. Comber.

Deciduous shrubs, 2–3 m tall; branches and twigs moderately slender, striate, brown or gray-brown when dry. Petiole ca. 4 mm; leaf blade thinly leathery or thickly papery, linear, oblong, or bamboolike, 7–15 cm, less than 1(–1.5) cm wide,

entire length of equal width, base subrotund, margin sparsely crenulate, apex acuminate; lateral veins 8–13 pairs, invisible or disappearing before reaching margin. Peduncle slender, 3–5 cm, 1 or 2 × dichotomously branched, several flowered; pedicel slender, 4–5 mm. Flowers 4- or 5-merous, 7–10 mm in diam.; sepals suborbicular, short; petals reddish to purple, ovate, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1 cm in diam., with 4 or 5 long and thin wings, up to 1 cm when fully developed. Aril bright red. Fl. Apr–Jul, fr. Aug–Nov.

Mixed forests, scrub; 2200–4300 m. ?Gansu, Henan, Hubei, ?Hunan, Shaanxi, Sichuan, Xizang, Yunnan [India, Myanmar].

The distribution reports from Gansu and Hunan have not been confirmed; those from Shaanxi and Xizang are from local work.

**3. *Euonymus ficoides*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 94. 1997.

榕叶卫矛 *rong ye wei mao*

Evergreen shrubs, 2–3 m tall; branches and twigs sturdy, brown or gray-brown when dry. Petiole 1.5–2 cm, sturdy; leaf blade thickly leathery, ovate or ovate-elliptic, 9–13 × 4–6 cm, base semirovate, attenuate, or cuneate, margin nearly entire, sometimes revolute, apex acuminate or acute; lateral veins 8–12 pairs, curved forward, netting and disappearing before reaching margin. Peduncle 5–6 cm, 1 or 2 × dichotomously branched, several flowered; pedicel short, less than ca. 1 cm. Flowers 5-merous (not seen). Capsule red when fresh, or dark brown when dry, nearly globose, ca. 1.5 cm in diam., with 5 obscure wings at maturity. Seeds 2; aril orange. Fl. unknown, fr. Oct–Nov.

• Mixed forests, scrub; 1200–2100 m. Yunnan.

**4. *Euonymus fimbriatus*** Wallich in Roxburgh, Fl. Ind. 2: 408. 1824.

遂叶卫矛 *sui ye wei mao*

*Euonymus fimbriatus* var. *serratus* Blakelock.

Deciduous trees, to 15 m tall, ca. 45 cm d.b.h.; branches and twigs sturdy, young ones usually slender, brown or gray-brown when dry. Petiole 5–10 mm; leaf blade leathery, elliptic-ovate, 6.5–10(–15) × 4–6 cm, base semirovate, attenuate, or cuneate, margin sharply double-serrulate, sometimes combined with single sharp serrulation, apex acuminate or acute; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle from new branches only, slender, 3–4 cm, 2–4 × dichotomously branched with several to many flowers; pedicel short and slender, ca. 6 mm. Flowers 4-merous, sometimes combined with 5-merous, less than 6 mm in diam.; sepals deltoid, very small; petals yellow-green or greenish yellow, ovate-rotund. Capsule pink to red when fresh, or brown to greenish brown when dry, nearly compressed globose, ca. 1.2 cm in diam., with 4 long and flat wings, up to more than ca. 1 cm, sometimes combined with 5 wings. Seeds 2; aril orange. Fl. Apr–May, fr. Jul–Aug.

Open ground, woodlands; 2100–3300 m. Xizang [Afghanistan, India, Kashmir, Nepal, Pakistan].

This is a common species that can be easily identified by its sharp and double-serrulate leaf margin. The species sometimes combines 4-merous flowers and fruit with 5-merous anatomy. This is a very rare character in the genus.

**5. *Euonymus frigidus*** Wallich in Roxburgh, Fl. Ind. 2: 409. 1824.

冷地卫矛 *leng di wei mao*

*Euonymus amygdalifolius* Franchet; *E. assamicus* Blakelock; *E. austrotibetanus* Y. R. Li; *E. burmanicus* Merrill; *E. crinitus* Pampanini; *E. dasydictyon* Loesener & Rehder; *E. frigidus* f. *elongatus* (Cowan & A. H. Cowan) H. Hara; *E. frigidus* var. *elongatus* Cowan & A. H. Cowan; *E. frigidus* var. *wardii* (W. W. Smith) Blakelock; *E. porphyreus* Loesener; *E. porphyreus* var. *angustifolius* L. C. Wang & X. G. Sun; *E. porphyreus* var. *ellipticus* Blakelock; *E. pygmaeus* W. W. Smith; *E. roseoperulatus* Loesener; *E. taliensis* Loesener; *E. wardii* W. W. Smith.

Deciduous shrubs to small trees, 3–7 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole less than 1 cm; leaf blade thickly papery or thinly leathery, variously elliptic-lanceolate to ovate-elliptic, 6–11 × 2–3.5 cm, widest at mid-blade, base subrotund, cuneate, or attenuate, margin finely crenulate, apex acuminate or acute; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle slender, 7–10 cm, 1 or 2 × dichotomously branched, several flowered; pedicel slender, 5–6 mm. Flowers 4-merous, less than 8 mm in diam.; sepals suborbicular, short; petals reddish to purple or brown, ovate, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1 cm in diam., with 4 short and obtuse wings, less than ca. 6 mm when fully developed. Aril bright red. Fl. May–Jul, fr. Aug–Nov.

Mixed forests, scrub; 500–4000 m. ?Gansu, Guizhou, Henan, Hubei, Ningxia, Qinghai, ?Shanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal].

The gathering *H. L. Tsiang 37838* from Sichuan was found to have 3- and 4-merous flowers co-existing on the same plant. The only other such occurrence is in *Euonymus sachalinensis*. The distribution reports from Gansu and Shanxi have not been confirmed.

**6. *Euonymus giraldii*** Loesener, Bot. Jahrb. Syst. 29: 442. 1900.

纤齿卫矛 *xian chi wei mao*

*Euonymus giraldii* var. *angustialatus* Loesener; *E. giraldii* var. *ciliatus* Loesener; *E. kansuensis* Nakai; *E. pashanensis* S. Z. Qu & Y. H. He; *E. perbellus* C. Y. Chang.

Deciduous shrubs or small trees, 3–7 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole less than 1 cm; leaf blade thickly papery or thinly leathery, variously elliptic-lanceolate to ovate-elliptic, 6–8 × 2–3.5 cm, widest at mid-blade, base subrotund, cuneate, or attenuate, margin finely crenulate, apex acuminate or acute; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle slender, 5–7 cm, 1 or 2 × dichotomously branched, several flowered; pedicel slender, 5–6 mm. Flowers 4-merous, less than 8 mm in

diam.; sepals suborbicular, short; petals reddish to purple, ovate, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, less than ca. 1 cm in diam., with 4 short and sharp wings, greater than ca. 6 mm when fully developed. Aril bright red. Fl. Apr–Jun, fr. Jul–Oct.

• Mixed forests, scrub; 1000–3700 m. Anhui, Gansu, Hebei, Henan, Hubei, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Yunnan.

This species was misidentified as *Euonymus sachalinensis* in some local works; however, it differs from *E. sachalinensis* by having smaller leaves and shorter wings, as well as being separated by a disjunct distribution.

**7. *Euonymus kweichowensis*** Chen H. Wang, *Chin. J. Bot.* 1: 51. 1936.

贵州卫矛 *gui zhou wei mao*

*Euonymus integrifolius* Blakelock.

Deciduous shrubs, ca. 3 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole less than ca. 1 cm; leaf blade thickly papery or thinly leathery, narrowly lanceolate, 8–12 × 1.5–2 cm, widest at mid-blade, base cuneate or attenuate, margin entire, apex acuminate, caudate, or acute; lateral veins 5–7 pairs, disappearing with obscure netting before reaching margin. Peduncle slender, up to 10 cm, 1 or 2 × dichotomously branched, several flowered. Flowers 4-merous (not seen). Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1 cm in diam., with 4 wide and short wings, more than ca. 5 mm when fully developed. Seeds 2, dark brown; aril bright red. Fl. unknown, fr. Aug.

• Forests, scrub; 900–1100 m. Guizhou.

This species is reported from only a few locations; further collections are needed.

**8. *Euonymus macropterus*** Ruprecht, *Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg* 15: 359. 1857.

黄心卫矛 *huang xin wei mao*

*Euonymus usuriensis* Maximowicz.

Deciduous shrubs, 2–3 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole sturdy, less than ca. 1 cm; leaf blade thickly papery or thinly leathery, ovate-elliptic, ovate, or obovate, 9–14 × 4–6 cm, widest at mid-blade, base subrotund, cuneate, or attenuate, margin crenulate, apex acuminate or acute; lateral veins 7–9 pairs, branching and disappearing before reaching margin. Peduncle slender, 7–10 cm, 2 or 3 × dichotomously branched with several to many flowers; pedicel slender, 5–6 mm. Flowers 4-merous, ca. 7 mm in diam.; sepals suborbicular, short; petals whitish green or yellow-green, ovate, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 6 mm in diam., with 4 long and sharp wings, more than ca. 1 cm when fully developed. Aril bright red. Fl. May–Jul, fr. Aug–Oct.

Mixed forests, scrub; 300–2100 m. ?Hebei, Heilongjiang, Jilin, Liaoning [Japan, Korea, Russia (Far East)].

The distribution report from Hebei has not been confirmed.

**9. *Euonymus oxyphyllus*** Miquel, *Ann. Mus. Bot. Lugduno-Batavi* 2: 86. 1865.

垂丝卫矛 *chui si wei mao*

Deciduous shrubs to small trees, 3–4 m tall; branches and twigs terete, sturdy, brown or dark brown when dry. Petiole less than ca. 1 cm; leaf blade thickly papery or thinly leathery, ovate-elliptic or ovate-lanceolate, 7–12 × 3.5–5 cm, base cuneate or attenuate, margin finely serrulate, apex acuminate or acute; lateral veins 5–7 pairs, netting and disappearing before reaching margin. Peduncle slender, 6–10 cm, 1–3 × dichotomously branched with several to many flowers; pedicel thin and slender, less than 10 mm. Flowers 5-merous, 6–8 mm in diam.; sepals suborbicular, short; petals white with a little purple, obovate, apex rotund or acute, base cuneate. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1.2 cm in diam., without wings or at most slightly 5-angled. Aril bright red. Fl. Apr–Jun, fr. Aug–Nov.

Forests, woodlands; near sea level to 2300 m. Anhui, Fujian, Henan, Hubei, Hunan, Jiangxi, Liaoning, Shandong, Taiwan, Zhejiang [Japan, Korea].

This species is well known and widespread throughout E Asia. The fruit is often identified as a member of *Euonymus* sect. *Illicifolii* because the wings are too short to observe with the naked eye; however, the other characters used to separate the sections place *E. oxyphyllus* in *E. sect. Uniloculares*.

**10. *Euonymus rehderianus*** Loesener in Sargent, *Pl. Wilson.* 1: 488. 1913.

短翅卫矛 *duan chi wei mao*

*Euonymus bicolor* H. Léveillé; *E. proteus* H. Léveillé.

Deciduous shrubs to small trees, ca. 5 m tall; branches and twigs sturdy, brown or gray-brown when dry. Petiole 1–2 cm; leaf blade thickly leathery, elliptic-ovate or obovate-elliptic, 6–9 × 2.5–4 cm, base attenuate or cuneate, margin entire, apex acuminate or acute; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle from new branches usually slender, 5–8 cm, ca. 2 × dichotomously branched, several flowered; pedicel short and slender, ca. 6 mm. Flowers 5-merous, 6–7 mm in diam.; sepals deltoid, very small; petals ovate-rotund, yellow-green or greenish yellow. Capsule pink to red when fresh, or brown to greenish brown when dry, nearly compressed globose, 1.2–1.4 cm in diam., with 5 short and flat wings, less than ca. 5 mm when fully developed. Seeds 2; aril orange. Fl. Apr–May, fr. Jul–Oct.

• Forests, scrub; 400–1600 m. Guangxi, Guizhou, Sichuan, Yunnan.

**11. *Euonymus sachalinensis*** (F. Schmidt) Maximowicz, *Bull. Acad. Imp. Sci. Saint-Petersbourg* 27: 446. 1881.

东北卫矛 *dong bei wei mao*

*Euonymus latifolius* (Linnaeus) Miller var. *sachalinensis* F. Schmidt, *Reis. Amur-Land., Bot.* 121. 1868; *E. maximowiczianus* (Prokhanov) Voroschilov; *Kalonymus maximowiczianus* Prokhanov; *K. sachalinensis* (F. Schmidt) Prokhanov.

Deciduous shrubs, 2–3 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole sturdy, less than ca. 1 cm; leaf blade thickly papery or thinly leathery, ovate-elliptic, ovate, or broadly elliptic, 9–15 × 5.5–8.5

cm, widest at mid-blade, base subrotund, cuneate, or attenuate, margin crenulate, apex acuminate or acute; lateral veins 7–9 pairs, branching and disappearing before reaching margin. Peduncle slender, 5–8 cm, 1–3 × dichotomously branched, several flowered; pedicel slender, 5–6 mm. Flowers 5-merous, 7–9 mm in diam.; sepals suborbicular, short; petals reddish to purple or brown, ovate, base cuneate. Ovary weakly angulate, 5-loculed, sometimes only 3 or 4 locules developing. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1 cm in diam., with 5 short and obtuse wings, less than ca. 5 mm when fully developed, sometimes only 3 or 4 wings developing. Aril bright red. Fl. Apr–Jul, fr. Aug–Nov.

Mixed forests, scrub; 100–2700 m. Heilongjiang, Jilin, Liaoning [Japan, Korea, Russia (Far East)].

The syntype specimen of *Euonymus latifolius* var. *sachalinensis*, collected by Przewalski from Gansu, belongs to *E. giraldii*.

The flowers and fruit of this species are 5-merous, but sometimes only 3 or 4 locules develop, especially in plants from N Japan and Russia (Far East). These character states are sometimes found in the same specimen, making it impossible to separate taxa by the number of wings or locules of the fruit. This species is very similar to *Euonymus oxyphyllus* in the texture of its leaves, but it can be separated from that species and from *E. macropterus* by its fruit with very short wings.

**12. *Euonymus sanguineus*** Loesener, Bot. Jahrb. Syst. 29: 441. 1900.

石枣子 shi zao zi

*Euonymus monbeigii* W. W. Smith; *E. sanguineus* var. *brevipedunculatus* Loesener; *E. sanguineus* var. *camptoneurus* Loesener; *E. sanguineus* var. *lanceolatus* S. Z. Qu & Y. H. He; *E. sanguineus* var. *orthoneurus* Loesener; *E. sanguineus* var. *pachyphyllus* Pampanini.

Deciduous shrubs or small trees, 3–5 m tall; branches and twigs sturdy, striate, brown or gray-brown when dry. Petiole typically less than ca. 1 cm; leaf blade leathery, variously ovate-elliptic, 6–8 × 3–4 cm, base subrotund, cuneate, or attenuate, margin sharply and finely serrate, sometimes combined with fine crenulations, apex acuminate or acute; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle 5–7 cm, 1 or 2 × dichotomously branched with several to many flowers; pedicel 5–6 mm, less than ca. 6 mm in diam. Flowers 4-merous; sepals suborbicular, short; petals whitish green or greenish white, ovate, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, less than 1 cm in diam., with 4 wide and sharp wings, more than ca. 8 mm when fully developed. Aril bright red. Fl. Apr–Jun, fr. Jul–Oct.

• Mixed forests, scrub; 1800–3700 m. Gansu, ?Guizhou, Henan, Hubei, Hunan, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

The distribution report from Guizhou has not been confirmed.

**13. *Euonymus schensianus*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 444. 1881.

陕西卫矛 shan xi wei mao

*Euonymus haoi* Loesener ex Chen H. Wang.

Deciduous shrubs, ca. 3 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole less than 1 cm; leaf blade thickly papery, ovate-elliptic, obovate, or obovate-elliptic, 5–8(–10) × 2.5–4 cm, base subrotund, cuneate, or attenuate, margin finely crenulate, apex acuminate or acute; lateral veins 4–6 pairs, disappearing before reaching margin. Peduncle slender, up to 10 cm or more, 1 or 2 × dichotomously branched with several to many flowers; pedicel thin and slender, ca. 10 mm. Flowers 4-merous, ca. 7 mm in diam.; sepals suborbicular, short; petals whitish green or greenish white, obovate, apex acute, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1 cm in diam., with 4 wide and obtuse wings, more than ca. 8 × 6 mm when fully developed. Aril bright red. Fl. Apr–May, fr. Sep–Nov.

• Foothills. Gansu, ?Guizhou, Henan, Hubei, Ningxia, Shaanxi, Sichuan.

The distribution report from Guizhou has not been confirmed.

**14. *Euonymus subcordatus*** J. S. Ma, Harvard Pap. Bot. 10: 95. 1997.

近心叶卫矛 jin xin ye wei mao

Shrubs, ca. 2 m tall; branches and twigs sturdy, 4-angled or winglike when young, brown or gray-brown when dry. Leaf blade sessile, thickly leathery, ovate-oblong, 13–15 × 4–6 cm, base cordate, margin coarsely serrate, apex acuminate; lateral veins impressed adaxially, prominent abaxially. Pedicel thin, ca. 10 mm. Flowers 4-merous (not seen). Capsule green when immature, globose, with 4 wings, ca. 1 cm in diam. Fl. before Jul, fr. Aug or later.

• Forests; ca. 600 m. Guangxi.

This species is known only from the type, which has very young fruit.

**15. *Euonymus szechuanensis*** Chen H. Wang, Contr. Bot. Surv. Northw. China 1: 49. 1939.

四川卫矛 si chuan wei mao

Deciduous shrubs, ca. 3 m tall; branches and twigs moderately sturdy, striate, brown or gray-brown when dry. Petiole less than 1 cm; leaf blade thickly papery, ovate-elliptic, obovate, or obovate-elliptic, 6–11 × 3–4 cm, base cuneate or attenuate, margin finely crenulate, apex acuminate, caudate, or acute; lateral veins 5 or 6 pairs, disappearing before reaching margin. Peduncle slender, up to 10 cm or more, 1 or 2 × dichotomously branched with several to many flowers; pedicel slender, ca. 10 mm. Flowers 5-merous, up to 1.2 cm in diam.; sepals suborbicular, short; petals dark red or purple, obovate, apex rotund, base cuneate. Ovary weakly angulate. Capsule green to brown, or yellow-brown when dry, nearly globose, ca. 1 cm in diam., with 5 wide and sharp wings, less than ca. 6 × 5 mm when fully developed. Aril bright red. Fl. Apr–Jul, fr. Jul–Aug.

• Forests; 700–1600 m. Shaanxi, Sichuan, Yunnan.

This species has 5 spreading wings on the capsule, and the flower is very large and purple; these characters are very different from the others in the section.

**2. *Euonymus* subg. *Euonymus***卫矛亚属 *wei mao ya shu*

Evergreen or deciduous shrubs to small trees; winter buds ovoid, small, 2–5 mm. Flowers 4- or 5-merous. Stamens filamentous or subsessile; anthers 2-celled. Ovaries 4- or 5-loculed. Capsule rugose, without wings, echinate or lobed, opening by 4 or 5 lobes at maturity.

About 113 species: Asia and Europe, cultivated in Africa, Asia, Europe, North and South America, and Oceania; 75 species (42 endemic, one introduced) in China.

**2. *Euonymus* sect. *Echinococcus* Nakai, J. Jap. Bot. 17: 617. 1941.**刺果卫矛组 *ci guo wei mao zu*

Shrubs or small trees, deciduous or evergreen. Flowers 4-merous, rarely 5-merous. Capsule with tubercles or prickles, 4- or 5-lobed at maturity.

Eighteen species: E, S, and SE Asia; 14 species (ten endemic) in China.

- 1a. Capsule with tubercles (not prickles), entire surface densely tuberculate ..... 28. *E. verrucocarpus*  
 1b. Capsule with prickles, not tubercles.  
 2a. Capsule with needle to threadlike prickles, sparsely covering surface.  
 3a. Prickles fine and slender or sometimes needlelike; capsule large, 1.3–1.8 cm in diam. .... 25. *E. lushanensis*  
 3b. Prickles straight, not fine and slender; capsule small, less than 1 cm in diam.  
 4a. Leaf blade entire ..... 26. *E. potingensis*  
 4b. Leaf blade crenulate to serrate.  
 5a. Dwarf shrubs, under 30 cm tall ..... 19. *E. aculeolus*  
 5b. Shrubs, more than 1 m tall.  
 6a. Leaf blade 5–12 × 3–4.5 cm, veins impressed adaxially, prominent abaxially; capsule ca. 8 mm in diam. .... 23. *E. chui*  
 6b. Leaf blade 4–6 × 2–3 cm, veins invisible; capsule 8–10 mm in diam. .... 27. *E. spraguei*  
 2b. Capsule with sturdy prickles, densely covering surface.  
 7a. Capsule grayish green or gray when dry, prickles more than 1 cm, flattened at base ..... 17. *E. actinocarpus*  
 7b. Capsule brown, yellow, tawny, black, or purple when dry, prickles less than 1 cm.  
 8a. Inflorescences more than 10 cm; flowers more than 10.  
 9a. Leaf blade ovate or ovate-elliptic, adaxially wrinkled, petiole 5–8 mm ..... 20. *E. balansae*  
 9b. Leaf blade oblong to elliptic, adaxially never wrinkled, petiole 1–2 cm ..... 16. *E. acanthocarpus*  
 8b. Inflorescences less than 9 cm; flowers less than 9.  
 10a. Leaf blade pubescent on both sides ..... 21. *E. acanthoxanthus*  
 10b. Leaf blade glabrous.  
 11a. Leaves sessile or petiole less than 4 mm.  
 12a. Leaf blade less than 4 × 2 cm ..... 22. *E. chenmoui*  
 12b. Leaf blade ca. 5 × 2–3 cm ..... 24. *E. echinatus*  
 11b. Leaf petiole more than 8 mm.  
 13a. Leaf blade leathery, 7–10 × 3–6 cm; capsule 1–1.5 cm in diam. .... 18. *E. aculeatus*  
 13b. Leaf blade thinly leathery or papery, 10–15 × 2.5–4.5 cm; capsule 1.5–2 cm in diam. .... 29. *E. wilsonii*

**16. *Euonymus acanthocarpus* Franchet, Pl. Delavay. 2: 129. 1889.**

刺果卫矛 *ci guo wei mao*

*Echinocarpus erythrocarpus* H. Léveillé; *Euonymus acanthocarpus* var. *laxus* (Chen H. Wang) C. Y. Cheng; *E. acanthocarpus* var. *longipes* (Lace) Blakelock; *E. acanthocarpus* var. *scandens* (Loesener) Blakelock; *E. acanthocarpus* var. *sutchuenensis* Franchet ex Loesener; *E. laxus* Chen H. Wang; *E. longipes* Lace; *E. tengyuehensis* W. W. Smith; *E. theifolius* Wallich ex M. A. Lawson var. *scandens* Loesener.

Deciduous shrubs, erect or ascending, 2–3(–8) m tall; branches and twigs sturdy, brown or gray. Petiole 1–2 cm; leaf

blade leathery, oblong, oblong-elliptic, or elliptic, 7–12 × 3–5.5 cm, base subrounded, rounded, cuneate, or attenuate, margin irregularly crenulate to crenate, apex acuminate or acute; lateral veins 5–8 pairs, disappearing before reaching margin. Peduncle 6–10 cm, typically more than 3 × dichotomously branched, many flowered; pedicel 4–6 mm. Flowers 4-merous, small, 6–8 mm in diam.; sepals suborbicular; petals yellow-green, obovate, base attenuate. Disk rounded. Filament 2–3 mm. Ovary densely prickled; stigma long. Capsule brown-red, nearly globose, 1–1.2 cm in diam., 4-lobed, densely prickly, prickles 1–2 mm. Aril orange. Fl. May–Aug, fr. Aug–Nov.

Forests, woodlands; 700–2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Myanmar].

**17. *Euonymus actinocarpus*** Loesener, Bot. Jahrb. Syst. 30: 459. 1902.

星刺卫矛 xing ci wei mao

*Euonymus angustatus* Sprague; *E. contractus* Sprague; *E. hemsleyanus* Loesener.

Deciduous shrubs, erect or ascending, to 4 m tall; branches and twigs sturdy, with 4 angles, brown-green or gray. Petiole 8–12 mm; leaf blade leathery, ovate to ovate-elliptic or elliptic, 7–10 × 3–5 cm, base cuneate or attenuate, margin crenulate, apex acute; lateral veins ca. 8 pairs, netted before reaching margin. Peduncle 6–10 cm, typically more than 3 × dichotomously branched, many flowered; pedicel slender, ca. 5 mm, sometimes with 4 wings. Flowers 4-merous, small, ca. 5 mm in diam.; sepals suborbicular; petals yellow-green, ovate, base cuneate. Disk 4-lobed. Filament absent. Ovary densely long prickly; stigma short. Capsule gray, nearly globose, base flattened, 2–2.5 cm in diam., 4-lobed, densely prickly, prickles 1–1.5 cm. Aril orange. Fl. Jan–Apr, fr. Jun–Jan.

• Forests, woodlands; below 1700 m. Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

**18. *Euonymus aculeatus*** Hemsley, Bull. Misc. Inform. Kew 1893: 209. 1893.

小千金 xiao qian jin

*Echinocarpus hederirhizus* H. Léveillé; *Euonymus xanthocarpus* C. Y. Cheng & Z. M. Gu.

Evergreen shrubs, scandent, 2–3 m tall; branches and twigs sturdy, striate, brown or gray-brown when dry. Petiole 8–12 mm; leaf blade leathery, ovate, elliptic, or ovate-elliptic, 7–10 × 3–6 cm, base cuneate or attenuate, margin crenulate distally, nearly entire proximally, apex acute; lateral veins 5 or 6 pairs, disappearing before reaching margin. Peduncle 4–6 cm, 2 or 3 × dichotomously branched, several flowered; pedicel glabrous, 4–5 mm. Flowers 4-merous, small, 6–7 mm in diam.; sepals suborbicular; petals yellow-green, ovate, base cuneate. Ovary densely long prickly; stigma absent. Capsule red when fresh, yellow-brown when dry, nearly globose, 1–1.5 cm in diam., 4-lobed, densely prickly, prickles ca. 6 mm. Aril bright red. Fl. Apr–May, fr. Jul–Sep.

• Forests, scrub; 300–1500 m. ?Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Sichuan, Yunnan.

The distribution reports from Guangdong and Henan have not been confirmed.

**19. *Euonymus aculeolus*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 94. 1997.

微刺卫矛 wei ci wei mao

Dwarf shrubs, 20–30 cm tall; young branches and twigs sturdy, 4-angled, green-brown. Leaf blade sessile, leathery, ovate, 3–5 × 1–1.5 cm, base truncate, margin crenulate, apex acute or acuminate; lateral veins 5 or 6 pairs, netting before reaching margin. Flowers 4-merous (not seen). Capsule typically 1, occasionally 2 or 3 in cluster, axillary, red when fresh, yellow-brown when dry, nearly globose, 6–8 mm in diam.,

4-grooved, with very small and slender, needle or threadlike prickles. Seeds ovoid, black; aril bright red. Fl. unknown, fr. Nov.

• Mountain slopes. Yunnan.

This species is very unusual because it is the only dwarf (less than 30 cm tall) in the genus.

**20. *Euonymus balansae*** Sprague, Bull. Misc. Inform. Kew 1908: 180. 1908.

刺猬卫矛 ci wei wei mao

*Euonymus hystrix* W. W. Smith; *E. mengtzeanus* (Loesener) Sprague; *E. theifolius* Wallich ex M. A. Lawson var. *mengtzeanus* Loesener.

Evergreen shrubs, scandent, ca. 3 m tall; branches and twigs 4-angled, brown or gray-brown when dry. Petiole 5–8 mm; leaf blade papery, ovate to ovate-elliptic, 10–15 × 4–8 cm, base cuneate or attenuate, margin crenulate, apex acute or acuminate; lateral veins 6–9 pairs, netting before reaching margin, impressed adaxially and prominent abaxially. Peduncle 4–6 cm, 2 or 3 × dichotomously branched, several flowered; pedicel glabrous, 4–5 mm. Flowers 4-merous, 9–10 mm in diam.; sepals suborbicular; petals yellow-green, ovate, base cuneate. Ovary densely prickly; stigma absent. Capsule red when fresh, black when dry, nearly globose, 1–1.3 cm in diam., 4-lobed, densely prickly, prickles ca. 3 mm. Aril bright red. Fl. May–Aug, fr. Jul–Nov.

Forests, scrub; 1000–3000 m. Yunnan [Vietnam].

**21. *Euonymus acanthoxanthus*** Pitard in Lecomte, Fl. Indo-Chine 1: 870. 1912.

三脉卫矛 san mai wei mao

*Echinocarpus cavaleriei* H. Léveillé; *E. esquirolii* H. Léveillé; *Euonymus blinii* H. Léveillé; *E. subtrinervis* Rehder.

Evergreen shrubs, scandent; branches and twigs slender, striate, green or brown when dry. Petiole ca. 3 mm; leaf blade papery, ovate-elliptic, 8–10 × 3–4 cm, pubescent abaxially, base cuneate or attenuate, margin crenulate to serrate, apex acute or acuminate; lateral veins 5–7 pairs, slightly prominent abaxially, disappearing before reaching margin. Peduncle up to 4 cm, 1 or 2 × dichotomously branched, several flowered. Flowers 4-merous (not seen). Capsule yellow-brown when dry, nearly globose, 1–1.5 cm in diam., slightly 4-grooved, densely prickly, prickles ca. 3 mm. Aril orange. Fl. unknown, fr. May–Sep.

Forest mountains; 500–800 m. Guizhou, Yunnan [N Vietnam].

**22. *Euonymus chenmoui*** W. C. Cheng, Contr. Biol. Lab. Sci. Soc. China, Bot. Ser. 10: 75. 1935.

陈谋卫矛 chen mou wei mao

Deciduous shrubs, prostrate, less than 1 m tall; branches and twigs 4-angled, brown or gray-brown when dry. Petiole 1–2 mm; leaves papery, ovate to ovate-elliptic, 1.8–3.6 × 0.9–1.7 cm, base broadly cuneate or subrotund, margin finely crenulate, apex acute or shortly acuminate; lateral veins 4–6 pairs, slightly prominent on both sides. Pedicel glabrous, ca. 2 cm. Flowers

4-merous, only 1 axillary, 7–8 mm in diam.; sepals rotund, very small; petals greenish yellow, suborbicular, 2–3 mm. Ovary densely prickly. Capsule dark red to red-purple when fresh, black when dry, nearly globose, 1–1.2 cm in diam., densely prickly, prickles ca. 2 mm. Seeds only 1 per locule; aril orange. Fl. May–Jul, fr. Sep–Oct.

- Woodlands; 1000–1500 m. Anhui, Jiangxi, Zhejiang.

**23. *Euonymus chui*** Handel-Mazzetti, Oesterr. Bot. Z. 90: 121. 1941 [*“chuii”*].

隐刺卫矛 yin ci wei mao

Deciduous shrubs, scandent, 2–3 m tall; branches and twigs striate, angulate, brown or gray-brown when dry, sometimes black. Petiole less than ca. 1 cm; leaf blade thinly leathery or thickly papery, ovate, obovate, elliptic, or ovate-oblong, 5–12 × 3–4.5 cm, base cuneate or attenuate, margin sparsely serrate, apex acute or acuminate; lateral veins 6–8 pairs, obviously impressed adaxially, prominent abaxially, disappearing before reaching margin. Peduncle 1–2 cm, 1–3-flowered. Flowers 4-merous; sepals very small, semirotund; petals orbicular, greenish yellow. Capsule red when fresh, brown when dry, nearly globose, ca. 8 mm in diam., sparsely prickly, prickles 1–2 mm. Aril bright orange. Fl. May–Jul, fr. Sep–Nov.

- Forests, scrub; 1400–2600 m. Gansu, Hubei, Hunan, Sichuan, Yunnan.

**24. *Euonymus echinatus*** Wallich in Roxburgh, Fl. Ind. 2: 410. 1824.

棘刺卫矛 ji ci wei mao

*Euonymus arboricola* Hayata; *E. fungosus* Ohwi subsp. *chinensis* P. S. Hsu; *E. mupinensis* Loesener & Rehder; *E. scandens* Graham; *E. subsessilis* Sprague; *E. trichocarpus* Hayata.

Evergreen or semievergreen shrubs, scandent, 2–3 m tall; branches and twigs slender, striate, angulate, brown or gray-brown when dry, sometimes black. Petiole short, ca. 3 mm; leaf blade thinly leathery, ovate, ca. 5 × 2–3 cm, base cuneate or truncate, margin sparsely serrate, apex acute or acuminate; lateral veins 6–8 pairs, sometimes impressed adaxially and prominent abaxially, disappearing before reaching margin. Peduncle 2–3 cm, 1–3-flowered; pedicel ca. 1 cm. Flowers 4-merous, 6–8 mm in diam.; sepals small, semirotund; petals orbicular, attenuate at base, greenish yellow. Capsule red when fresh, brown when dry, nearly globose, ca. 10 mm in diam., densely prickly, prickles 1–2 mm. Aril bright orange. Fl. Apr–Jul, fr. Sep–Jan.

Forests, scrub; 1300–3500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan (Ryukyu Islands), Myanmar, Nepal, Pakistan, Thailand].

This is one of the most complicated and variable species in the section. *Euonymus scandens* appears to be conspecific; however, the type is without flowers and fruit, making a definitive determination impossible.

**25. *Euonymus lushanensis*** F. H. Chen & M. C. Wang, Acta Phytotax. Sin. 3: 239. 1954.

庐山卫矛 lu shan wei mao

*Euonymus acanthocarpus* Franchet var. *lushanensis* (F. H. Chen & M. C. Wang) C. Y. Cheng; *E. furfuraceus* Q. H. Chen.

Deciduous shrubs, scandent, 2–3 m tall; branches and twigs striate, angulate, brown or gray-brown when dry. Petiole 1–2 cm; leaf blade thinly leathery or thickly papery, ovate to elliptic, or ovate-oblong, 9–15 × 3–4.5 cm, base cuneate or attenuate, margin crenate, apex acute or acuminate; lateral veins 6–8 pairs, disappearing before reaching margin, slightly impressed adaxially, slightly prominent abaxially. Peduncle 2–10 cm, 2 or 3 × dichotomously branched with several to many flowers. Flowers 4-merous (not seen). Capsule red when fresh, brown when dry, nearly globose, 1.3–1.8 cm in diam., 4-lobed, with sparse needlelike prickles, prickles ca. 3 mm. Aril bright red. Fl. May–Aug, fr. Oct–Nov.

- Forests, scrub; 600–1000 m. ?Anhui, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang.

This species' large fruit with few needlelike prickles is unique in the section. The distribution report from Anhui has not been confirmed.

**26. *Euonymus potingensis*** Chun & F. C. How ex J. S. Ma, Harvard Pap. Bot. 10: 94. 1997.

保亭卫矛 bao ting wei mao

Evergreen shrubs or small trees, scandent; branches and twigs brown or dark brown, obscurely angled when young. Petiole ca. 4 mm; leaf blade thinly leathery or thickly papery, oblong-elliptic to elliptic, 6–10 × 3–4.5 cm, base and apex attenuate, margin entire; lateral veins 5–7 pairs, disappearing before reaching margin. Peduncle 3–4 cm, several flowered. Flowers 4-merous (not seen). Capsule (immature) globose, sparsely prickly. Fl. unknown, fr. May.

- Valley forests; ca. 1100 m. Hainan.

This is the only species in Hainan Island with prickles on the capsule. The entire leaf margin is also unique to the section.

**27. *Euonymus spraguei*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 59. 1911.

疏刺卫矛 shu ci wei mao

*Euonymus kuraruensis* Hayata.

Deciduous shrubs, scandent, 4–5 m tall; branches and twigs striate, angulate, brown or gray-brown when dry, sometimes green. Petiole 5–14 mm; leaf blade thinly leathery, ovate-elliptic, ca. 5 × 2–3 cm, base cuneate or truncate, margin sparsely crenulate, apex acute or acuminate; lateral veins 6–8 pairs, sometimes invisible and disappearing before reaching margin. Peduncle 2–3 cm, 1–3-flowered; pedicel ca. 1 cm or less. Flowers 4-merous, 6–8 mm in diam.; sepals small, semirotund; petals orbicular, attenuate at base, greenish yellow. Capsule red when fresh, brown when dry, nearly globose, 8–10 mm in diam., 4-lobed, sparsely prickly or nearly smooth, prickles 1–2 mm. Aril bright orange. Fl. Apr–Jul, fr. Aug–Feb.

- Forests, scrub; 1100–2800 m. Taiwan.

**28. *Euonymus verrucocarpus*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 3: 231. 1998.

瘤果卫矛 liu guo wei mao

Deciduous shrubs to small trees, to 5 m tall, to 13 cm d.b.h.;

stem green to gray-green, 4-angled, glabrous; twigs green to light green, 4-angled when dry; winter buds very small, with several yellow scales, generally acute. Petiole 2–3 mm; leaf blade ± papery, ovate or elliptic-ovate, base and apex acuminate or acute, margin denticulate; lateral veins 4–6 pairs, disappearing before reaching margin or unclear, glabrous on both sides. Peduncle axillary, up to 10 mm, typically 1-flowered, occasionally few flowered. Flowers 4-merous (not seen). Capsule usually 1, sometimes 2 or 3, with dense and very short tubercles, less than ca. 6 × 5 mm, red when fresh (field record); pedicel ca. 5 mm. Seeds 2 per locule, nearly round or oblong-round, ca. 4 × 3 mm, black when dry, partially covered by aril. Fl. unknown, fr. Nov.

- Scrub; ca. 2400 m. Yunnan.

**29. *Euonymus wilsonii*** Sprague, Bull. Misc. Inform. Kew 1908: 180. 1908.

**3. *Euonymus* sect. *Melanocarya*** (Turczaninow) Nakai, J. Jap. Bot. 17: 618. 1941.

深裂卫矛组 shen lie wei mao zu

*Melanocarya* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 31: 453. 1858.

Shrubs or small trees, mostly deciduous, a few evergreen. Flowers 4-merous. Capsule 4-lobed into base, opening by 4 lobes at maturity, sometimes only 1–3 lobes developing.

About 11 species: E and S Asia, cultivated in Europe and North America; ten species (seven endemic) in China.

1a. Leaves deciduous.

- 2a. Young branches and twigs with 4 corky wings ..... 30. *E. alatus*  
 2b. Young branches and twigs without wings.  
 3a. Leaf blade broadly linear or oblong-lanceolate, 4–7 × as long as wide ..... 34. *E. euscaphis*  
 3b. Leaf blade ovate to elliptic, less than 4 × as long as wide.  
 4a. Leaf blade obovate or elliptic-obovate ..... 31. *E. centidens*  
 4b. Leaf blade ovate to ovate-elliptic.  
 5a. Leaf blade margin finely and sharply serrulate; flowers from greenish pink to red; style long and persistent ..... 39. *E. verrucosoides*  
 5b. Leaf blade margin crenulate; flowers light yellow or greenish yellow; style short and invisible ..... 33. *E. distichus*

1b. Leaves evergreen.

- 6a. Flowers 4- or 5-merous; cymes with many flowers; leaf blade margin ciliate ..... 37. *E. lucidus*  
 6b. Flowers 4-merous only; cymes with less than 7 flowers; leaf blade margin without cilia.  
 7a. Leaf blade entire ..... 36. *E. hukuangensis*  
 7b. Leaf blade margin crenulate to serrate.  
 8a. Leaf blade small, 4–7 cm ..... 38. *E. tashiroi*  
 8b. Leaf blade large, 9–15 cm.  
 9a. Leaf blade mainly obovate, margin often serrulate to ciliate; capsule lobes often bending backward ..... 32. *E. dielsianus*  
 9b. Leaf blade mainly elliptic, margin entire or obscurely crenulate; capsule lobes never bending backward ..... 35. *E. hainanensis*

**30. *Euonymus alatus*** (Thunberg) Siebold, Verh. Batav. Genootsch. Kunst. 12: 49. 1830.

卫矛 wei mao

*Celastrus alatus* Thunberg in Murray, Syst. Veg., ed. 14, 237. 1784; *C. striatus* Thunberg; *Euonymus alatus* var. *ellipticus* Chen H. Wang; *E. alatus* var. *microphyllus* Chen H. Wang; *E. alatus* var. *pilosus* Loesener & Rehder; *E. alatus* var. *pubescens* Maximowicz; *E. ellipticus* (Chen H. Wang) C. Y. Cheng; *E.*

长刺卫矛 chang ci wei mao

Evergreen shrubs, scandent, 3–4 m tall; branches and twigs sturdy, striate, green or brown when dry. Petiole 1–1.4 cm; leaf blade thinly leathery or papery, elliptic, ovate-elliptic, or long elliptic, 10–15 × 2.5–4.5 cm, base cuneate or attenuate, margin crenulate on distal 2/3, nearly entire on proximal 1/3, apex acute, acuminate, or caudate; lateral veins 6–8 pairs, impressed adaxially, prominent abaxially, netting before reaching margin. Peduncle 4–6 cm, 2 or 3 × dichotomously branched with many flowers; pedicel glabrous, 5–7 mm. Flowers 4-merous, small, 6–7 mm in diam.; sepals suborbicular; petals green, ovate, base attenuate. Ovary densely long prickly; stigma absent. Capsule red when fresh, yellow-brown or gray when dry, nearly globose, 1.5–2 cm in diam., 4-lobed, densely prickly, prickles 6–7 mm. Aril bright red. Fl. Apr–May, fr. Jul–Sep.

- Forests, scrub; 1000–2600 m. Guangxi, Guizhou, Hubei, Shaanxi, Sichuan, Yunnan.

*striatus* (Thunberg) Loesener; *E. verrucosus* Scopoli var. *tche-fouensis* Debeaux.

Deciduous shrubs, 1–4 m tall; young branches usually with 2 or 4 winglike corks, wings up to 5 mm wide, 1–2 mm thick, twigs 4-angled, green or brown when dry. Petiole sessile or very short, 2–4 mm; leaf blade thinly leathery to papery, obovate or obovate-elliptic, sometimes ovate-elliptic or oblong-elliptic, 4.5–10 × 2–4 cm, base cuneate or attenuate, margin crenulate to serrulate, apex acute, acuminate, or even caudate; lateral veins

5–7 pairs, curving forward and disappearing before reaching margin. Peduncle slender and short, 1–2 cm, typically 1 dichotomous branch with 3 flowers, rarely 2 branches with more flowers; pedicel slender, 5–7 mm. Flowers 4-merous, ca. 9 mm in diam.; sepals suborbicular; petals green, light yellow, or greenish yellow, ovate, base attenuate. Capsule reddish brown when fresh, dark brown or gray when dry, 4-lobed, 1–1.3 cm in diam., only 1–3 lobes developing, lobes ovoid. Aril bright red. Fl. Apr–Jul, fr. Jul–Nov.

Forests, woodlands, scrub; near sea level to 2700 m. Anhui, Gansu, Guangdong, ?Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, ?Yunnan, Zhejiang [Japan, Korea, Russia (Sakhalin)]; cultivated in Europe and North America].

This species is widespread, not only as a common shrub in the distribution area but also as a cultivated ornamental in the Old and New Worlds. The leaves change from pinkish to reddish and even purple in late autumn. The distribution reports from Guangxi and Yunnan have not been confirmed.

**31. *Euonymus centidens*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 13: 262. 1914.

百齿卫矛 *bai chi wei mao*

*Euonymus euscaphioides* F. H. Chen & M. C. Wang; *E. euscaphioides* var. *serrulatus* F. H. Chen & M. C. Wang; *E. streptopterus* Merrill.

Deciduous shrubs, 2–4(–5) m tall; branches terete, twigs 4-angled, green or brown when dry. Petiole sessile or very short, less than ca. 3 mm; leaf blade thinly leathery or thickly papery, obovate or elliptic-obovate, 6–11 × 2.5–4.5 cm, base cuneate or attenuate, margin crenulate, serrulate to serrate, even ciliate, apex acute, acuminate, or caudate; lateral veins 5–7 pairs, obscure to apparent adaxially, curving forward, netting and disappearing before reaching margin. Cymes single or clustered, axillary or terminal; peduncle slender, 2–3 cm, 1 or 2 × dichotomously branched with 3 flowers, rarely more than 3; pedicel slender, 5–7 mm. Flowers 4-merous, 7–8 mm in diam.; sepals suborbicular; petals green, light yellow, or greenish yellow, ovate, base attenuate. Capsule reddish brown when fresh, dark brown or gray when dry, 4-lobed, 1.3–1.5 cm in diam., sometimes only 2 or 3 lobes developing, lobes ovoid. Aril bright red. Fl. May–Jun, fr. Sep–Nov.

• Forests, woodlands, scrub; 200–1400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

**32. *Euonymus dielsianus*** Loesener ex Diels, Bot. Jahrb. Syst. 29: 440. 1900.

裂果卫矛 *lie guo wei mao*

*Euonymus cavaleriei* H. Léveillé; *E. dielsianus* var. *euryanthus* Handel-Mazzetti; *E. dielsianus* var. *fertilis* Loesener; *E. dielsianus* var. *latifolius* Loesener; *E. fertilis* (Loesener) C. Y. Cheng ex C. Y. Chang; *E. fertilis* var. *euryanthus* (Handel-Mazzetti) C. Y. Chang; *E. leclerei* H. Léveillé.

Evergreen shrubs to small trees, 2–8 m tall; branches terete, twigs striate, green or brown when dry. Petiole sturdy, short, less

than 1 cm; leaf blade leathery or thickly leathery, obovate or elliptic-obovate, 9–15 × 4.5–6 cm, base cuneate or attenuate, margin proximal 1/5–2/5 entire, distal 3/5–4/5 crenulate, serrulate to serrate, sometimes ciliate, apex acute, acuminate, or caudate; lateral veins 6–8 pairs, obscure to clear, curving forward, netting and disappearing before reaching margin. Cymes single or clustered when young, axillary; peduncle slender, 2–3 cm, 1 or 2 × dichotomously branched with 3 flowers, rarely more than 3; pedicel 4–6 mm. Flowers 4-merous, ca. 6 mm in diam.; sepals suborbicular; petals green, light yellow, or greenish yellow, ovate, base attenuate. Capsule reddish brown when fresh, dark brown or gray when dry, 4-lobed, lobes bending backward, 1.8–2.4 cm in diam., sometimes only 2 or 3 lobes developing, lobes ovoid. Seeds dark brown; aril bright red. Fl. Apr–Jul, fr. Sep–Nov.

• Forests, woodlands, scrub; 500–1800 m. Guangdong, Guangxi, Guizhou, ?Henan, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

**33. *Euonymus distichus*** H. Léveillé, Repert. Spec. Nov. Regni Veg. 13: 261. 1914.

双歧卫矛 *shuang qi wei mao*

Deciduous shrubs, 1–2 m tall; young branches and twigs 4-angled, green or brown when dry. Petiole sessile or very short, 1–3 mm; leaf blade papery, ovate or ovate-elliptic, 3.5–5 × 1.8–2.5 cm, base cuneate or suborbicular, margin crenulate, apex acute or acuminate; lateral veins ca. 5 pairs, invisible, disappearing before reaching margin. Pedicel slender, less than ca. 1 cm. Flowers single, axillary, 4-merous, 8–9 mm in diam.; sepals orbicular; petals light yellow or greenish yellow, orbicular, base nearly attenuate. Capsule reddish brown when fresh, brown or gray when dry, ca. 1 cm in diam., 4-lobed, sometimes only 3 lobes developing, lobes ovoid. Aril bright red. Fl. May–Jul, fr. Aug–Nov.

• Scrub on slopes of lower mountains; ca. 1000 m. ?Guangdong, Guizhou, Hunan, Sichuan.

The distribution report from Guangdong has not been confirmed.

**34. *Euonymus euscaphis*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 148. 1921.

鸭椿卫矛 *ya chun wei mao*

*Euonymus euscaphis* var. *gracilipes* Rehder; *E. tsoi* Merrill subsp. *brevipes* P. S. Hsu.

Deciduous shrubs, 1–2 m tall; branches terete, twigs 4-angled, green or brown when dry. Petiole short, ca. 3 mm; leaf blade thickly papery, broadly linear or oblong-lanceolate, 8–12 × 1.8–2.2 cm, base cuneate to rounded, margin crenulate, apex acute or acuminate; lateral veins 10–12 pairs, obscure, curving forward, netting and disappearing before reaching margin. Peduncle slender, 1–2 cm, 1 or 2 × dichotomously branched with 3 flowers, rarely more than 3; pedicel slender, 5–7 mm. Flowers 4-merous, 6–8 mm in diam.; sepals suborbicular; petals green or greenish yellow, rotund, base subrounded. Capsule reddish brown when fresh, dark brown or gray when dry, 1.1–1.3 cm in diam., 4-lobed, sometimes only 2 or 3 lobes developing, lobes ovoid. Aril bright red. Fl. Apr–Jun, fr. Jul–Oct.

• Forests. Anhui, Fujian, Guangdong, Hunan, Jiangxi, Zhejiang.

**35. *Euonymus hainanensis*** Chun & F. C. How, Acta Phytotax. Sin. 7: 47. 1958.

海南卫矛 hai nan wei mao

Evergreen shrubs, 3–4 m tall; branches terete, twigs striate, green or brown when dry. Petiole sturdy, short, less than 6 mm; leaf blade thickly leathery, elliptic, 9–11.5 × 3–4.5 cm, base cuneate or attenuate, adaxially ± farinose, margin entire, revolute, or obscurely crenulate, apex acute or acuminate; lateral veins 8–10 pairs, impressed adaxially and prominent abaxially, sometimes obscure, curving forward, netting and disappearing before reaching margin. Peduncle short, less than ca. 1 cm, usually with 1 dichotomous branch and 1–3 flowers; pedicel short, less than ca. 2 mm. Flowers 4-merous, 7–8 mm in diam.; sepals suborbicular; petals white. Capsule reddish brown when fresh, dark brown or gray when dry, less than ca. 1 cm in diam., 4-lobed, usually only 1 or 2 lobes developing, lobes ovoid. Seeds typically 1, dark brown; aril red. Fl. Apr–Jun, fr. Aug–Nov.

- Forests; 700–1000 m. Hainan.

This species is very distinct and the only one in Hainan with a lobed capsule.

**36. *Euonymus hukuangensis*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 94. 1997.

湖广卫矛 hu guang wei mao

Evergreen shrubs to small trees, to 6 m tall; branches terete, twigs striate, green or brown when dry. Petiole sturdy, short, 5–9 mm; leaf blade leathery, elliptic, ovate-elliptic, or obovate-elliptic, 6–9 × 2.5–4 cm, base cuneate or attenuate, margin entire, apex acute, acuminate, or sometimes shortly apiculate; lateral veins 7 or 8 pairs, obscure or invisible, disappearing before reaching margin. Peduncle ca. 9 mm, usually 1 or 2 × dichotomously branched, several flowered; pedicel short, less than 3 mm. Flowers 4-merous, ca. 10 cm in diam.; sepals suborbicular; petals white, suborbicular. Capsule reddish brown when fresh, dark brown or gray when dry, 1–1.5 cm in diam., 4-lobed, lobes ovoid. Seeds 2 per locule, brown. Aril red. Fl. Apr–Jun, fr. Aug–Nov.

- Forests; 500–1200 m. Fujian, Guangdong, Guangxi, Hunan.

The specific epithet "*hukuangensis*" derives from "hu," from Hunan, and "kuang," from Kwangtung and Kwansi (i.e., Guangdong and Guangxi).

**37. *Euonymus lucidus*** D. Don, Prodr. Fl. Nepal. 191. 1825.

垂序卫矛 chui xu wei mao

*Euonymus pendulus* Wallich ex Roxburgh.

Evergreen shrubs to small trees, 4–12 m tall; branches terete, twigs striate or sometimes 4-angled, green or brown when dry. Petiole sturdy, short, less than ca. 1 cm; leaf blade thickly leathery or leathery, elliptic or oblong-elliptic, 10–11.5 × 3(–4.5) cm, base cuneate or attenuate, adaxially ± farinose, margin long and sharply ciliate, apex acute or acuminate; lateral veins invisible, or sometimes in ca. 10 pairs, slightly curving forward, netting and disappearing before reaching margin. Cymes many,

axillary or clustered; peduncle up to 4 cm, usually 1–3 × dichotomously branched with many flowers; pedicel short, less than ca. 5 mm. Flowers 5-merous, sometimes combined with 4-merous, 7–8 mm in diam.; sepals suborbicular; petals white. Capsule reddish brown when fresh, dark brown or gray when dry, 1.5–1.6 cm in diam., 4- or 5-lobed, lobes wide and thin, wing up to 7 × 5 mm. Seeds typically 1, dark brown; aril red. Fl. Apr–May, fr. Aug–Nov.

Forests, woodlands; 1600–3200 m. Xizang [Bhutan, India, Myanmar, Nepal, Pakistan].

The flowers and fruit of this species are usually 5-merous; however, in alpine conditions, it sometimes includes 4-merous anatomy. This combination of characters is unique in the section.

**38. *Euonymus tashiroi*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 31: 23. 1887.

菱叶卫矛 ling ye wei mao

*Euonymus acutorhombifolius* Hayata; *E. matsudae* Hayata; *Glyptopetalum matsudae* (Hayata) Nakai.

Evergreen shrubs, 1.5–2 m tall; young branches and twigs 4-angled, green when dry. Petiole sessile or very short, 2–4 mm; leaf blade thinly papery, elliptic or ovate-elliptic, sometimes oblong-elliptic, 4–5(–7) × 2.2–3.5(–5) cm, base cuneate or attenuate, margin remotely and obtusely serrate, apex acute, acuminate, or slightly caudate; lateral veins ca. 5 pairs, sometimes invisible, curving forward and disappearing before reaching margin. Pedicel slender, ca. 5 mm. Flowers typically 1(or 2 or more), axillary, 4-merous, ca. 1 cm in diam.; sepals suborbicular; petals green, light yellow or greenish yellow, ovate, base attenuate. Capsule dark brown when fresh, brown or gray when dry, 1–1.3 cm in diam., 4-lobed, only 1–3 lobes developing, lobes ovoid. Aril bright red. Fl. Apr–Dec, fr. May–Dec.

Forests, woodlands, scrub; 100–1400 m. Taiwan [Japan (Ryukyu Islands)].

**39. *Euonymus verrucosoides*** Loesener, Bot. Jahrb. Syst. 30: 462. 1902.

疣点卫矛 you dian wei mao

*Euonymus alatus* (Thunberg) Siebold var. *apertus* Loesener; *E. verrucosoides* var. *viridiflorus* Loesener & Rehder.

Deciduous shrubs, 1–3 m tall; young branches and twigs 4-angled, with evident nodes, green or brown when dry. Petiole sessile or very short, 2–4 mm; leaf blade papery, ovate-elliptic to obovate-elliptic, sometimes oblong-elliptic, 3.5–4(–9) × 1.5–2(–3.5) cm, base cuneate or attenuate, sometimes narrowly attenuate, margin finely and sharply serrulate, apex acute or acuminate to long acuminate; lateral veins 7–10 pairs, curving forward and disappearing before reaching margin. Peduncle slender and short, 1.5–3(–8) cm, 1 dichotomous branch with 3 flowers, rarely 2 × branched with more than 3 flowers; pedicel slender, 5–7 mm. Flowers 4-merous, 7–8 mm in diam.; sepals triangular; petals greenish pink to pinkish red, oblong, apex subrounded, base attenuate. Ovary with long style persisting. Capsule reddish brown when fresh, brown, gray, or dark colored when dry, 1.3–1.5(–2) cm in diam., 4-lobed, sometimes only 1–3

lobes developing, lobes ellipsoid. Aril bright red. Fl. May–Jul, fr. Aug–Oct. ?Guizhou, Henan, Hubei, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

- Woodlands, scrub, dry mountain slopes; 1400–3700 m. Gansu, The distribution report from Guizhou has not been confirmed.

**4. *Euonymus* sect. *Ilicifolii* Nakai, J. Jap. Bot. 17: 619. 1941 [*"Ilicifolia"*].**

冬青卫矛组 *dong qing wei mao zu*

Shrubs, shrublike, scandent, ascending, prostrate, or climbing on other vegetation, occasionally small trees to ca. 3 m tall, mostly evergreen, a few deciduous. Flowers usually 4-merous, occasionally 5-merous. Fruit globose, rotund or spherical, without prickles or wings, opening by 4 or 5 lobes at maturity.

Twenty species: E, S, and SE Asia, cultivated in Africa, Asia, Europe, North and South America, and Oceania; 14 species (six endemic, one introduced) in China.

- 1a. Deciduous, shrubs to small trees ..... 53. *E. venosus*  
 1b. Evergreen.  
 2a. Capsule with white spots when mature.  
 3a. Leaves without petiole or with very short petiole, less than 3 mm, base round or cordate, lateral veins impressed adaxially and prominent abaxially; capsule without light-colored grooves when mature ..... 40. *E. bockii*  
 3b. Leaves with short petiole, 4–9 mm, base cuneate, lateral veins neither impressed adaxially nor prominent abaxially; capsule with light-colored grooves when mature ..... 47. *E. pseudovagans*  
 2b. Capsule without white spots when mature.  
 4a. Leaves small, 3–5 cm.  
 5a. Leaves triangular- or elliptic-lanceolate, with sparse and sharp denticles on margin ..... 44. *E. jinyangensis*  
 5b. Leaves mainly ovate, sometimes combined with elliptic or obovate.  
 6a. Subshrubs, ascending or procumbent on ground or other vegetation; leaf blade acute or obtuse at apex ..... 41. *E. fortunei*  
 6b. Shrubs to ascending subshrubs; leaf blade apex rounded, sometimes weakly acute.  
 7a. Peduncle 7–8 cm, usually with more than 20 flowers; capsule 8–10 mm in diam. .... 50. *E. tonkinensis*  
 7b. Peduncle 1–5 cm, usually with less than 7 flowers; capsule ca. 6 mm in diam. .... 52. *E. vagans*  
 4b. Leaves large, 5–20 cm.  
 8a. Peduncle more than 7 cm, usually with many flowers.  
 9a. Leaves papery, secondary veins ca. 4 pairs ..... 45. *E. kengmaensis*  
 9b. Leaves leathery or thinly leathery, secondary veins ca. 7 pairs.  
 10a. Leaves ovate to elliptic, densely arranged on branches or twigs, petiole 3–10 mm ..... 42. *E. japonicus*  
 10b. Leaves obovate to ovate-elliptic, sparsely arranged on branches or twigs, petiole 2–4 cm ..... 43. *E. hupehensis*  
 8b. Peduncle less than 4 cm, usually ca. 3-flowered.  
 11a. Capsule purple when fresh, dark red when dry, usually clustered at top of branches ..... 51. *E. vaganoides*  
 11b. Capsule pink to red when fresh, brown to red-brown when dry, axillary only.  
 12a. Flowers ca. 6 mm in diam.; capsule 5–9 mm in diam. .... 48. *E. theacola*  
 12b. Flowers ca. 5 mm in diam.; capsule ca. 8 mm in diam.  
 13a. Leaves entire and revolute on margin ..... 46. *E. pallidifolius*  
 13b. Leaves crenulate to serrate on margin ..... 49. *E. theifolius*

**40. *Euonymus bockii* Loesener, Bot. Jahrb. Syst. 29: 439. 1900.**

南川卫矛 *nan chuan wei mao*

*Euonymus bockii* var. *orgyalis* (W. W. Smith) C. Y. Cheng; *E. orgyalis* W. W. Smith; *E. petelotii* Merrill; *E. subsessilis* Sprague var. *latifolius* Loesener.

Evergreen shrubs or ascending subshrubs, 6–8 m tall; branches and twigs rounded, with lenticels when old, usually brown or dark brown. Leaves sessile or with very short petiole, less than ca. 3 mm; leaf blade elliptic or ovate-elliptic, 8–16 × 4–8 cm, base rounded to cordate, apex acute; lateral veins 6–9 pairs, prominent abaxially. Peduncle 3–4 cm, slender, usually

several flowered, sometimes more than 5-flowered; pedicel usually less than ca. 9 mm. Flowers 4-merous, ca. 6 mm in diam.; sepals semirobund; petals nearly orbicular, greenish. Capsule brown or green-brown, densely white spotted, sometimes white scalelike, less than ca. 8 mm in diam. Aril red. Fl. Apr–Jun, fr. Aug–Dec.

Mixed forests; 1000–2300 m. Chongqing, Guangxi, Guizhou, Sichuan, Yunnan [India, Vietnam].

This is an easily recognized species in *Euonymus* sect. *Ilicifolii* due to its large sessile leaves and fruit densely white spotted at maturity. Leaf blade variation has been used to circumscribe new taxa; however, taking variation across the genus into account, those taxa are not supported.

**41. *Euonymus fortunei*** (Turczaninow) Handel-Mazzetti, Symb. Sin. 7: 660. 1933.

扶芳藤 fu fang teng

*Elaeodendron fortunei* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 36: 603. 1863, nom. cons. prop.; *Euonymus fortunei* var. *acuminatus* F. H. Chen & M. C. Wang; *E. fortunei* var. *patens* (Rehder) Handel-Mazzetti; *E. hederaceus* Champion ex Benth; *E. japonicus* Thunberg var. *acutus* Rehder; *E. japonicus* var. *chinensis* Pampanini; *E. japonicus* var. *radicans* Miquel; *E. kiautschovicus* Loesener; *E. kiautschovicus* var. *patens* (Rehder) Loesener; *E. patens* Rehder; *E. radicans* (Miquel) Siebold ex Handel-Mazzetti var. *alticola* Handel-Mazzetti; *E. wensiensis* J. W. Ren & D. S. Yao.

Evergreen subshrubs, ascending or procumbent on ground or rock, trees sometimes dwarfed, to 10 m tall; branches and twigs rounded, sometimes striate, usually brown or green-brown. Leaves densely arranged on branches; petiole 2–9 mm, sometimes sessile; leaf blade variously ovate or ovate-elliptic, 2–5.5 × 2–3.5 cm, glabrous, base nearly truncate, at times ± cuneate, margin crenulate to serrate, apex obtuse to acute; lateral veins 4–6 pairs, invisible. Peduncle usually with few flowers; pedicel usually less than ca. 5 mm. Flowers 4-merous, ca. 5 mm in diam.; sepals semirotund; petals nearly orbicular, greenish or whitish. Capsule brown to red-brown, 5–6 mm in diam. Aril red. Fl. Apr–Jul, fr. Sep–Dec.

Common in woodlands, scrub, and forests, often cultivated in gardens; near sea level to above 3400 m. Anhui, Fujian, Hebei, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Laos, Myanmar, Pakistan (?cultivated), Philippines, Thailand, Vietnam; cultivated in Africa, Europe, North America, Oceania, South America].

This is the most common and widespread species in the genus. It is also the most complex and polymorphic species in E, S, and SE Asia, and can be confused with *Euonymus japonicus*, *E. theifolius*, or *E. vagans*. Numerous taxa have been named within the *E. fortunei* complex but many of these refer to cultivated plants and are best treated as cultivars.

Cao and Ma (Taxon 55: 233. 2006) proposed the name *Elaeodendron fortunei* Turczaninow (1863) for conservation against the senior taxonomic synonym *Euonymus hederaceus* Champion ex Benth (Hooker's J. Bot. Kew Gard. Misc. 3: 333. 1851). Conservation as proposed was subsequently recommended by the Committee for Vascular Plants (Brummitt, Taxon 56: 1291. 2007).

**42. *Euonymus japonicus*** Thunberg, Nova Acta Regiae Soc. Sci. Upsal. 3: 208. 1780.

冬青卫矛 dong qing wei mao

*Euonymus sinensis* Carrière (1883), not *E. chinensis* Lour-eiro (1790), nor Lindley (1826).

Evergreen shrubs or small trees, erect, to 3 m tall, sometimes dwarfed; branches gray-green to gray-brown, terete, glabrous, sturdy, twigs green to light green, glabrous, not evidently striate, especially when fresh. Petiole 3–10 mm; leaf blade leathery or thickly leathery, ovate, obovate, orbicular-ovate, or long ovate, (3–)5–10(–12) × (2–)3–5(–5.5) cm, base orbicular or semiorbicular, margin crenulate distally, nearly entire proximally, apex orbicular or semiorbicular; lateral veins 6–8 pairs, slightly visible or unclear, especially when dry. Cymes usually

axillary, sometimes terminal, many branched with many flowers; peduncle up to 8 cm, sub-branches 2–4 cm; pedicel 4–7 mm. Flowers 4-merous, 5–6 mm in diam.; sepals nearly orbicular; petals green or yellowish green, sometimes cream, nearly orbicular. Capsule globose or subglobose, brown or yellow-brown to red-brown, 6–9(–12) mm in diam., 4-lobed. Seeds 2 per locule, dark brown, globose; aril orange-red. Fl. Apr–Aug, fr. Aug–Jan.

Cultivated, especially in gardens and arboreta; near sea level to 1400 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan (Lan Yu), Xinjiang, Yunnan, Zhejiang [native to Japan; cultivated in Cambodia, India, Indonesia, Korea, Laos, Myanmar, Pakistan, Philippines, Thailand, Vietnam; also cultivated in Africa, Europe, North America, Oceania, South America].

This species is a native of Japan, and it is from here that the cultivated form was introduced to the world. *Euonymus japonicus*, especially in the cultivated condition, is very similar to *E. fortunei*. The native species differs by having an erect habit vs. climbing or procumbent in *E. fortunei*. Ding Hou used the name *E. japonicus* (Fl. Males., Ser. 1, Spermat. 6: 252. 1963) to represent the taxa in S and SE Asia; however, it is *E. fortunei* that is native to this region, while *E. japonicus* is only cultivated in the area.

**43. *Euonymus hupehensis*** (Loesener) Loesener, Bot. Jahrb. Syst. 30: 454. 1902.

湖北卫矛 hu bei wei mao

*Euonymus chinensis* Lindley var. *hupehensis* Loesener, Bot. Jahrb. Syst. 29: 436. 1900; *E. hupehensis* var. *brevipedunculatus* Loesener; *E. hupehensis* var. *longipedunculatus* Loesener; *E. hupehensis* var. *maculatus* Loesener.

Evergreen shrubs, ascending subshrubs; branches gray-green to gray-brown, terete, glabrous, twigs green to light green, glabrous. Petiole 2–4 cm; leaf blade thinly leathery, obovate, elliptic, or ovate-elliptic, 6–10 × 3–5 cm, base cuneate or attenuate, margin crenulate, apex acute; lateral veins ca. 7 pairs. Peduncle up to 8 cm, several flowered; pedicel 4–7 mm. Flowers 4-merous, ca. 6 mm in diam.; sepals semirotund; petals green, yellowish green, or whitish, suborbicular. Capsule globose or subglobose, brown or yellow-brown to red-brown, 6–9 mm in diam., 4-lobed. Seeds dark brown; aril orange-red. Fl. Apr–Jul, fr. Aug–Dec.

• Forests, woodlands, scrub; 1000–3000 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan.

**44. *Euonymus jinyangensis*** C. Y. Chang, Bull. Bot. Res., Harbin 5(1): 85. 1985.

金阳卫矛 jin yang wei mao

Evergreen subshrubs, climbing on rock or other vegetation in alpine conditions, to 1 m tall; branches and twigs mainly black or dark brown when dried. Petiole ca. 3 mm; leaf blade triangular- or elliptic-lanceolate, 4–5 × 1.2–1.5 cm, base and apex attenuate, margin with sparse and sharp denticles; lateral veins obscure. Cymes axillary, 3–5(–7)-flowered. Flowers 4-merous, small, ca. 6 mm in diam.; sepals rotund; petals pale green, ovate or rotund, nearly entire. Ovary smooth. Capsule globose, ca. 6 mm in diam., 4-lobed. Fl. and fr. Jun–Oct.

• Forested mountains and valleys; 1600–2900 m. Sichuan, Xizang, Yunnan.

**45. *Euonymus kengmaensis*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 93. 1997.

耿马卫矛 *geng ma wei mao*

Evergreen shrubs (scandent) to small trees, to 8 m tall; branches gray-green to gray-brown, terete, glabrous, twigs green to light green. Petiole ca. 4 mm; leaf blade papery or papery, ovate to elliptic, 8–12 × 3–5 cm, base and apex acuminate or acute, margin crenulate; lateral veins ca. 4 pairs, slightly curved upward, disappearing before reaching margin. Inflorescence terminal or axillary, with many flowers, up to 8 cm, ca. 6 cm in diam. Flowers 4-merous, ca. 7 mm in diam.; petals greenish yellow or yellowish green, nearly orbicular. Capsule globose or subglobose, brown or yellow-brown, 4-lobed. Seeds dark brown; aril orange. Fl. Mar–Jun, fr. Jul–Nov.

• Dense forests and scrub; 1300–2900 m. Yunnan.

**46. *Euonymus pallidifolius*** Hayata, Icon. Pl. Formos. 3: 57. 1913.

淡绿叶卫矛 *dan lü ye wei mao*

Evergreen shrubs; branches and twigs round, sturdy, usually green or yellow. Petiole 4–6 mm; leaf blade elliptic or elliptic-ovate, 6–8 × 3–4 cm, base attenuate, margin entire and revolute, apex acute; lateral veins and veinlets invisible. Peduncle 2–3 cm, usually with less than 3 flowers; pedicel ca. 3 mm. Flowers 4-merous, ca. 5 mm in diam.; sepals semirobund; petals nearly orbicular, greenish or whitish. Capsule brown or brown-yellow, sometimes shallowly grooved, ca. 8 mm in diam. Aril red. Fl. Mar–Jun, fr. Aug–Nov.

• Beach scrub; near sea level to 200 m. Taiwan.

This species is in need of further work because there are very few specimens available.

**47. *Euonymus pseudovagans*** Pitard in Lecomte, Fl. Indo-Chine 1: 871. 1912.

假游藤卫矛 *jia you teng wei mao*

Evergreen shrubs, or ascending subshrubs, to 3 m tall; branches and twigs brown and green, usually 4-angled. Petiole 4–9 mm; leaf blade elliptic or ovate-elliptic, 7–14 × 3–6 cm, base cuneate, margin serrate to crenulate, apex acute; lateral veins 5–7 pairs. Peduncle 3–4 cm, usually several flowered, sometimes more than 5-flowered; pedicel usually less than ca. 1 cm. Flowers 4-merous (not seen). Capsule brown or yellow-brown, densely white spotted with 4 bright or yellow-brown grooves, up to 1 cm in diam. Aril red. Fl. unknown, fr. Oct–Jan.

Mixed forests, scrub; 300–2400 m. Guangxi, Guizhou, Yunnan [N Vietnam].

**48. *Euonymus theacola*** C. Y. Cheng ex T. L. Xu & Q. H. Chen, Bull. Bot. Res., Harbin 14: 349. 1994 [*“theacolus”*].

茶色卫矛 *cha se wei mao*

Evergreen shrubs or subshrubs, 2–4 m tall, sometimes climbing. Petiole sturdy, less than ca. 1 cm; leaf blade ovate to

long elliptic, 6–12 × 2–3 cm, base subrounded, cuneate or attenuate, margin obscurely entire, crenulate, or sparsely large crenate, apex acuminate or acute, even caudate; lateral veins 5–7 pairs, appearing as rugae on surface, impressed adaxially and prominent abaxially, curved forward, netting and disappeared before reaching margin. Peduncle 2–3 cm, sturdy, several flowered. Flowers 4-merous, ca. 6 mm in diam.; sepals semi-orbicular, small; petals orbicular, from light pink (immature) to yellow-green (mature), nearly rounded. Ovary small verrucose. Capsule globose, 5–6 mm in diam., lavender-white when fresh (from record), brown or yellow when dry, 4-lobed. Aril orange. Fl. Mar–Jun, fr. Jul–Nov.

Mixed forests, forest ravines; 1200–2900 m. Guangxi, Guizhou, Sichuan, Yunnan [Bangladesh, India (Assam), Myanmar, Thailand].

**49. *Euonymus theifolius*** Wallich ex M. A. Lawson in J. D. Hooker, Fl. Brit. India 1: 612. 1875.

茶叶卫矛 *cha ye wei mao*

*Euonymus paravagans* Z. M. Gu & C. Y. Cheng.

Evergreen shrubs or ascending subshrubs, 2–3 m tall; branches and twigs round, usually brown or yellow. Petiole 3–5 mm; leaf blade elliptic or elliptic-lanceolate, 5–10 × 2.5–5 cm, base cuneate, margin crenulate to serrate, apex acute or acuminate; lateral veins 5–8 pairs. Peduncle 2–3 cm, slender, usually with more than 7 flowers, sometimes only 5-flowered; pedicel ca. 5 mm. Flowers 4-merous, ca. 5 mm in diam.; sepals semirobund; petals nearly orbicular, greenish or whitish. Capsule brown or brown-yellow, ca. 8 mm in diam. Aril red. Fl. Mar–Jun, fr. Aug–Dec.

Forests, woodlands, scrub; 1500–3400 m. ?Guizhou, ?Sichuan, Xizang, Yunnan [Bangladesh, Bhutan, India, Myanmar, Nepal, Thailand].

This species is among the complex *Euonymus bockii*, *E. fortunei*, and *E. jinyangensis*, which are very similar. The distribution reports from Guizhou and Sichuan have not been confirmed.

**50. *Euonymus tonkinensis*** (Loesener) Loesener, Bot. Jahrb. Syst. 30: 453. 1902.

北部湾卫矛 *bei bu wan wei mao*

*Euonymus chinensis* Lindley var. *tonkinensis* Loesener, Notizbl. Königl. Bot. Gart. Berlin 3: 77. 1900.

Evergreen shrubs, to 2 m tall; branches and twigs round, usually brown or yellow. Petiole 3–5 mm; leaf blade rotund to ovate, 4–5 × 3–3.5 cm, base rounded to cuneate, distal margin crenulate, apex rounded or subacute; lateral veins ca. 5 pairs. Peduncle 7–8 cm, sturdy, usually several × dichotomously branched with 20–30 flowers; pedicel ca. 5 mm. Flowers 4-merous, ca. 5 mm in diam.; sepals semirobund; petals nearly orbicular, greenish. Capsule brown or brown-yellow, 8–10 mm in diam. Aril red. Fl. Feb–Aug, fr. Jul–Jan.

Forests, woodlands, scrub; 1500–3400 m. Guangdong, Guangxi, ?Hainan [N Vietnam].

This species is very similar to *Euonymus japonicus*; however, due to limited materials, further study is still needed. The distribution report from Hainan has not been confirmed.

**51. *Euonymus vaganoides*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 93. 1997.

拟游藤卫矛 ni you teng wei mao

Evergreen shrubs, climbing; branches terete, twig sturdy, brown or dark brown. Leaves clustered at apex of branches; petiole sturdy, ca. 3 mm; leaf blade elliptic-obovate, 8–10 × 3–5 cm, thickly leathery, base widely attenuate, margin sparsely crenulate, apex cuspidate or acuminate; lateral veins 5–7 pairs, prominent abaxially. Flowers not seen. Capsule few, terminal on branches, nearly globose, 7–9 mm in diam., purple, densely spotted with small white dots when dry. Aril orange-red. Fl. unknown, fr. Sep–Nov.

• Forests, woodlands, scrub; 1100–1300 m. Guangxi, Hunan, Yunnan.

**52. *Euonymus vagans*** Wallich in Roxburgh, Fl. Ind. 2: 412. 1824.

游藤卫矛 you teng wei mao

*Euonymus jinfoshanensis* Z. M. Gu; *E. jinggangshanensis* M. X. Nie; *E. pseudosootepensis* Y. R. Li & S. K. Wu.

Evergreen shrubs or ascending subshrubs, to 3 m tall; branches and twigs rounded, usually brown or dark brown, sometimes gray. Petiole ca. 5 mm; leaf blade ovate, ovate-elliptic, or rounded-ovate, 4–5 × 2.5–3.5 cm, base rounded to truncate, even cuneate, apex nearly rounded; lateral veins ca. 5 pairs, usually impressed adaxially. Peduncle 1–2 cm, usually several flowered; pedicel usually less than ca. 6 mm. Flowers 4-merous, ca. 6 mm in diam.; sepals semirotund; petals nearly

orbicular, greenish or whitish. Capsule brown or red-brown, less than ca. 6 mm in diam. Aril red. Fl. May–Jul, fr. Aug–Nov.

Mixed forests, scrub; 1100–3300 m. ?Guangdong, Guangxi, Guizhou, ?Henan, ?Hubei, Jiangxi, ?Shanxi, Sichuan, Xizang, Yunnan [Bangladesh, Bhutan, India, Myanmar, Nepal].

The distribution reports from Guangdong, Henan, Hubei, and Shanxi have not been confirmed.

**53. *Euonymus venosus*** Hemsley, Bull. Misc. Inform. Kew 1893: 210. 1893.

曲脉卫矛 qu mai wei mao

Deciduous shrubs to small trees, 2–6 m tall; branches and twigs sturdy, gray or brown, terete, glabrous. Petiole 3–5 mm; leaf blade thinly leathery or leathery, oblong-elliptic, 6–12 × 1.5–2 cm, base and apex acuminate or acute, margin finely crenulate to nearly entire; lateral veins and veinlets curved or bent, even in tortuous form, prominent on both surfaces. Peduncle 2–4 cm, with few flowers, rarely 7. Flowers 4-merous, 6–8 mm in diam.; petals light yellow, nearly rotund. Capsule globose or subglobose, slightly grooved, 8–10 cm in diam., pink-brown to yellow-brown, 4-lobed. Seeds yellow-brown; aril orange-red. Fl. May–Jul, fr. Aug–Sep.

• Forests, rock slopes, scrub; 700–2500 m. Henan, Hubei, Hunan, Shaanxi, Sichuan, ?Yunnan.

This is a distinctive species in the genus and can be recognized even without flowers or fruit. The leaf blade is typically narrowly oblong and has curved or bending veins and veinlets. The record from Yunnan has not been confirmed; that from Henan results from local work.

## 5. *Euonymus* sect. *Euonymus*

卫矛组 wei mao zu

Shrubs to small trees, sometimes shrublike or rarely climbing, evergreen or deciduous. Flowers usually 4-merous, occasionally 5-merous. Fruit rugose, without prickles and wings, not globose, opening by 4 or 5 lobes at maturity.

About 65 species: Asia, Europe, cultivated in Europe and North America; 37 species (19 endemic) in China.

- 1a. Flowers large, more than 1 cm in diam.; disk large, 7–8 mm in diam., usually 3–12 ovules per cell.
  - 2a. Flowers and fruit 5-merous.
    - 3a. Petals with obvious black or purple veins toward margin; leaf blade elliptic, less than 6 cm; capsule 1.2–1.6 cm ..... 84. *E. tingens*
    - 3b. Petals without black or purple veins; leaf blade linear to lanceolate, or obovate; capsule ca. 2.5 cm ..... 89. *E. yunnanensis*
  - 2b. Flowers and fruit 4-merous.
    - 4a. Capsule with 4 large winglike angles, up to 1 cm ..... 56. *E. chengii*
    - 4b. Capsule without wings, only angular.
      - 5a. Leaf blade usually long elliptic to oblong, or oblanceolate ..... 62. *E. grandiflorus*
      - 5b. Leaf blade usually ovate to elliptic, or obovate ..... 55. *E. carnosus*
- 1b. Flowers small, less than 1 cm in diam.; disk small, 2–5 mm in diam., usually 2 ovules per cell.
  - 6a. Leaf blade usually small, less than 6(–7) cm; branches and twigs tuberculate or black warty.
    - 7a. Leaf blade ovate, oblong, elliptic, or lanceolate, usually more than 1 cm wide.
      - 8a. Branches and twigs with tubercle or black warts; capsule subglobose ..... 86. *E. verrucosus*
      - 8b. Branches and twigs without tubercle or black warts; capsule oblong or pear-shaped.
        - 9a. Leaf blade thickly leathery, rotund-oblong; capsule wider than long ..... 76. *E. percoriaceus*
        - 9b. Leaf blade papery, lanceolate; capsule longer than wide, pear-shaped ..... 80. *E. semenovii*
    - 7b. Leaf blade linear, oblong-linear, linear-elliptic, or linear-lanceolate, usually less than 1 cm wide.

- 10a. Branches and twigs terete; flowers pale yellow ..... 83. *E. ternifolius*
- 10b. Branches and twigs with 4 corky wings; flowers white-green or greenish yellow.
- 11a. Leaf blade linear, 2–4 × ca. 2 mm ..... 68. *E. lichiangensis*
- 11b. Leaf blade linear-elliptic or linear-lanceolate, 2–7 × 2–20 mm.
- 12a. Leaf blade linear-elliptic, 2–4 × 3–10 mm; flowers white-green or greenish yellow ..... 73. *E. nanoides*
- 12b. Leaf blade linear-lanceolate, 2–7 × 2–20 mm; flowers white-green ..... 72. *E. nanus*
- 6b. Leaf blade usually large, more than 7 cm; branches and twigs smooth.
- 13a. Leaves deciduous.
- 14a. Flowers and fruit 5-merous ..... 58. *E. dolichopus*
- 14b. Flowers and fruit 4-merous.
- 15a. Young branches with narrow corky wings ..... 77. *E. phellomanus*
- 15b. Young and old branches without wings.
- 16a. Capsule with obscure angles.
- 17a. Capsule apiculate; leaf blade apex acute or acuminate, margin crenate or serrate ..... 64. *E. hui*
- 17b. Capsule without apiculus; leaf blade apex rounded, margin small crenate ..... 87. *E. viburnoides*
- 16b. Capsule with strong angles and grooves.
- 18a. Leaf blade smooth on both surfaces ..... 69. *E. maackii*
- 18b. Leaf blade rugose on both surfaces.
- 19a. Leaf blade 11–13(–15) cm, apex acute or acuminate ..... 63. *E. hamiltonianus*
- 19b. Leaf blade 9–10 cm, apex rounded ..... 75. *E. parasimilis*
- 13b. Leaves evergreen.
- 20a. Petals usually fimbriate to denticulate on margin.
- 21a. Petals pink to red or purple, cymes 15–20 cm ..... 66. *E. laxicymosus*
- 21b. Petals white to green, fimbriate, cymes up to 8 cm ..... 59. *E. gibber*
- 20b. Petals entire.
- 22a. Flowers and fruit 5-merous.
- 23a. Leaf blade margin large denticulate; petals red-pink to black-purple, ca. 1 cm in diam. .... 57. *E. chloranthoides*
- 23b. Leaf blade margin without large denticles; petals purple, white, cream, or greenish white to green.
- 24a. Petals white, cream, or greenish white to green.
- 25a. Leaf blade long lanceolate, leathery, margin finely remotely serrate ..... 85. *E. tsoi*
- 25b. Leaf blade ovate, elliptic to oblong, margin distally crenulate, proximally entire ..... 60. *E. glaber*
- 24b. Petals purple.
- 26a. Leaf blade with serrate margin ..... 81. *E. serratifolius*
- 26b. Leaf blade entire to crenulate to sparsely denticulate.
- 27a. Leaf blade elliptic-obovate or ovate, 6–10 × 2.5–3.5 cm ..... 67. *E. laxiflorus*
- 27b. Leaf blade long subulate or broadly linear, ca. 14 × 2 cm ..... 90. *E. prismatomeroides*
- 22b. Flowers and fruit 4-merous.
- 28a. Leaf blade narrowly elliptic, delicate ..... 61. *E. gracillimus*
- 28b. Leaf blade variously ovate.
- 29a. Veins curved or nearly arched; leaf blade elliptic to ovate.
- 30a. Leaf blade veins even with surface ..... 70. *E. microcarpus*
- 30b. Leaf blade veins concave adaxially and prominent abaxially.
- 31a. Leaf blade usually entire, sometimes slightly serrate toward apex ..... 54. *E. bullatus*
- 31b. Leaf blade margin ciliate to sharply and finely denticulate ..... 82. *E. tenuiserratus*
- 29b. Veins pinnate; leaf blade lanceolate to oblong.
- 32a. Leaf blade large, ca. 16 cm.
- 33a. Leaf blade obovate-elliptic or oblong-lanceolate, 7–11 × 2.5–5 cm, margin large denticulate ..... 71. *E. myrianthus*
- 33b. Leaf blade long lanceolate, 10–15 × ca. 3 cm, margin remotely serrulate ..... 79. *E. salicifolius*
- 32b. Leaf blade small, less than 13 cm.
- 34a. Capsule 2–2.8 cm ..... 88. *E. wui*
- 34b. Capsule 0.8–1.7 cm.
- 35a. Leaf blade thickly papery to thinly leathery; capsule more than 1.5 cm ..... 65. *E. kachinensis*
- 35b. Leaf blade thickly leathery; capsule 0.8–1.7 cm.
- 36a. Leaf blade narrowly lanceolate, acuminate or acute at both ends, pubescent on both surfaces; mature fruit pubescent ..... 78. *E. pittosporoides*

- 36b. Leaf blade usually oblong to ovate, cordate or nearly so at base; leaf and fruit without pubescence ..... 74. *E. nitidus*

**54. *Euonymus bullatus*** Wallich ex Loddiges, Bot. Cab. 18: t. 1749. 1831.

凸脉卫矛 tu mai wei mao

Evergreen small trees, to 8 m tall; branches sturdy and terete. Petiole sturdy, 1–2 cm; leaf blade thinly leathery to leathery, ovate-elliptic to broadly oblong-elliptic, 12–21 × 7–11 cm, base widely attenuate, margin entire, apex acute or acuminate; lateral veins ca. 15 pairs, curving forward, webbing before reaching margin, impressed and evidently prominent abaxially. Peduncle 3–5 cm, more than 2 × dichotomously branched with many flowers; pedicel ca. 5 mm. Flowers 4-merous, 6–8 mm in diam.; sepals semirotund; petals red, nearly obovate. Capsule obovoid, 4-angled with deep grooves, brown or yellow-brown to red-brown, ca. 1.2 × 1.5 cm, 4-lobed. Seeds ellipsoid, brown; aril orange-red. Fl. Apr–Jun, fr. Aug–Nov.

Mixed forests; 900–3300 m. Yunnan [Bangladesh, India, Myanmar, Thailand].

**55. *Euonymus carnosus*** Hemsley, J. Linn. Soc., Bot. 23: 118. 1886.

肉花卫矛 rou hua wei mao

*Euonymus batakensis* Hayata; *E. huangii* H. Y. Liu & Y. P. Yang; *E. platycline* Ohwi.

Deciduous shrubs to small trees, to 8 m tall, ca. 10 cm d.b.h.; branches and twigs gray-green to gray-brown, terete, sturdy. Petiole 5–20 mm; leaf blade thickly papery to leathery, elliptic or oblong-elliptic to ovate or obovate-elliptic, 6–13 × 1.5–7 cm, base cuneate or attenuate, margin crenulate, apex obtuse or mucronulate; lateral veins 8–12 pairs, curving forward, redivided and webbing with veinlets before reaching margin. Peduncle 2–6 cm, 1–3 × dichotomously branched with several to many flowers; pedicel 5–10 mm. Flowers 4-merous, 10–12 mm in diam.; sepals semirotund, persistent; petals yellow or brown-green, orbicular. Capsule 4-angled (immature), brown or yellow-brown to red-brown, 1.2–1.5(–2) × 1–1.2(–1.5) cm, 4-lobed (mature). Seeds 3–6 per locule, ellipsoid, dark brown, arillate. Fl. May–Aug, fr. Aug–Nov.

Forests, woodlands; near sea level to 2000 m, typically 200–900 m. Anhui, Fujian, Guangdong, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang [Japan].

This is a typical E Asian species distributed in the Sino-Japanese region. It has ovate-oblong leaf blades that turn a fresh red or purple in late autumn, giving it high ornamental value. It is similar to *Euonymus grandiflorus*, which typically has narrower leaf blades and larger flowers, and is distributed in the Sino-Himalayan region from SW China to the Himalayas. In the local floras, the species has been erroneously described as evergreen.

*Euonymus huangii* H. Y. Liu & Y. P. Yang (Taiwania 45: 129. 2000) was published to validate the name "*E. morrisonensis*" Kanehira & Sasaki (Formosan Trees, rev. ed., 388. 1936, without Latin description or indication of type). It is an abnormal alpine form of *E. carnosus* from the high mountains of Taiwan, being smaller in stature and sometimes with only three of the four flower parts developing.

**56. *Euonymus chengii*** J. S. Ma, Harvard Pap. Bot. 10: 95. 1997.

静容卫矛 jing rong wei mao

Evergreen shrubs, 3–5 m tall; branches gray-black to gray-brown, terete, sturdy, twigs greenish or yellow-greenish, with 4 striae when young. Leaves sessile or subsessile; leaf blade leathery to thickly papery, elliptic, 5–10 × 2.3–3.6 cm, base cuneate or acuminate, margin entire, apex slightly caudate; lateral veins invisible. Peduncle 1.5–3.5 cm, 1–3(–4) × dichotomously branched, several flowered; pedicel 5–10 mm. Flowers 4-merous, 10–14 mm in diam.; sepals semiorbicular; petals light green, orbicular to obovate. Capsule tetra-globose, with 4 long winglike angles when fully mature, reddish when fresh, brown or yellow-brown to red-brown when dry, 1.8–3 × 3–3.6 cm, 4-lobed. Seeds ovoid, dark brown, 2 or more per locule; aril orange. Fl. Mar–Jul, fr. Jul–Jan.

• Forests and woodlands in lower mountains or valleys; near sea level to 200 m. S Guangdong, Hainan.

This species was mistakenly treated as a synonym of *Euonymus nitidus* in a recent revision (J. S. Ma, Thaiszia 11: 1–264. 2001). Further collections from S Guangdong confirm that this is an unusual species in the genus, with winglike angles and more than 2 ovules and seeds per locule; this differs from most of the species in the section.

**57. *Euonymus chloranthoides*** Yang, J. W. China Border Res. Soc., Ser. B, 15: 90. 1945.

缙云卫矛 jin yun wei mao

Evergreen shrubs, ca. 1 m tall; branches terete, young twigs with 4 striae or angles. Petiole sturdy, 1–2 mm or subsessile; leaf blade thinly leathery, obovate, oblong-obovate, or elliptic to oblong-elliptic, 8–12.5 × 2.5–5 cm, base attenuate to broadly attenuate, margin large denticulate, apex acuminate; lateral veins 7–9 pairs, redividing and webbing into veinlets. Peduncle 1–2 cm, 1 or 2 × dichotomously branched, several flowered; pedicel ca. 5 mm. Flowers 5-merous, ca. 10 × 10 mm; sepals suborbicular; petals red-pink to black-purple at maturity, obovate. Capsule obovoid, with 5 angles and little grooves, brown or yellow-brown to red-brown, ca. 1 × 1.2 cm, 5-lobed, sometimes only 3 or 4 lobes developing. Seeds subglobose, red, partly covered by orange-red aril. Fl. May–Aug, fr. Oct–Nov.

• Forests, woodlands; 300–400 m. Sichuan.

This is a rare species: only a few collections have been made since it was first described in the 1940s. The regular and large-denticulate leaf margin make it unique in the genus.

**58. *Euonymus dolichopus*** Merrill ex J. S. Ma, Harvard Pap. Bot. 10: 95. 1997.

长梗卫矛 chang geng wei mao

Evergreen shrubs, 2–3 m tall; branches and twigs gray-green to gray-brown, terete, sturdy. Petiole 3–4 mm; leaf blade thickly papery to leathery, elliptic or oblong-elliptic, 8–12 × 3–4.5 cm, base cuneate or suborbicular, margin nearly entire or obscurely finely crenulate, apex acute or acuminate; lateral veins

9–11 pairs, obscure, curving forward, webbing before reaching margin. Peduncle ca. 6 cm, 1 or 2 × dichotomously branched, several flowered; pedicel ca. 10 mm. Flowers 5-merous (not seen). Capsule subglobose, with 5 obscure small angles, apex emarginate, yellow, ca. 0.9 × 1 cm. Seeds ellipsoid, dark brown, partly covered by orange aril. Fl. unknown, fr. Oct.

- Guangxi.

This species is known only from the type specimen.

**59. *Euonymus gibber*** Hance, J. Bot. 20: 77. 1882.

流苏卫矛 liu su wei mao

*Euonymus miyakei* Hayata; *E. xylocarpus* C. Y. Cheng & Z. M. Gu.

Evergreen shrubs to small trees, to 3 m tall; branches terete, sturdy, twigs green to light green, 4-angled, twigs and leaves sometimes farinose. Petiole sturdy, less than 1 cm; leaf blade thinly leathery or thickly papyraceous, obovate-elliptic, 6–10 × 3–4.5 cm, base cuneate or attenuate, margin entire, apex obtuse or rounded; lateral veins invisible. Peduncle 3–4 cm, 1 or 2 × dichotomously branched, several flowered; pedicel ca. 5 mm. Flowers 5-merous, 10–12 mm in diam.; sepals semiorbicular; petals white to pink, obovate, apex fimbriate. Capsule obovate, with 5 angles and deep grooves, brown or yellow-brown to red-brown, ca. 1 × 1.2–1.4 cm, 5-lobed, basal sepals persistent. Seeds ellipsoid, dark brown, partly covered by orange-red aril. Fl. Jun–Aug, fr. Aug–Oct.

- Forests, woodlands; 100–1600 m. Guangdong, Hainan, Taiwan, Yunnan.

**60. *Euonymus glaber*** Roxburgh, Fl. Ind. 2: 403. 1824.

帽果卫矛 mao guo wei mao

*Euonymus mitratus* Pierre.

Evergreen small trees or shrubs, 5(–15) m tall; branches and twigs dark brown to purplish brown, terete. Petiole 5–10 mm; leaf blade papery, elliptic to oblong-elliptic, 9–11 × 4–4.5 cm, base cuneate to attenuate, margin distal 3/4 crenulate, proximal 1/4 entire or subentire, apex acute or acuminate; lateral veins 6–9 pairs, curving forward, disappearing before reaching margin. Peduncle short, less than 2.5 cm, 1 or rarely 2 × dichotomously branched, several flowered; pedicel 2–3.5 mm. Flowers usually 5-merous, occasionally combined with 4-merous, ca. 6 mm in diam.; sepals semiorbicular, very small; petals cream, ovate to obovate. Capsule compressed globose and concave at apex, (4 or)5-angled and grooved (immature), narrowing toward base, 1.4–1.5 × ca. 1 cm, (4 or)5-lobed (mature). Seeds ellipsoid, sometimes only 1 developing, arillate. Fl. and fr. unknown.

Mixed forests; 500–1600 m. Guangxi, Yunnan [Bangladesh, Cambodia, India, Malaysia, Myanmar, Thailand, Vietnam].

**61. *Euonymus gracillimus*** Hemsley, J. Linn. Soc., Bot. 23: 119. 1886.

纤细卫矛 xian xi wei mao

Deciduous shrubs, slender, to 4 m tall; branches terete,

slender, twigs green to light green, slender, 4-angled. Petiole slender, 2–4 mm; leaf blade thinly leathery or thickly papery, elliptic or narrowly elliptic, 4–5 × 1.2–2 cm, base cuneate or attenuate, margin entire to crenulate or remotely serrate distally, apex acuminate or long acute; lateral veins not obvious, curving forward and webbing and disappearing before reaching margin. Peduncle 3–4 cm, slender, 1 or 2 × dichotomously branched, several flowered; pedicel 3–5 mm. Flowers 4-merous (not seen). Capsule rhombic, 4-angled and deeply grooved, brown or yellow-brown to red-brown, 8(–10) mm × 1.2(–1.4) cm. Seeds ellipsoid, dark brown; aril orange-red. Fl. unknown, fr. Aug–Nov.

- Forests, scrub; ca. 1200 m. Guangdong, Guangxi, Hainan.

This species is readily distinguished by its extreme slenderness, narrow leaves, and minute flowers on a filiform peduncle. It is rare in the wild. The original description lists a 5-merous flower; however, on the type specimen (K), it is difficult to examine the number because the specimen is just before the flower bud stage. All specimens corresponding with the description and the type have only 4-lobed fruits.

*Euonymus gracillimus* is based on material collected by Reeves without exact locality. It undoubtedly came from S China, where John Reeves resided in Guangzhou (Canton) and Macao from 1812–1813. Its relationship with *E. nitidus*, which has slightly larger leaves but the same fruit, needs further study.

**62. *Euonymus grandiflorus*** Wallich in Roxburgh, Fl. Ind. 2: 404. 1824.

大花卫矛 da hua wei mao

*Euonymus grandiflorus* var. *angustifolius* Chen H. Wang; *E. grandiflorus* f. *longipedunculatus* C. Y. Chang; *E. grandiflorus* f. *salicifolius* Stapf & Ballard; *E. mairei* H. Léveillé.

Deciduous shrubs to small trees, to 15 m tall; branches and twigs gray-green to gray-brown, terete, sturdy. Petiole 5–10 mm; leaf blade thickly papery to leathery, oblong-elliptic to obovate-elliptic, 4–10 × 2–4 cm, base cuneate or long attenuate, margin finely crenulate, apex obtuse or mucronulate; lateral veins 10–13 pairs, slightly curving forward, disappearing before reaching margin. Peduncle single or clustered, 2–3.5 cm, 1–3 × dichotomously branched with several to many flowers; pedicel 10–15 mm. Flowers 4-merous, 17–22 mm in diam.; sepals semiorbicular, persistent; petals yellow or brown-green, orbicular. Capsule with 4 right angles, brown or yellow-brown to red-brown, 1.2–1.4 × 1.1–1.4 cm. Seeds usually 2 per locule, sometimes 3, ellipsoid, dark brown, arillate. Fl. Mar–May, fr. Aug–Nov.

Forests, woodlands; 1400–3300 m. Gansu, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan [Bhutan, India, Myanmar, Nepal, Vietnam].

This species is very similar to *Euonymus carnosus*; however, it differs by having smaller leaves, larger flowers, and a Sino-Himalayan distribution, rather than Sino-Japanese. These two species hybridize across Guangxi, Hunan, and Hubei in SC China.

**63. *Euonymus hamiltonianus*** Wallich in Roxburgh, Fl. Ind. 2: 403. 1824.

西南卫矛 xi nan wei mao

*Euonymus bodinieri* H. Léveillé; *E. darrisii* H. Léveillé; *E. hamiltonianus* f. *lanceifolius* (Loesener) C. Y. Cheng ex Q. H. Chen; *E. hamiltonianus* var. *pubinervius* S. Z. Qu & Y. H. He; *E. lanceifolius* Loesener; *E. rugosus* H. Léveillé; *E. yedoensis* Koehne var. *koehneanus* Loesener.

Deciduous shrubs to small trees, 3–20 m tall, to 25 cm d.b.h.; branches and twigs terete, sturdy, green to light green. Petiole sturdy, 9–20 mm; leaf blade thinly leathery or thickly papery, elliptic, or sometimes ovate-elliptic, 11–13(–15) × 3–5(–7) cm, base attenuate, margin finely crenulate, surfaces rough, apex acuminate; lateral veins 6–9 pairs, curving forward, webbing and disappearing before reaching margin. Peduncle 3–4.5 cm, 1–3 × dichotomously branched, several flowered; pedicel 5–7 mm. Flowers 4-merous, 9–10 mm in diam.; sepals ovate; petals white, lanceolate or long ovate, apex acuminate or obtuse. Capsule rhombic, with 4 angles and deep grooves, brown or yellow-brown to red-brown, ca. 8 mm × 1–1.3 cm. Seeds ellipsoid, dark brown; aril orange-red. Fl. Apr–Jul, fr. Aug–Nov.

Forests, woodlands; near sea level to 3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan, SE Xizang (Zayü), Yunnan, Zhejiang [Afghanistan, Bhutan, India, Japan, Kashmir, Korea, Myanmar, Nepal, Pakistan, Russia (?Sakhalin), Thailand].

This is one of the most common species in the genus. Growing in large populations, it can be found throughout the distribution area. It is undoubtedly similar to *Euonymus europaeus* Linnaeus, but they are quite distinct in their distributions.

**64. *Euonymus hui*** J. S. Ma, Harvard Pap. Bot. 10: 96. 1997.

秀英卫矛 xi ying wei mao

Deciduous trees, to 25 m tall, ca. 10 cm d.b.h.; branches terete, sturdy, twigs green to light green, 4-angled. Petiole sturdy, 1–1.3 cm; leaf blade thinly leathery or thickly papery, elliptic, 8–14 × 3–6 cm, base cuneate or attenuate, margin crenate or serrate, apex acute or acuminate; lateral veins 8–11 pairs, curving forward, webbing and disappearing before reaching margin. Peduncle 2.5–3 cm, sturdy, 1 or 2 × dichotomously branched, several flowered; pedicel 4–6 mm. Flowers 4-merous (not seen). Capsule subglobose, 4-angled, green when fresh, brown or yellow-brown when dry, ca. 8 × 6–7 mm, slightly apiculate at apex. Seeds ellipsoid, dark brown; aril orange-red. Fl. unknown, fr. Jul–Sep.

- About 600 m. W Sichuan (Tianquan).

This species is known only from the type. It is similar to *Euonymus nitidus*, *E. hamiltonianus*, and species in *E. sect. Ilicifolii* but differs from these by having smaller obliquely angled fruit.

**65. *Euonymus kachinensis*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 193. 1904.

克钦卫矛 ke qin wei mao

Deciduous shrubs, ca. 2 m tall; branches terete, sturdy, twigs green to light green, 4-angled. Petiole sturdy, 4–7 mm; leaf blade thinly leathery or thickly papery, elliptic, or sometimes obovate-elliptic, 6–8 × 2–3 cm, base cuneate or attenuate, margin crenulate to crenate, apex acute, mucronate; lateral veins 7–9 pairs, unclear, curving forward, disappearing before reach-

ing margin. Peduncle 1–2 cm, slender, 1 or 2 × dichotomously branched, several flowered; pedicel 5–7 mm, slender. Flowers 4-merous, 5–6 mm in diam.; sepals ovate; petals red to purple. Capsule broadly pear-shaped, more than 1.5 cm, strongly 4-angled. Seeds not seen. Fl. Jul, fr. unknown.

2600–3500 m. Yunnan [India (Assam), Myanmar].

This species is in need of further collection.

**66. *Euonymus laxicymosus*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 96. 1997.

稀序卫矛 xi xu wei mao

Evergreen shrubs, to 4 m tall; branches terete, sturdy, dark brown to brown, twigs 4-angled. Petiole sturdy, 5–10 mm; leaf blade leathery and rigid, lanceolate, sometimes elliptic-lanceolate, 12–16 × 3–4.5 cm, base cuneate or attenuate, margin entire, sometimes finely and remotely crenulate, apex acute or acuminate; lateral veins 8–11 pairs, curving forward, webbing and disappearing before reaching margin. Peduncle 10–15 cm, 1 or 2 × dichotomously branched, several flowered; pedicel 1–1.8 cm. Flowers 5-merous, 8–9 mm in diam.; sepals semiorbicular; petals dark pink to purple or purplish brown, obovate, margin ciliate. Capsule subglobose, 5-angled, red when fresh, brown or yellow-brown when dry, ca. 1.2 × 1.5 cm. Seeds ellipsoid, dark brown, partially covered by orange-red aril. Fl. May–Dec, fr. Jul–Jan.

Forests, woodlands; 1200–1400 m. Guangdong, Guangxi, Yunnan [Vietnam].

The protologue cites two misidentified specimens, *S. Z. Wang 17* (KUN) and *S. Z. Wang 357* (KUN, PE), which in fact belong to *Euonymus prismatomerioides*.

**67. *Euonymus laxiflorus*** Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 3: 333. 1851.

疏花卫矛 shu hua wei mao

*Euonymus crosnieri* H. Léveillé & Vaniot; *E. forbesianus* Loesener; *E. incertus* Pitard; *E. pellucidifolius* Hayata; *E. rostratus* W. W. Smith; *E. rubescens* Pitard; *E. vaniotii* H. Léveillé.

Deciduous shrubs to small trees, 3–12 m tall, to 18 cm d.b.h.; branches greenish gray, terete, sturdy, twigs greenish, 4-angled or striate when dry. Petiole sessile or only 2–4 mm; leaf blade thinly leathery, elliptic-obovate or ovate, 6–10(–12) × 2.5–3.5 cm, base attenuate, margin nearly entire proximally, crenate distally, apex caudate or with a long tail; lateral veins unclear or invisible. Peduncle slender, 2–3.5 cm, 1–3 × dichotomously branched with few flowers; pedicel 6–10 mm. Flowers 5-merous, ca. 8 mm in diam.; sepals semiorbicular, very small; petals purple, suborbicular. Capsule obovoid, base attenuate, 5-angled and grooved, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, 8–10 mm × ca. 1.2 cm. Seeds ovoid, dark brown, partially covered by orange aril. Fl. Mar–Aug, fr. May–Nov.

Forests, woodlands, scrub; 300–2200 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Cambodia, India, Myanmar, Vietnam].

**68. *Euonymus lichiangensis*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 33. 1917.

丽江卫矛 *li jiang wei mao*

Deciduous dwarf shrubs, 1–1.5 m tall; branches greenish gray, 4-angled, sturdy, twigs greenish, with 4 right angles. Petiole subsessile or only 1–2 mm; leaf blade thinly leathery, linear, 2–4 × ca. 2 mm, base subrounded, margin entire, revolute, apex obtuse or acute; lateral veins invisible. Peduncle short, 0.5–1.5(–2) cm, 1 dichotomous branch with few flowers, typically only central flower developing; pedicel ca. 5 mm. Flowers 4-merous, 5–6 mm in diam.; sepals semiorbicular, very small; petals white-green, suborbicular. Capsule obovoid-rhombic, base attenuate, 4-angled, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, ca. 8 mm × 1 cm, sometimes only 2 or 3 locules developing. Seeds ovoid, dark brown, partially covered by orange aril. Fl. May–Jul, fr. Sep–Nov.

• Forests, scrub. NW Yunnan.

**69. *Euonymus maackii*** Ruprecht, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 15: 358. 1857.

白杜 *bai du*

*Euonymus bungeanus* Maximowicz; *E. bungeanus* var. *latifolius* Chen H. Wang; *E. bungeanus* var. *mongolicus* (Nakai) Kitagawa; *E. bungeanus* var. *ovatus* F. H. Chen & M. C. Wang; *E. bungeanus* f. *pendulus* Rehder; *E. forbesii* Hance; *E. hamiltonianus* Wallich var. *semipersistens* Rehder; *E. maackii* f. *lanceolatus* Rehder; *E. maackii* f. *salicifolius* T. Chen; *E. maackii* var. *trichophyllus* Y. B. Chang; *E. micranthus* Bunge; *E. mongolicus* Nakai; *E. oukiakensis* Pampanini.

Deciduous shrubs to trees, 3–10 m tall, to 15 cm d.b.h.; branches and twigs terete, sturdy, green to light green. Petiole 1–2.5 mm; leaf blade thinly leathery or thickly papyraceous, ovate, orbicular-ovate, elliptic, or ovate-lanceolate, 6–10.5 × 2–4 cm, base subattenuate, margin crenulate, apex acute or acuminate, sometimes caudate, both surfaces smooth; lateral veins 6–8 pairs, curving forward, webbing and disappearing before reaching margin. Peduncle 2–3.5 cm, 1–3 × dichotomously branched, several flowered; pedicel 5–7 mm. Flowers 4-merous, 8–9 mm in diam.; sepals ovate; petals white, lanceolate or long ovate, apex acuminate or obtuse. Capsule rhombic, with 4 angles and deep grooves, base attenuate, brown or yellow-brown to red-brown, ca. 8 × 9 mm. Seeds subglobose, dark brown, partially covered by orange aril. Fl. Apr–Jul, fr. Aug–Nov.

Edges of woodlands and forests; near sea level to 1000 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia (cultivated), Qinghai (cultivated), Shaanxi, Shandong, Shanxi, Sichuan (cultivated), Xinjiang, Yunnan, Zhejiang [Japan, Korea, Russia (Far East); cultivated in Europe and North America].

This is one of the most common species in the genus. Its growth is quite variable under both cultivated and wild conditions.

**70. *Euonymus microcarpus*** (Oliver ex Loesener) Sprague, Bull. Misc. Inform. Kew 1908: 35. 1908.

小果卫矛 *xiao guo wei mao*

*Euonymus chinensis* Lindley var. *microcarpus* Oliver ex Loesener, Bot. Jahrb. Syst. 30: 456. 1902; *E. aureovirens* Handel-Mazzetti.

Deciduous small trees to shrubs, 3–8 m tall; branches greenish gray, terete, sturdy, twigs greenish, terete. Petiole sessile to 10 mm, sturdy; leaf blade thinly leathery, ovate to ovate-elliptic or ovate-linear, 4.5–6.3 × (1–)2–3 cm, base attenuate, suborbicular, or acute, margin entire, apex obtuse or acute; lateral veins fine, straight, veinlets obvious, not impressed adaxially but prominent abaxially, both disappearing before reaching margin. Peduncle 2–3 cm, 1–3 × dichotomously branched, several flowered; pedicel ca. 5 mm. Flowers 4-merous, 6–7 mm in diam.; sepals semiorbicular, very small; petals white-green, suborbicular. Capsule rhombic, 4-angled, base truncate, apex emarginate, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, 4–5 × 9–10 mm. Seeds ovoid, dark brown, partially covered by orange aril. Fl. Apr–May, fr. Jul–Oct.

• Forests, scrub; 300–2600 m. Henan, Hubei, Shaanxi, Sichuan, Xizang, ?Yunnan.

The distribution report from Yunnan has not been confirmed.

**71. *Euonymus myrianthus*** Hemsley, Bull. Misc. Inform. Kew 1893: 210. 1893.

大果卫矛 *da guo wei mao*

*Euonymus lipoensis* Z. R. Xu; *E. myrianthus* var. *crassifolius* (Loesener) Blakelock; *E. myrianthus* var. *tenuifolius* (Loesener) Blakelock; *E. myrianthus* var. *tenuis* C. Y. Cheng ex T. L. Xu & Q. H. Chen; *E. rosthornii* Loesener; *E. rosthornii* var. *crassifolius* Loesener; *E. rosthornii* var. *tenuifolius* Loesener; *E. sargentianus* Loesener & Rehder.

Evergreen shrubs to small trees, 3–12 m tall; branches gray-black to gray-brown, terete, sturdy, twigs greenish, sometimes with 4 striae. Petiole ca. 5 mm, sturdy; leaf blade thickly leathery, obovate-elliptic or oblong-lanceolate, 7–11 × 2.5–5 cm, base attenuate or acuminate, margin large denticulate, apex acute or acuminate; lateral veins 7–9 pairs, slightly curving forward and dividing into veinlets before reaching margin. Peduncle 2–3.5 cm, 1 or 2 × dichotomously branched, several flowered; pedicel 15–20 mm. Flowers 4-merous, ca. 1 cm in diam.; sepals semiorbicular; petals greenish yellow, orbicular or oblong. Capsule tetra-globose, usually with 4 right angles, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, 1.5–1.8 × 1.2–1.5 cm. Seeds ovoid, dark brown; aril orange. Fl. Apr–Jul, fr. Aug–Nov.

• Forests, woodlands; near sea level to 1200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang.

This is a common species. It is variable in morphology and habitat.

**72. *Euonymus nanus*** M. Bieberstein, Fl. Taur.-Caucas. 3: 160. 1819.

矮卫矛 *ai wei mao*

Deciduous procumbent or ascending shrubs, 1–2 m tall; branches greenish gray, 4-angled, sturdy, twigs greenish, with 4

right angles. Petiole subsessile or only 1–2 mm; leaf blade thinly leathery, linear to linear-lanceolate, 2–7 × 2–20 mm, base subrounded or attenuate, margin entire, revolute, apex obtuse or acute; lateral veins invisible. Peduncle short and slender, 0.5–1.5(–2) cm, 1 dichotomous branch with few flowers, typically only central flower developing; pedicel ca. 5 mm. Flowers 4-merous, 5–6 mm in diam.; sepals semiorbicular, very small; petals white-green, suborbicular. Capsule obovoid-rhombic, base attenuate, 4-angled, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, ca. 8 mm × 1 cm, sometimes only 2–3 locules developing. Seeds ovoid, dark brown, partially covered by orange aril. Fl. May–Jul, fr. Sep–Nov.

High mountain forests and scrub, dry habitats. Gansu, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi [Mongolia, Russia; C, E, and S Europe].

**73. *Euonymus nanoides*** Loesener & Rehder in Sargent, Pl. Wilson. 1: 492. 1913.

小卫矛 xiao wei mao

*Euonymus nanoides* var. *oresbius* (W. W. Smith) Y. R. Li; *E. oresbius* W. W. Smith; *E. pachycladus* Handel-Mazzetti.

Deciduous dwarf shrubs, ascending, many branches at middle and up, 1–3 m tall; branches greenish gray, 4-angled, sturdy, twigs greenish, with corky wings. Petiole very short, 2–3 mm; leaf blade thickly papery, linear-elliptic, 2–4 × 3–10 mm, base subrounded, margin entire to crenulate, apex obtuse or acute; lateral veins invisible. Peduncle few, clustered axillary, mostly several flowered; pedicel 1–5 mm. Flowers 4-merous, 5–7 mm in diam.; sepals semiorbicular, very small; petals white-green or greenish yellow, suborbicular. Capsule obovoid-rhombic, base attenuate, 4-angled, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, ca. 8 mm × 1 cm, sometimes only 2 or 3 locules developing. Seeds ovoid, dark brown, partially covered by orange aril. Fl. Apr–Jul, fr. Jul–Oct.

• Forests, scrub; 2900–3400 m. Gansu, Hebei, Henan, ?Nei Mongol, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.

The distribution report of this species from Nei Mongol has not been confirmed.

**74. *Euonymus nitidus*** Benth, London J. Bot. 1: 483. 1842.

中华卫矛 zhong hua wei mao

*Euonymus chinensis* Lindley var. *nitidus* (Benth) Loesener; *E. esquirolii* H. Léveillé; *E. flavescens* Loesener; *E. merrillii* Chen H. Wang; *E. merrillii* var. *longipetiolatus* Chen H. Wang; *E. nantoensis* Loesener ex Handel-Mazzetti; *E. oblongifolius* Loesener & Rehder; *E. uniflorus* H. Léveillé & Vaniot.

Evergreen shrubs to small trees, 2–10 m tall; branches gray-black to gray-brown, terete, sturdy, twigs greenish or yellow-greenish, striate. Petiole 5–8(–12) mm; leaf blade leathery to thickly papery, elliptic or oblong-elliptic, 6.5–10(–15) × 3–4(–6) cm, base cuneate or acuminate, margin entire to crenulate, apex acute or acuminate, sometimes shortly caudate; lateral veins 7–9 pairs, not evident, slightly curving forward, redividing and disappearing before reaching margin. Peduncle typically

many, 1.5–3.5 cm, 1–3(–4) × dichotomously branched with many flowers; pedicel 5–10 mm. Flowers 4-merous, 5–6 mm in diam.; sepals semiorbicular; petals whitish green, orbicular to obovate. Capsule tetra-globose, 4-angled, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, (0.9–)1.5–1.7 × (1.2–)1.4–1.6 cm. Seeds ovoid, dark brown; aril orange. Fl. Mar–Jul, fr. Jul–Jan.

Forests and woodlands in lower mountains and valleys; 100–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang [Bangladesh, Cambodia, Japan, N Vietnam].

The leaves of this species are very variable and fruit growth can be dwarfed in poor growing conditions. It is clear that *Euonymus oblongifolius* is an extreme form of this species. *Euonymus chengii*, which was included in this species in the revision work of *Euonymus* (J. S. Ma, Thaiszia 11: 1–264. 2001), is now recognized after careful examination of new collections.

**75. *Euonymus parasimilis*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 10: 96. 1997.

碧江卫矛 bi jiang wei mao

Evergreen trees, to 10 m tall, to 30 cm d.b.h. (field record); branches and twigs gray-brown, terete, sturdy. Petiole 3–6 mm, sturdy; leaf blade thickly leathery, elliptic to broadly elliptic, 9–10 × 4–6 cm, base nearly rounded, margin entire to finely crenulate, apex ± rounded; lateral veins 6–9 pairs, distal part curving forward and disappearing before reaching margin, surface sometimes rugose, especially during fruiting time. Peduncle 6–8 cm, 1 or 2 × dichotomously branched, several flowered; pedicel 1–2 cm. Flowers 4-merous (not seen). Capsule obpyramidal, 4-angled, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, ca. 8 mm × 1.5 cm. Seeds ellipsoid, dark brown; aril orange. Fl. unknown, fr. Aug–Oct.

• Rocky mountains; ca. 1500 m. Yunnan.

This species is known only from the type.

**76. *Euonymus percoriaceus*** C. Y. Wu ex J. S. Ma, Harvard Pap. Bot. 10: 97. 1997 [“*pereoriacea*”]

西畴卫矛 xi chou wei mao

Evergreen shrubs to small trees, 2–8 m tall; branches and twigs gray-green to gray-brown, terete, twigs striate. Petiole 3–5 mm; leaf blade leathery, ovate-elliptic or obovate-elliptic, 5–7 × 2.8–3 cm, base cuneate or attenuate or suborbicular, margin crenulate distally, entire proximally, apex obtuse or acuminate, even caudate; lateral veins unclear. Peduncle 1.5–2 cm, 1 or 2 × dichotomously branched, several flowered; pedicel 5–10 mm. Flowers 4-merous, ca. 9 mm in diam.; sepals semirotund; petals light green or greenish white, orbicular. Capsule obturbinate, 4-angled, brown or yellow-brown to red-brown, ca. 8 × 10 mm. Seeds subglobose, dark brown; aril orange. Fl. May, fr. Dec.

• Forests, woodlands; 1000–1500 m. Yunnan.

**77. *Euonymus phellomanus*** Loesener, Bot. Jahrb. Syst. 29: 444. 1900.

栓翅卫矛 shuan chi wei mao

Deciduous shrubs, 2–3(–5) m tall; branches and twigs gray-green to gray-brown, terete, corky winged or striate. Petiole 3–5 mm; leaf blade thickly papery, ovate-elliptic or oblong-elliptic, 6–10 × 2–3 cm, base cuneate or attenuate, margin crenulate, slightly pubescent, apex obtuse or acuminate; lateral veins 10–14 pairs, curving forward, disappearing before reaching margin. Peduncle 1.8–3 cm, 1–3 × dichotomously branched, several flowered, very slender; pedicel 5–10 mm. Flowers 4-merous, ca. 10 mm in diam.; sepals semirotund; petals greenish white, oblong. Capsule subglobose, 4-angled, brown or yellow-brown to red-brown, ca. 8 × 9 mm. Seeds ovoid, dark brown, partially covered by orange aril. Fl. May–Jul, fr. Aug–Nov.

• Woodlands, dry slopes; 1000–3000 m. Gansu, Henan, Hubei, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan.

The distribution report from Anhui (J. S. Ma, *Thaiszia* 11: 1–264, 2001) is a mistake.

**78. *Euonymus pittosporoides*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 3: 232. 1998.

海桐卫矛 *hai tong wei mao*

Small trees, 3–7 m tall, to 30 cm d.b.h. (field record), sometimes shrublike; stem gray to gray-brown, terete, glabrous; twigs green to light green, terete; winter buds very small, generally pubescent. Petiole 5–10 mm; leaf blade ± leathery, lanceolate or willowlike, base and apex acuminate or acute, margin denticulate; lateral veins 6–9 pairs, disappearing before reaching margin, glabrous or pubescent on both surfaces. Peduncle axillary, up to 10 cm, usually with only 1 flower, sometimes to few flowered. Flowers 4-merous (not seen); petals white to pinkish (field record). Fruit usually 1, sometimes 2 or 3, with pedicel ca. 5 cm. Capsule 4-lobed, usually only 2 or 3 locules developing, red when fresh, brown or yellow-brown when dry, ca. 8 × 6 mm. Seeds 2 per locule, nearly round or oblong, ca. 4 × 3–4 mm in diam., red when fresh, or black when dry, partially covered by aril. Fl. Feb–Jul, fr. May–Dec.

Forests, shaded woodlands; 100–1800 m. Guangdong, Guangxi, Guizhou, Sichuan, Yunnan [Vietnam].

**79. *Euonymus salicifolius*** Loesener, Bot. Jahrb. Syst. 30: 458. 1902.

柳叶卫矛 *liu ye wei mao*

*Euonymus georgei* H. F. Comber; *E. lawsonii* C. B. Clarke ex Prain f. *salicifolius* (Loesener) C. Y. Cheng; *E. lawsonii* var. *salicifolius* (Loesener) Blakelock.

Evergreen shrubs, 2–3 m tall; branches terete, sturdy, twigs green to light green, striate. Petiole sturdy, 6–10 mm; leaf blade leathery, long lanceolate, 10–15 × ca. 3 cm, base cuneate or attenuate, margin remotely serrulate, apex acuminate; lateral veins 10–12. Peduncle ca. 3 cm, several flowered; pedicel ca. 5 mm. Flowers 4-merous (not seen). Capsule obtrihombic, 4-angled with little deep grooves, brown or yellow-brown to red-brown, ca. 1 × 1.5 cm. Seeds ovoid, dark brown; aril orange-red. Fl. unknown, fr. Dec.

Mixed forests. Yunnan [Vietnam].

Records of *Euonymus lawsonii* C. B. Clarke ex Prain from China (e.g., in FRPS 45(3): 42. 1999) are misidentifications of *E. salicifolius*. True *E. lawsonii* is distributed in India and Myanmar.

**80. *Euonymus semenovii*** Regel & Herder, Bull. Soc. Imp. Naturalistes Moscou 39: 557. 1866.

中亚卫矛 *zhong ya wei mao*

*Euonymus przewalskii* Maximowicz.

Deciduous shrubs, 2–3 m tall; branches and twigs gray-green to gray-brown, with corky wing, sometimes terete. Petiole 3–5 mm; leaf blade papery, ovate-lanceolate, 3.5–5 × 1–1.5 (–2.5) cm, base subrounded or attenuate, margin crenulate, apex acuminate or acute; lateral veins 4–6 pairs, slightly curving forward and disappearing before reaching margin. Peduncle slender, 1.8–2.5 cm, 1 or 2 × dichotomously branched, several flowered; pedicel 10–15 mm. Flowers 4-merous, 6–9 mm in diam.; sepals semiorbicular; petals dark red, oblong. Capsule subglobose, 4-angled, base attenuate, brown or yellow-brown to red-brown, ca. 8 × 9–10 mm. Seeds subglobose, dark brown or black, partially covered by orange aril. Fl. May–Jul, fr. Aug–Oct.

Forests, woodlands, sparse dried grasslands; 1000–3200 m. Gansu, Hebei, Henan, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [C Asia].

**81. *Euonymus serratifolius*** Beddome, Fl. Sylv. S. India 64. 1870.

印度卫矛 *yin du wei mao*

Evergreen shrubs, ca. 2 m tall; branches terete, sturdy, twigs green to light green, terete with striae. Petiole sturdy, 6–10 mm; leaf blade papery, long lanceolate, 15–22 × 3–5.5 cm, base subrounded, margin variously serrate, denticles ciliate, apex acuminate or caudate; lateral veins 12–15 pairs, webbing and disappearing before reaching margin. Peduncle slender, 2–5 cm, several flowered; pedicel 6–8 mm. Flowers 5-merous, 7–9 mm in diam., purple. Capsule obpyramidal, 5-angled with deep grooves, brown or yellow-brown to red-brown, ca. 3 × 2.5 cm. Seeds ellipsoid, dark brown; aril orange-red. Fl. May–Aug.

Forests; ca. 1800 m. Guangxi, Yunnan [India].

**82. *Euonymus tenuiserratus*** C. Y. Cheng ex J. S. Ma, Harvard Pap. Bot. 3: 232. 1998.

柔齿卫矛 *rou chi wei mao*

Evergreen shrubs, ca. 3 m tall; branches terete, sturdy, twigs green to light green, terete, striate. Petiole sturdy, 6–10 mm; leaf blade papery, ovate to ovate-elliptic, 6–10 × 2–5.5 cm, base subrounded to suborbicular, margin ciliate to sharply and finely denticulate, apex caudate; lateral veins ca. 8 pairs, webbing and disappearing before reaching margin. Peduncle slender, 2–3 cm, several flowered; pedicel 6–8 mm. Flowers 4-merous, 7–9 mm in diam., green. Capsule not seen. Fl. May, fr. unknown.

• Woodlands; ca. 2000 m. Yunnan.

This species is known only from the type and is very similar to *Euonymus serratifolius*.

**83. *Euonymus ternifolius*** Handel-Mazzetti, Symb. Sin. 7: 659. 1933.

韩氏卫矛 *han shi wei mao*

Deciduous dwarf shrubs, ca. 1 m tall, much branched;

branches and twigs gray, terete, sturdy. Petiole very short or sessile; leaf blade thickly papery, oblong-linear, 1.8–2.3 × ca. 3 mm, base subattenuate, margin subentire, minutely crenulate, apex obtuse; lateral veins invisible. Peduncle few from upper branches, typically several flowered; pedicel 5–10 mm. Flowers 4-merous, 9–10 mm in diam.; sepals semiorbicular; petals pale yellow, suborbicular. Capsule not seen. Fl. May–Jun, fr. unknown.

- Forests, scrub; 2800–3000 m. Sichuan.

There are only a few collections available for this species, and the type has the only flower. The type was collected between Yen Yuen (Yanyuan, Sichuan) and Yungning (Ningliang, Yunnan), from the Sichuan side, according to Handel-Mazzetti's description and the type record. The leaves appear clustered on the young twigs, and the flowers larger than the other small *Euonymus* species; the pale yellow flower color is also distinct.

**84. *Euonymus tingens*** Wallich in Roxburgh, Fl. Ind. 2: 406. 1824.

染用卫矛 ran yong wei mao

Evergreen shrubs to small trees, 2–8 m tall; branches gray-black to gray-brown, terete, sturdy, twigs greenish, with striae. Petiole 3–5(–8) mm; leaf blade thickly leathery, elliptic or oblong-elliptic, 4–6 × 2–2.5 cm, base cuneate or suborbicular, margin crenulate, apex obtuse or acute; lateral veins 8–12 pairs, curving forward and disappearing before reaching margin. Peduncle many, 1.5–3.5 cm, 1–3 × dichotomously branched, several flowered; pedicel 5–20 mm. Flowers 5-merous, ca. 1.5 cm in diam.; sepals semiorbicular; petals creamy white with purplish veining around edges, orbicular to obovate. Capsule obovoid-globose, 5-angled, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, 1.2–1.3 × 1.2–1.4(–1.5) cm. Seeds ellipsoid, dark brown, partially covered by orange aril. Fl. May–Aug, fr. Jul–Nov.

Forests, woodlands; 1300–3700 m. ?Guangxi, Guizhou, Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal].

The distribution report from Guangxi has not been confirmed.

**85. *Euonymus tsoi*** Merrill, Sunyatsenia 1: 198. 1934.

狭叶卫矛 xia ye wei mao

*Euonymus kwangtungensis* C. Y. Cheng; *E. longifolius* Champion ex Benth (1851), not Medikus (1782); *E. nitidus* Benth f. *tsoi* (Merrill) C. Y. Cheng.

Evergreen shrubs, 1–5 m tall; branches terete, sturdy, twigs gray to light green-gray, young branches striate. Petiole sturdy, 6–14 mm; leaf blade leathery, long lanceolate or elliptic-lanceolate, 13–18.5 × ca. 3 cm, base cuneate or attenuate, margin remotely serrulate, apex acuminate; lateral veins 10–12. Peduncle 3–7 cm, several flowered; pedicel ca. 5 mm. Flowers 4-merous, dark. Capsule obovoid, 5-angled with little deep grooves, brown or yellow-brown to red-brown, ca. 1 × 1–1.4 cm. Seeds ovoid, dark brown; aril orange-red. Fl. Apr–Jul, fr. Aug–Dec.

- Dense mixed forests; near sea level to 1200 m. Guangdong, Guangxi.

**86. *Euonymus verrucosus*** Scopoli, Fl. Carniol., ed. 2, 1: 166. 1772.

瘤枝卫矛 liu zhi wei mao

*Euonymus integerrimus* Prokhanov; *E. pauciflorus* Maximowicz; *E. pauciflorus* var. *chinensis* (Maximowicz) Rehder; *E. verrucosus* var. *chinensis* Maximowicz; *E. verrucosus* var. *pauciflorus* (Maximowicz) Regel.

Deciduous shrubs, ca. 3 m tall; branches and twigs gray-green to gray-brown, terete, densely verrucate. Petiole very short or subsessile, sometimes 2–3 cm; leaf blade thickly papery, ovate-elliptic or oblong-elliptic, even rhombic, 5–7 × 2–3 cm, base cuneate or attenuate, margin crenulate, sparsely pubescent, apex obtuse or acuminate; lateral veins 5–8 pairs, curving forward, disappearing before reaching margin. Peduncle 2–4 cm or absent with petioles axillary in clusters, 1–3 × dichotomously branched, several flowered, very slender; pedicel 5–10 mm. Flowers 4-merous, 7–10 mm; sepals semiorbicular; petals pinkish to dark red, orbicular. Capsule subglobose, 4-angled, brown or yellow-brown to red-brown, ca. 8 mm × 1 cm. Seeds ovoid, dark brown, partially covered by orange aril. Fl. May–Jul, fr. Aug–Nov.

Forests, woodlands; 200–1300 m. Gansu, Heilongjiang, Jilin, Liaoning, Ningxia, Qinghai, Shaanxi [Japan, Korea, Russia (including European part); C and N Asia].

**87. *Euonymus viburnoides*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 194. 1904.

荚蒾卫矛 jia mi wei mao

*Euonymus chengkangensis* C. W. Wang; *E. crenatus* Chen H. Wang; *E. forrestii* H. F. Comber; *E. leishanensis* Q. H. Chen; *E. saxicola* Loesener & Rehder.

Deciduous shrubs to small trees, 2–6 m tall; branches and twigs gray-green to gray-brown, terete, sturdy, striate. Petiole 4–12 mm; leaf blade thickly papery or thinly leathery, variously ovate, ovate-elliptic, or oblong-ovate, 6–10 × 2–4 cm, base cuneate or suborbicular, margin crenulate to crenate, apex obtuse or acute; lateral veins 6–8 pairs, curving forward, disappearing before reaching margin. Peduncle 3–4 cm, 1–3 × dichotomously branched with several to many flowers; pedicel 5–10 mm. Flowers 4-merous, 5–6 mm in diam.; sepals semiorbicular; petals brownish red. Capsule subglobose, with 4 little striae or angles, brown or yellow-brown to red-brown, 1–1.2 × ca. 1 cm. Seeds 1 or 2 per locule, ellipsoid, dark brown, partially covered by orange aril. Fl. May–Jul, fr. Jul–Nov.

Mixed forests, woodlands; 1300–3400 m. ?Guangxi, Guizhou, Sichuan, Yunnan [Bhutan, India, Myanmar].

The report from Guangxi has not been confirmed.

**88. *Euonymus wui*** J. S. Ma, Harvard Pap. Bot. 10: 97. 1997.

征镒卫矛 zheng yi wei mao

Deciduous shrubs, 2–3 m tall; branches terete, slender, dark brown to brown, twigs slender, striate. Petiole short, 3–4 mm; leaf blade leathery, elliptic, 5–6 × 1.5–4 cm, base cuneate or attenuate, margin entire, apex acute or caudate; lateral veins invisible. Peduncle very short, ca. 5 mm, 1 or 2 × dichotomously

branched, few flowered; pedicel ca. 1.5 cm. Flowers 4-merous (not seen); sepals triangular, persistent. Capsule obovate-obovoid, 4-angled with little grooves, red when fresh, brown or yellow-brown when dry, 2–2.8 × ca. 1 cm. Seeds 2 or 3 each locule, ovoid to globose, dark brown, arillate. Fl. unknown, fr. Aug.

- Mixed forests; 1900–2400 m. SW Guangxi, S Yunnan.

**89. *Euonymus yunnanensis*** Franchet, Bull. Soc. Bot. France 33: 454. 1886.

云南卫矛 yun nan wei mao

*Euonymus decorus* W. W. Smith; *E. linearifolius* Franchet; *E. pinchuanensis* Loesener; *E. pulvinatus* Chun & F. C. How; ?*E. stenophyllus* J. W. Ren.

Evergreen shrubs, 2–3 m tall; branches terete, sturdy, dark brown to brown, twigs slender, striate. Petiole short, 3–5 mm; leaf blade leathery, variously linear to elliptic or obovate-elliptic, 5–9 cm × 6–24 mm, base cuneate or attenuate, margin remotely crenate and revolute, apex acute or obtuse; lateral veins invisible. Peduncle 2–3.5 cm, usually only middle flower developing; pedicel 1.5–2.5 cm. Flowers 5-merous, 2–2.5 cm in diam.; sepals triangular, persistent; petals light green, ovate, revolute, apex obtuse and entire. Capsule cylindrical-rhombic to obovate, 5-angled with small grooves, red when fresh, brown or yellow-brown when dry, 1.5–1.8 × 1.2–1.4 cm. Seeds usually 2, ellipsoid, dark brown, partially covered by orange-red aril. Fl. Mar–Apr, fr. May–Jul.

- Forests, woodlands; 1700–2400 m. ?Guizhou, Sichuan, ?Xizang, Yunnan.

The distribution reports from Guizhou and Xizang have not been confirmed. *Euonymus stenophyllus* J. W. Ren (Acta Bot. Boreal. Occid. Sin. 23: 1635. 2003) was described from Gansu. Its affinity to *E. yunnanensis* needs further study.

**90. *Euonymus prismatomerioides*** C. Y. Wu ex J. S. Ma, Harvard Pap. Bot. 3: 232. 1998.

显脉卫矛 xian mai wei mao

Evergreen shrubs, 2–4 m tall; branches gray-black, terete, glabrous, twigs green to light brown, 4-angled, glabrous. Petiole ca. 5 mm; leaf blade long subulate or broadly linear, up to 14 cm, less than 2 cm in diam., base cuneate, margin unclearly and sparsely denticulate, apex long attenuate; main vein impressed adaxially and prominent abaxially, lateral veins obscure and reticulate before reaching margin. Cymes axillary or terminal on young twig, typically 3–5-flowered; peduncle less than 3 cm. Flowers purple-red when fresh, 5-merous; sepals 5, semi-orbicular, ca. 2 mm × as wide; petals 5, orbicular, 3–4 mm × as wide, slightly attenuate at base, nearly entire or mildly crenulate on margin, not ciliate. Stamens 5; filament short; anther cells 2. Ovary and fruit not seen. Fl. May, fr. unknown.

- Evergreen broad-leaved forests; ca. 1600 m. Yunnan.

*Euonymus prismatomerioides* is provisionally accepted here. A fruiting specimen is needed for a more definitive placement.

## 2. GLYPTOPETALUM Thwaites, Hooker’s J. Bot. Kew Gard. Misc. 8: 267. 1856.

沟瓣属 gou ban shu

Liu Quanru (刘全儒); A. Michele Funston

Evergreen shrubs or small trees, glabrous. Leaves opposite, entire or crenulate; stipulate. Inflorescences axillary, cymose, 1–4 × dichotomous. Flowers bisexual, 4-merous; petals green-yellow, green-white, red, or purple. Disk fleshy, annular, 4-angled or lobed; stamens on disk; anthers obliquely dehiscent, latrorse. Ovary immersed in disk, 4-locular; ovules pendulous, 1 per locule. Capsule subglobose, leathery, pallid, cinereous-luteous or cinereous-brunescens, surface usually with densely squarrose macula or smooth, loculicidally dehiscent. Seeds 1–4, ovoid or rounded, basal 1/3–1/2 covered by aril.

About 20 species: tropical and subtropical Asia; nine species (seven endemic) in China.

*Glyptopetalum reticulinerve* C. Y. Wu ex G. S. Fan & Y. J. Xu (Bull. Bot. Res., Harbin 27: 129. 2007) was recently described from evergreen forests at 600–800 m in SE Yunnan (Hekou, Honghe). We have not treated it here because we were unable to examine any specimens.

- 1a. Disk bowl-shaped, tightly invaginated and coalescent with ovary at base, emergence plane; filament apparent, 1–2 mm.
  - 2a. Leaf blade obovate or oblong-obovate, to 5 cm; petiole 2–3 mm; flowers yellow-green ..... 8. *G. fengii*
  - 2b. Leaf blade elliptic, rarely narrowly obovate-elliptic, to 12 cm; petiole ca. 5 mm; flowers white-green ..... 9. *G. geloniifolium*
- 1b. Disk disciform, not coalescent with ovary, most of ovary immersed in disk; filament very short, less than 1 mm or absent.
  - 3a. Leaf blade margin with coarse spiny teeth.
    - 4a. Leaf blade obovate or elliptic, rarely narrowly elliptic, base broadly cuneate, petiole 2–6 mm ..... 6. *G. ilicifolium*
    - 4b. Leaf blade ovate or oblong-ovate, base cordate, clasping stem, sessile ..... 7. *G. aquifolium*
  - 3b. Leaf blade margin dentate, denticulate, serrate, or nearly entire.
    - 5a. Leaf blade leathery or thickly leathery, adaxial surface plane or when dry with large irregular bullations present.
      - 6a. Capsule pallid, densely maculate, spots small, squarrose; aril crimson ..... 4. *G. longipedicellatum*
      - 6b. Capsule brown or fulvous, rough with minute tubercles; aril yellow ..... 5. *G. sclerocarpum*
    - 5b. Leaf blade papery, thickly papery, or thinly leathery, adaxial surface smooth or rugose due to impressed nerves.

- 7a. Cymes 4–6 × ramified; peduncle 6–7 cm; petiole 10–20 mm; capsule pallid green, densely muricate, murications small ..... 2. *G. longepedunculatum*
- 7b. Cymes 1–3 × ramified; peduncle 2–4 cm; petiole 5–12 mm; capsule pallid, maculate, macula squarrose.
- 8a. Leaf blade oblong, oblong-ovate, or narrowly elliptic; lateral nerves 7–9 pairs ..... 1. *G. feddei*
- 8b. Leaf blade narrowly oblong or oblong-lanceolate, rarely oblong-elliptic or narrowly obovate; lateral nerves 8–18 pairs ..... 3. *G. rhytidophyllum*

**1. *Glyptopetalum feddei*** (H. Léveillé) Ding Hou, *Blumea* 12: 59. 1963.

罗甸沟瓣 *luo dian gou ban*

*Euonymus feddei* H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 13: 260. 1914.

Evergreen shrubs, 1–2 m tall. Petiole slightly thick, 5–8 mm; leaf blade thickly papery or thinly leathery, oblong, oblong-ovate, or narrowly elliptic, 10–22 × 4–8 cm, base broadly cuneate, margin sparsely denticulate or serrate, apex often obliquely acuminate; lateral veins 7–9 pairs, anastomosing at margin, sometimes appearing rugose due to depressed veins. Cymes 1–3 × dichotomously branched; peduncle 2–4 cm, branches 1.5–3 cm; pedicels 4–10 mm; bract and bractlets 3–6 mm. Flowers white-green, 0.8–1 cm in diam.; petals orbicular. Stamens inserted on margin of disciform disk; filament less than 1 mm. Ovary partly immersed in disk. Capsule subglobose, pallid green or yellow-white when dry, 1–1.5 cm in diam., densely squarrose maculate. Seeds brown, ca. 1.2 cm, ca. 1/2 covered by aril. Fl. Aug–Jun, fr. Sep–Nov.

• Valleys in dense forests; 500–800 m. NW Guangxi (Fengshan, Nandan, Tian'e), S Guizhou (Luodian).

**2. *Glyptopetalum longepedunculatum*** Tardieu, *Notul. Syst. (Paris)* 14: 47. 1950.

细梗沟瓣 *xi geng gou ban*

Small trees, ca. 5 m tall. Petiole 1–2 cm; leaf blade thickly papery or thinly leathery, oblong, oblong-ovate, or narrowly elliptic, 10–22 × 4–8 cm, base broadly cuneate, margin sparsely denticulate or serrate, apex often obliquely acuminate; lateral veins 7–9 pairs, thin and clear, often depressed adaxially. Cymes 3 or 4 × dichotomously branched; peduncle 6–7 cm, branches 2–3 cm; pedicels 0.8–1.2 cm; bract and bractlets ca. 3 mm. Flowers not seen. Capsule subglobose, 1.2–1.5 cm in diam., pallid, with densely small lamellate tubercles. Seeds crimson, ca. 1/2 covered by aril. Fl. unknown, fr. Oct–Dec.

Valleys in dense forests. Guangxi (Mubian) [Vietnam].

**3. *Glyptopetalum rhytidophyllum*** (Chun & F. C. How) C. Y. Cheng in C. Y. Cheng & P. H. Huang, *Fl. Reipubl. Popularis Sin.* 45(3): 89. 1999.

皱叶沟瓣 *zhou ye gou ban*

*Euonymus rhytidophyllus* Chun & F. C. How, *Acta Phytotax. Sin.* 7: 51. 1958.

Evergreen shrubs, 1.5–3 m tall; branches green, twigs 4-angled. Petiole sturdy, 5–12 mm; leaf blade green when dry, thinly leathery, narrowly oblong, oblong-lanceolate, or narrowly elliptic, 10–18 × 2.5–6.5 cm, base broadly cuneate, margin

sparsely denticulate or serrate, apex long acuminate; lateral veins 8–18 pairs, appearing rugose due to depressed veins. Cymes 1 or 2 × dichotomously branched; peduncle 2–4 cm, branches 1.5–3 cm; pedicels 5–8 mm; bractlets subulate, ca. 1.2 cm, persistent. Flowers slightly green; petals broadly obovate. Stamens inserted on margin of disciform disk; filament short; anther diverging. Ovary without style; stigma disciform. Capsule globose, pallid or slightly brown, 1–1.4 cm in diam., squarrose maculate. Seeds brown-red; aril yellow when dry. Fl. Aug–Jun, fr. Sep–Dec.

• Dense forests, forest margins, mountain regions; 600–900 m. Guangxi (Longlin), Yunnan.

**4. *Glyptopetalum longipedicellatum*** (Merrill & Chun) C. Y. Cheng in C. Y. Cheng & P. H. Huang, *Fl. Reipubl. Popularis Sin.* 45(3): 90. 1999.

长梗沟瓣 *chang geng gou ban*

*Euonymus longipedicellatus* Merrill & Chun, *Sunyatsenia* 2: 36. 1934; *E. longipedicellatus* var. *continentalis* Chun & F. C. How; *Glyptopetalum continentalum* (Chun & F. C. How) C. Y. Cheng & Q. S. Ma.

Trees or shrubs, 2–12 m tall, often scandent when growing in dark conditions; twigs sturdy, yellow-green, terete, smooth. Petiole very sturdy, (0.6–)1.2–1.8 cm × 2–3 mm; leaf blade leathery, usually narrowly elliptic, (6–)15–25(–30) cm, base cuneate or broadly cuneate, margin with very shallow teeth or entire, apex acuminate or acute; lateral veins (7–)10–18 pairs, smooth adaxially, slightly prominent and obvious abaxially. Cymes 2 or 3 × dichotomously branched; peduncle 2–5 cm, branches 1–3 cm; pedicels 2–3.5 cm; bract and bractlets subulate, often caducous. Flowers yellow-green, ca. 1.2 cm in diam.; petals broadly obovate. Filament nearly absent. Ovary nearly coalescent with disk; stigma small. Capsule pallid, subglobose or obovate, 1.5–1.8 × 1.8–2.5 cm, densely small squarrose maculate. Aril crimson, covering ca. 1/2 of seed.

• Valley forests, streamsides; 500–600 m. Guangdong, Hainan (Baoting, Lingshui).

**5. *Glyptopetalum sclerocarpum*** (Kurz) M. A. Lawson in J. D. Hooker, *Fl. Brit. India* 1: 613. 1875.

硬果沟瓣 *ying guo gou ban*

*Euonymus sclerocarpus* Kurz, *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* 41: 299. 1872.

Evergreen trees or shrubs, 2–12 m tall, often scandent when growing in dense shade. Petiole sturdy, 8–10 mm, wider than 2 mm in diam.; leaf blade leathery or thickly leathery, narrowly oblong to elliptic, rarely obovate, 12–27 × 4.5–9 cm or smaller, base broadly cuneate to rounded, margin sparsely serrate or en-

tire, apex acuminate or obtuse; lateral veins more than 10 pairs, dense, both surfaces plane, obvious. Cymes 1 or 2 × dichotomously branched, usually 3-flowered; peduncle 2–5 cm; pedicels 1–1.5 cm. Flowers yellow-white; petals slightly thick, obovate. Filament very short; anther diverging. Styles short and thick, elongating in bloom. Capsule subglobose, 1.2–2.2 cm in diam.; pericarp brown or fulvous, very thick and rigid, rough with minute tubercles. Seeds oblong, 1–1.5 × 0.8–1 cm; aril yellow, covering ca. 1/2 of seed. Fl. Aug–Jun, fr. Sep–Dec.

Dense forests, mountain slopes; 900–2500 m. Yunnan [India].

**6. *Glyptopetalum ilicifolium*** (Franchet) C. Y. Cheng & Q. S. Ma in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 92. 1999.

刺叶沟瓣 *ci ye gou ban*

*Euonymus ilicifolius* Franchet, Bull. Bot. Soc. France 33: 453. 1886 [*“ilicifolia”*]; *Pragmotessara ilicifolia* (Franchet) Pierre.

Shrubs, 1–4 m tall; branches green. Petioles 2–6 mm; leaf blade thickly leathery, usually pruinose, obovate, elliptic, or narrowly elliptic, 3.5–9 × 2–4 cm, base broadly cuneate, margin sparsely spiny denticulate, apex rounded or acute; lateral veins 5–7 pairs, reaching margin. Cymes usually 3-flowered; peduncle ca. 15 mm; pedicels 1–1.3 cm, median ones slightly longer; bractlets very small, shorter than 1 mm. Flowers slightly purple; calyx 4-lobed; petals broadly rounded. Filament short; anther with enlarged connective. Ovary without style; stigma disciform. Capsule subglobose, 1–1.5 mm in diam., pallid and pale yellowish brown, weakly squarrose maculate. Seeds brown-red, ca. 1 cm, ca. 1/2 covered by aril. Fl. Aug–Jun, fr. Jul–Dec.

• Dense forests, mountain slopes. Guizhou, Sichuan (Puge), NW Yunnan (Lijiang).

**7. *Glyptopetalum aquifolium*** (Loesener & Rehder) C. Y. Cheng & Q. S. Ma in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 93. 1999.

冬青沟瓣 *dong qing gou ban*

*Euonymus aquifolium* Loesener & Rehder in Sargent, Pl. Wilson. 1: 484. 1913.

Shrubs, ca. 3 m tall; branches yellow-brown. Leaf blade leathery, ovate or oblong-ovate, 4–7 × 2.5–4.5 cm, base cordate, amplexicaul, margin with clear and irregular large spiny teeth, apex acute or shortly acuminate; lateral veins 6 or 7 pairs, curved. Cymes 1- to several flowered; peduncle 1.8–2.2 cm (infructescent); pedicels 1–1.2 cm, up to 2.5 cm when only

1-flowered. Flowers not seen. Capsule globose, 6–8 mm in diam., green-white, squarrose maculate. Seeds oblong, brown-purple, ca. 10 mm, more than 1/2 covered by aril. Fl. unknown, fr. Sep–Dec.

• Rocky mountains, cliffs; ca. 2200 m. Sichuan (Ebian, Wa Shan).

**8. *Glyptopetalum fengii*** (Chun & F. C. How) Ding Hou, Fl. Males., Ser. 1, Spermat. 6: 256. 1963.

海南沟瓣 *hai nan gou ban*

*Euonymus fengii* Chun & F. C. How, Acta Phytotax. Sin. 7: 44. 1958.

Shrubs, to 4 m tall. Petioles short, 2–3 mm; leaf blade thickly papery, obovate or oblong-obovate, 4–7 × 2.5–4.5 cm, base narrowly cuneate, margin entire, apex obtuse, often emarginate; lateral veins not obvious. Cymes usually 3-flowered; peduncle 2–4 cm; branches ca. 1 cm. Flowers yellow-green, 6–8 mm in diam.; petals broadly elliptic, slightly carose. Stamens inserted on margin of cupuliform disk; filament longer than styles; anther introrse, dorsifixed. Ovary coalescent with thin disk; style absent; stigma capitate. Capsule unknown. Fl. Dec–Feb.

• Lowland forests. Hainan.

**9. *Glyptopetalum geloniifolium*** (Chun & F. C. How) C. Y. Cheng in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 94. 1999.

白树沟瓣 *bai shu gou ban*

*Euonymus geloniifolius* Chun & F. C. How, Acta Phytotax. Sin. 7: 45. 1958; *E. geloniifolius* var. *robustus* Chun & F. C. How; *Glyptopetalum geloniifolium* var. *robustum* (Chun & F. C. How) C. Y. Cheng; *G. occultonervatum* R. H. Miao.

Evergreen shrubs, 1–3 m tall. Petioles ca. 5 mm; leaf blade leathery, elliptic, narrowly elliptic, or narrowly obovate-elliptic, 5–12 × 2.5–6 cm, base broadly cuneate, margin crispate, apex obtuse or often emarginate. Cymes 1 or 2 × dichotomously branched; peduncle 2–3 cm, branches 1–1.5 cm; pedicels 1–2 mm. Flowers white-green, ca. 8 mm in diam.; calyx lobes membranous; petals with erose margins. Stamens inserted on margin of cupuliform disk; filament ca. 1.5 mm. Ovary coalescent with disk; style very short; stigma small. Capsule oblate, red, ca. 1.5 cm in diam., squarrose maculate. Seeds brown-purple, ca. 8 mm; aril slightly yellow, partially covering seed. Fl. Jul–Aug, fr. Dec–Feb.

• Sparse forests, mountain slopes, seacoasts, riversides. Guangdong, Guangxi, Hainan.

### 3. MONIMOPETALUM Rehder, J. Arnold Arbor. 7: 233. 1926.

永瓣藤属 *yong ban teng shu*

Ma Jinshuang (马金双); A. Michele Funston

Scandent shrubs, glabrous; bud scales persistent on nodes of young shoots. Leaves alternate, papery, margin entire-ciliate; stipules 2, persistent. Inflorescences axillary, cymose; peduncle and pedicel slender and thin; bracts and bractlets awl-shaped, margin ciliate, persistent. Flowers bisexual, 4-merous. Disk compressed globose. Stamens sessile on disk. Ovary connected with disk basally, 4-locular; ovules erect, 2 per locule. Capsule deeply 4-lobed, loculicidally dehiscent, only 1 or 2 developing, persistent petals becoming winglike. Seeds 1(or 2) per locule; basal aril thin and small.

- One species: China.

**1. *Monimopetalum chinense*** Rehder, J. Arnold Arbor. 7: 234. 1926.

永瓣藤 yong ban teng

Vinelike shrubs, 1.5–6 m tall; young branches slightly 4-angled, base usually with persistent bud scales, scales usually triangular-ovate, margin entire-ciliate, apex thin and elongate or caudate. Leaves alternate; stipules usually thin and linear, 5–6 mm, persistent; petiole thin, 8–12 mm; leaf blade papery, ovate, narrowly ovate, or elliptic-ovate, 5–9 × 1.5–5 cm, base rounded or widely attenuate, margin finely serrulate, often fimbriate at tip of teeth, apex long acuminate or abruptly acute; lateral veins 4 or 5 pairs, slender and thin, usually not evident. Cymes (1 or)2(or 3)-branched; peduncle 2–12 mm; pedicel 3–8 mm, slender and thin; bracts and bractlets narrowly ovate or awl-shaped, margin

ciliate, persistent. Flowers 3–4 mm in diam., whitish or light green; sepals 4, slightly lobed, lobes semiorbicular, margin denticulate; petals ovate-rotund or obovate. Style very short or nearly absent; stigma small and round. Capsule deeply 4-lobed, persistent petals enlarging and becoming winglike, 10–12 × up to 3 mm. Seeds black, with thin aril at base. Fl. May–Oct, fr. Jun–Nov.

- Coniferous and broad-leaved mixed forests; 400–700 m. S Anhui (Qimen), E Hubei (Tongshan), N Jiangxi (Jingdezhen).

This is a very rare species in China. It is listed at the second grade of Chinese plant protection by Chien (in Fu & Jin, China Pl. Red Data Book, 210–211. 1992). The first fruiting specimen was collected in 1926 from S Anhui, while the first flowering specimen was collected from N Jiangxi in 1959. This species was collected from E Hubei for the first time in 1997.

#### 4. *CELASTRUS* Linnaeus, Sp. Pl. 1: 196. 1753, nom. cons.

南蛇藤属 nan she teng shu

Zhang Zhixiang (张志翔); A. Michele Funston

*Monocelastrus* F. T. Wang & T. Tang.

Scandent to twining shrubs, deciduous or evergreen, glabrous or pubescent, with oblong or circular gray lenticels; bud scales imbricate. Leaves alternate, subentire or serrate; stipules small, linear, deciduous. Inflorescences axillary or terminal, cymose, thyrsoid, or flowers solitary. Flowers unisexual, rarely bisexual, rarely dioecious, 5-merous, greenish or yellowish white. Disk membranous or fleshy, annular to cupuliform, entire or slightly 5-lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary 3-locular, separate from or slightly adnate to disk; ovules erect, 1 or 2 per locule. Capsule globose, yellowish, leathery, loculicidally dehiscent. Seeds 1–6, ellipsoid, enclosed in aril; aril carnosous, red to orange-red.

About 30 species: tropical, subtropical, and temperate zones of Asia, Australia, and North and South America, as well as Madagascar; 25 species (16 endemic) in China.

This genus is divided into two subgenera: *Celastrus* subg. *Celastrus* and *C.* subg. *Racemocelastrus* Ding Hou; the latter does not occur in China.

- 1a. Fruit 1-loculed, 1-seeded; evergreen (*C.* sect. *Sempervirentes*).
  - 2a. Lenticels of young branchlets not obvious; floral disk thin, cupuliform; stamens inserted on margin of disk; fruit small, 6.5–10 mm wide, globose.
  - 3a. Leaves narrowly rectangular-elliptic, narrowly ovate-elliptic to elliptic-oblongate; secondary veins 5–7 pairs; valves without transverse rugae ..... 22. *C. hindsii*
  - 3b. Leaves ovate or widely elliptic; secondary veins 7–10 pairs; valves with transverse rugae ..... 23. *C. tonkinensis*
- 2b. Lenticels of young branchlets obvious; floral disk carnosous, shallowly discoid or slightly pillow-form; stamens inserted below disk; fruit large, 8–12 mm wide, widely elliptic, rarely globose.
  - 4a. Young branchlets, leaves, and valves puce when dry; leaf blade papery to thinly leathery; valves rugose and curly when fruit ripe ..... 24. *C. monospermus*
  - 4b. Young branchlets, leaves, and valves yellowish green when dry; leaf blade thickly leathery; valves not rugose and curly when fruit ripe ..... 25. *C. virens*
- 1b. Fruit 3-loculed, 3–6-seeded; deciduous or evergreen.
  - 5a. Inflorescences generally terminal, occasionally axillary in upper part of branches (*C.* sect. *Celastrus*).
    - 6a. Branchlets not obviously angled; leaf blade small, 5–10 × 2.5–5 cm, narrowly elongate; sepals imbricate; disk cupulate ..... 1. *C. paniculatus*
    - 6b. Branchlets generally 4–6-angled; leaf blade large, 7–18 × 5–14 cm, relatively broad; sepals valvate; disk disciform ..... 2. *C. angulatus*
  - 5b. Inflorescences axillary, or both axillary and terminal (*C.* sect. *Axillares*).
    - 7a. Inflorescences usually axillary; seeds generally crescentiform or curved-semiorbicular; if seeds elliptic, bud scales thornlike (*C. flagellaris*).
      - 8a. Outer scales of buds thornlike, thorn 1.5–2.5 mm; seeds elliptic ..... 14. *C. flagellaris*
      - 8b. Bud scales not thornlike; seeds crescentiform or curved-semiorbicular.
      - 9a. Petiole short, less than 9 mm.

- 10a. Leaf blade widely obovate or rarely orbicular, 1.5–4 cm; petiole 1–5 mm; peduncle slender, 4–6.5 mm; fruit 6–7 mm wide ..... 15. *C. cuneatus*
- 10b. Leaf blade oblanceolate, rarely widely oblanceolate, 6.5–12.5 cm; petiole 4–9 mm; peduncle subsessile, only ca. 2 mm; fruit 7.5–8.5 mm wide ..... 16. *C. oblanceifolius*
- 9b. Petiole long, more than 10 mm, longest up to 30 mm.
- 11a. Fruit small, 4–5 mm wide; seeds small, ca. 2.5 mm ..... 17. *C. homaliifolius*
- 11b. Fruit large, 6.5–10 mm wide; seeds large, 3–5 mm.
- 12a. Cymes 3-flowered; peduncle short, 2–5 mm; pedicels jointed distally ..... 18. *C. aculeatus*
- 12b. Cymes 3–14-flowered; peduncle long, 5–20 mm; pedicels jointed below middle or near base.
- 13a. Leaf blade obovate or obovate-elliptic; cymes 7–14-flowered; young branchlets, peduncles, and pedicels densely brown hirsute ..... 19. *C. hirsutus*
- 13b. Leaves oblong or elliptic; cymes 3–7-flowered; young branchlets, peduncles, and pedicels with very short brown or yellowish white stiff hairs.
- 14a. Young branchlets, peduncles, and pedicels with dense and very short brown stiff hairs; leaf blade widely elliptic to orbicular; secondary veins in 3 or 4 pairs ..... 20. *C. kusanoi*
- 14b. Young branchlets, peduncles, and pedicels with very short yellowish white stiff hairs; leaf blade rectangular-elliptic, rarely rectangular-obovate; secondary veins in 5–7 pairs ..... 21. *C. stylosus*
- 7b. Inflorescences both axillary and terminal; seeds usually elliptic.
- 15a. Leaf blade abaxially pallid.
- 16a. Leaf blade narrowly lanceolate ..... 3. *C. franchetianus*
- 16b. Leaf blade broad, elliptic to broadly lanceolate or obovate-lanceolate.
- 17a. Petiole short, 8–12 mm; seeds elliptic ..... 4. *C. glaucophyllus*
- 17b. Petiole long, 12–20 mm; seeds convex or slightly crescentiform.
- 18a. Terminal inflorescence long, 7–10 cm; leaf blade small, ovate or rectangular-elliptic, 6–9.5 × 2.5–5.5 cm, base widely cuneate; fruit stalk long, 10–25 mm ..... 5. *C. hypoleucus*
- 18b. Terminal inflorescence short, 3–7 cm; leaf blade large, widely ovate, widely ovate-elliptic or orbicular, 6–13.5 × 3.5–9.5 cm, base widely rounded; fruit stalk short, 5–10 mm ..... 6. *C. hypoleucoides*
- 15b. Leaf blade same color on both surfaces.
- 19a. Veinlets obviously prominent and cancellate netted; leaf blade abaxially pubescent along veins ..... 7. *C. rugosus*
- 19b. Veinlets not cancellate netted; leaf blade glabrous, or sometimes sparsely with short hair along veins.
- 20a. Terminal inflorescences long, 6–18 cm; valves adaxially maculate, macula small, brown ..... 8. *C. vaniotii*
- 20b. Terminal inflorescence short, generally 1–6 cm (*C. hookeri*: sometimes up to 9 cm); valves without macula.
- 21a. Winter buds large, 5–12 mm; fruit large, 10–12 mm wide; filament sometimes with papillate hairs ..... 9. *C. gemmatus*
- 21b. Winter buds small, 1–3 mm; fruit small, 5.5–10 mm wide; filament smooth.
- 22a. Petiole 2–8 mm; leaf blade up to 9 cm, elliptic.
- 23a. Leaf blade glabrous; pedicels jointed above middle ..... 10. *C. punctatus*
- 23b. Leaf blade slightly pubescent along veins abaxially; pedicels jointed at or below middle ..... 11. *C. rosthornianus*
- 22b. Petiole usually more than 10 mm, longest up to 20 mm; leaf blade up to 13 cm, oblong, ovate, or nearly rounded.
- 24a. Terminal inflorescence long, 3–9 cm; pedicels jointed at or above middle; capsule 6–7 mm wide ..... 12. *C. hookeri*
- 24b. Terminal inflorescence short, 1–3 cm; pedicels jointed below middle or near base; capsule 8–10 mm wide ..... 13. *C. orbiculatus*

### 1. *Celastrus* sect. *Celastrus*

#### 圆锥组 yuan zhui zu

Deciduous or evergreen. Panicles typically terminal; foliage bud at axil of branching inflorescences absent if inflorescences axillary at upper part of branches. Fruit 3-loculed. Seeds 3–6.

About six species: S and SE Asia, Australia, Madagascar, North America, Pacific Islands; two species (one endemic) in China.

**1. *Celastrus paniculatus*** Willdenow, Sp. Pl. 1: 1125. 1797.

灯油藤 deng you teng

*Celastrus dependens* Wallich; *C. euphlebiophyllus* (Ha-

yata) Kanehira; *C. multiflorus* Roxburgh (1824), not Lamarck (1785); *C. paniculatus* subsp. *multiflorus* Ding Hou; *C. paniculatus* subsp. *serratus* (Blanco) Ding Hou; *Diosma serrata* Blanco; *Euonymus euphlebiophyllus* Hayata.

Large deciduous twining shrubs, stem up to 23 cm in diam.; bark pale brown, rough and cracked, exfoliating in small scales; branchlets pubescent or glabrous, with prominent elliptic lenticels; axillary buds small, 1–2 mm, triangular. Petiole 6–16 mm; leaf blade elliptic, oblong, rectangular, ovate, or obovate to sub-orbicular, 5–10 × 2.5–5 cm, glabrous, base cuneate, margin serrate, apex mucronate to acuminate; secondary veins 5–7 pairs, rarely abaxially pubescent at axil of veins. Thyrses terminal, 5–10 cm, 1- or 2-ramous; rachis and pedicels occasionally with short tomentum; pedicels 3–6 mm. Flowers greenish, 5-merous, dioecious, 2–3 × 1.2–1.8 mm; sepals free, imbricate, semi-orbicular, ciliate; petals oblong to obovate-rectangular. Disk membranous, cupulate, slightly 5-lobed. Stamens ca. 3 mm, inserted on margin of disk. Ovary globose. Capsule 1–1.3 cm in diam., depressed, globose, 3-valved, bright yellow, 3–6-seeded. Seeds elliptic, 3.5–5.5 × 2–5 mm; aril orange-red. Fl. Apr–Jun, fr. Jun–Sep.

Forest slopes; 200–2000 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam; Australia, Pacific islands (New Caledonia)].

Seed oiliness in this species is more than 50%. It is used for making lamp oil and soap in Yunnan. Many pharmacological studies deal with its effects on the central nervous system and the tranquilizing property of the alkaloidal fractions of the oil.

The variable leaf blade shape led to the creation of three subspecies: *Celastrus paniculatus* subsp. *paniculatus*, *C. paniculatus* subsp. *serratus* (Blanco) Ding Hou (not in China), and *C. paniculatus* subsp. *multiflorus* (Roxburgh) Ding Hou. However, there are so many transi-

tional blade forms that it is hard to distinguish between them; therefore, the subspecies are not recognized here.

**2. *Celastrus angulatus*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 455. 1881.

苦皮藤 ku pi teng

*Celastrus latifolius* Hemsley.

Deciduous twining shrubs; branchlets dark brown, 4–6-angular; lenticels dense, prominent, orbicular to elliptic, white; axillary buds ovate, 2–4 mm. Petiole 1.5–3 cm, strong; leaf blade ovate to orbicular, 7–18 × 5–14 cm, leathery, light green, glabrous, base cuneate, margin crenate, apex acute to shortly acuminate; secondary veins 5–7 pairs, obviously prominent on adaxial surface. Paniculate thyrses terminal, apically branched, 10–20 cm, 1- or 2-ramous; rachis and pedicels glabrous or with russet short hairs; pedicels short, jointed at apex. Flowers small, greenish, dioecious; sepals valvate, triangular to ovate, ca. 1.2 mm, margin approximately entire; petals rectangular, ca. 2 × 1.2 mm, margin erose. Disk carose, discoid, slightly 5-lobed. Stamens ca. 3 mm, inserted on disk; staminodia in female flowers ca. 1 mm. Pistils 3–4 mm; ovary globose; style reflexed; pistillodes in male flowers ca. 1.2 mm. Capsule globose, yellow, 8–10 mm wide, 3-valved, adaxial side of valves with brown macula. Seeds elliptic, 3.5–5.5 × 1.5–3 mm; aril bright red. Fl. May–Jun.

• Mountain thickets, slopes; 1000–2500 m. Anhui, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Yunnan.

**2. *Celastrus* sect. *Axillares*** (Rehder & E. H. Wilson) C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 103. 1999.

腋花组 ye hua zu

*Celastrus* ser. *Axillares* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 355. 1915.

Deciduous twining shrubs. Inflorescences axillary, or both axillary and terminal; foliage buds at axil of branching inflorescences. Capsule 3-loculed. Seeds 3–6.

About 19 species: E and S Asia; 19 species (14 endemic) in China.

**3. *Celastrus franchetianus*** Loesener, Bot. Jahrb. Syst. 30: 470. 1902.

洱源南蛇藤 er yuan nan she teng

*Celastrus racemulosus* Franchet, Bull. Soc. Bot. France 33: 455. 1887, not Hasskarl (1858).

Twining shrubs, 1–2 m tall; branchlets terete; young branchlets green, lenticels usually absent. Petiole 5–11 mm; leaf blade lanceolate, 5–13 × 2–4 cm, thinly papery to coriaceous, base cuneate, margin serrulate, apex acuminate; secondary veins 7–9 pairs, prominent. Thyrses terminal, elongate; peduncle very short, less than 5 mm. Flowers 5-merous, white to pea green, ca. 5 mm wide. Disk slightly orbicular, lobe triangular. Ovary 3-loculed; ovules 2 per locule; style columnar; stigma 3-lobed. Capsule ovate to slightly globose.

• Forests in mountain regions; ca. 2300 m. Yunnan.

**4. *Celastrus glaucophyllus*** Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 347. 1915.

灰叶南蛇藤 hui ye nan she teng

*Celastrus glaucophyllus* var. *angustus* Q. H. Chen.

Deciduous twining shrubs; branchlets with elliptic to oblong sparse lenticels. Petiole 8–12 mm; leaf blade broadly elliptic, obovate-elliptic, or rarely narrowly elliptic, 5–10 × 2.5–6.5 cm, leathery during fruiting period, adaxially green, abaxially gray-white, base orbicular or broadly cuneate, margin sparsely finely serrate, apex shortly acuminate; secondary veins 4 or 5 pairs, rarely 6. Racemose panicles axillary to terminal, 3–6 cm, axillary inflorescences only 3–5-flowered; rachis short, only 1–2 mm; pedicels 2.5–3.5 mm, jointed at or above middle. Sepals elliptic or ovate, 1.5–2 mm, margin sparsely erose-denticulate; petals obovate-rectangular to narrowly ovate, 4–5 × ca. 2.2 mm. Disk shallowly cupulate, slightly carose, edge approximately semicircular. Stamens ± shorter than petals; anthers broadly elliptic to approximately orbicular. Pistillode 1.5–2 mm in male flowers. Fruit globose, 8–10 mm wide; stipes 5–9 mm. Fl. Mar–Jun, fr. Aug–Oct.

• Mixed forests; 700–3700 m. Guizhou, Hubei, Hunan, S Shaanxi, Sichuan, Yunnan.

The leaf blades are quite variable in this species.

**5. *Celastrus hypoleucus*** (Oliver) Warburg ex Loesener, Bot. Jahrb. Syst. 29: 445. 1900.

粉背南蛇藤 fen bei nan she teng

*Erythrospermum hypoleucum* Oliver, Hooker's Icon. Pl. 19: t. 1899. 1889; *Celastrus hypoglaucus* Hemsley.

Twining shrubs; branches with sparse broadly elliptic or approximately orbicular lenticels, young branchlets without lenticels; axillary buds small, orbicular-triangular, ca. 2 mm wide. Petiole 1.2–2 cm; leaf blade elliptic to rectangular-elliptic, 6–9.5 × 2.5–5.5 cm, abaxial surface gray, adaxial surface green, glabrous, base cuneate, margin serrate, apex shortly acuminate; secondary veins 5–7 pairs. Thyrses terminal and axillary, terminal thyrses 7–10 cm, many flowered, axillary ones short and small, 3–7-flowered; rachis short; pedicels 2–8 mm, jointed above middle. Sepals approximately triangular, apex obtuse; petals rectangular or elliptic, ca. 4.3 mm. Disk cupuliform. Stamens ca. 4 mm; staminodia in female flowers ca. 1.5 mm. Pistils ca. 3 mm; ovary elliptic; stigma flat; pistillodes in male flowers ca. 2 mm. Terminal infructescence long and pendulous, axillary ones mainly fruitless. Capsule globose, adaxial side of valves with brownish red macula; stipes slender, 1–2.5 cm. Seeds convex or slightly crescentiform, 4–5 × 1.4–2 mm, black to blackish brown. Fl. May–Aug, fr. Jul–Oct.

• Forests; 400–2700 m. Anhui, E Gansu, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan, Zhejiang.

**6. *Celastrus hypoleucoides*** P. L. Chiu, J. Hangzhou Univ., Nat. Sci. Ed. 8: 114. 1981.

薄叶南蛇藤 bo ye nan she teng

Twining shrubs; branchlets with sparse or very sparse lenticels; lenticels broadly elliptic or approximately orbicular. Petiole 1.2–2 cm; leaf blade broadly ovate, broadly ovate-elliptic, or nearly orbicular, 6–13.5 × 3.5–9.5 cm, papery, abaxially powdery white, base widely rounded, sometimes decurrent, margin shallowly serrate or obtusely serrulate, apex shortly acuminate; secondary veins 5–7 pairs, curved, approximately parallel. Inflorescences terminal and axillary, terminal inflorescences many flowered, 3–7 cm, axillary ones 3–7- or more flowered; rachis short; pedicels 2–4 mm, jointed at or below middle. Sepals large, globose, 2–3 mm wide, ciliate, apex obtusely orbicular-triangular; petals elliptic or orbicular-elliptic, ca. 4.5 × 2.5–3 mm. Disk cupuliform, margin approximately truncate. Stamens slightly shorter than corolla; anther ovate, apex often apiculate. Infructescence 3–7 cm, stipe sturdy, 5–10 × ca. 1.5 mm. Capsule globose, adaxially brown maculate. Seeds convex to slightly crescentiform, 4.5–6 × 2–3 mm, blackish brown. Fl. May–Jun, fr. Aug–Nov.

• Thickets, slopes. Anhui, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Yunnan, Zhejiang.

**7. *Celastrus rugosus*** Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 349. 1915.

皱叶南蛇藤 zhou ye nan she teng

*Celastrus glaucophyllus* Rehder & E. H. Wilson var. *rugosus* (Rehder & E. H. Wilson) C. Y. Wu ex Y. C. Ho.

Deciduous twining shrubs; branchlets purplish brown, glabrous; lenticels small, elliptic or oblong, slightly flat; winter buds globose or ovate, ca. 2 mm wide. Petiole 1–1.7 cm, glabrous; leaf blade elliptic, obovate, or rectangular-elliptic, 6–13 × 3–8(–9) cm, thinly papery in flower, papery in fruit, rarely hard papery, glabrous, abaxially whitish green, base cuneate, broadly cuneate, or suborbicular, margin serrate, apex acuminate or broadly orbicular, mucronulate; secondary veins 4–6 pairs, veins with yellowish white short hairs, veinlets parallel. Inflorescences terminal and axillary, terminal inflorescences 3–6 cm, axillary ones mainly 3–5-flowered; rachis 2–5 mm; pedicels 2–6 mm, jointed generally below middle. Sepals ovate, ca. 2 × 1.5 mm, apex obtuse, ciliate; petals slightly ovate-rectangular, ca. 4 × 1.5 mm. Disk shallowly cupuliform, slightly carnose, lobe semicircular or slightly narrow. Stamens ca. 4 mm; filament filiform; anther rectangular-elliptic; staminodia in female flowers short and small. Pistils ampullaceous; ovary globose; styles slender and long; stigma slightly 3-lobed; pistillodes in male flowers 1–1.5 mm. Capsule globose, 8–10 mm wide. Seeds elliptic, 4–5 × 1.5–2.5 mm, brown. Fl. May–Jun, fr. Aug–Oct.

• Thickets, slopes; 1400–3600 m. N Guangxi, Guizhou, Hubei, S Shaanxi, Sichuan, E Xizang, Yunnan.

**8. *Celastrus vaniotii*** (H. Léveillé) Rehder, J. Arnold Arbor. 14: 249. 1933.

长序南蛇藤 chang xu nan she teng

*Saurauia vaniotii* H. Léveillé, Fl. Kouy-Tchéou, 415. 1914–1915 [“*vanioti*”]; *Celastrus spiciformis* Rehder & E. H. Wilson; *C. spiciformis* var. *laevis* Rehder & E. H. Wilson.

Twining shrubs; branchlets glabrous, lenticels sparse orbicular or elliptic; axillary buds approximately globose, rarely ovate-orbicular, 1.5–2.5 mm. Petiole 1–1.7 cm; leaf blade ovate, rectangular-ovate, or rectangular-elliptic, 6–12 × 3.5–7 cm, glabrous or rarely abaxially pubescent on veins, base rounded, rarely broadly cuneate, margin with recurved glandular teeth, apex shortly acuminate, rarely narrowly acute; secondary veins 6 or 7 pairs, prominent on both surfaces. Terminal thyrses 6–18 cm, axillary inflorescences short, 3–4 cm; pedicels 4–6 mm, jointed generally below middle. Sepals ciliate; petals obovate-rectangular or approximately obovate, 3–3.5 × 1.5–2 mm. Disk slightly cupuliform, lobe broadly rounded. Stamens ± shorter than corolla, or as long as corolla; filament conical-linear; anther rectangular-elliptic; staminodes in female flowers ca. 1 mm. Pistils ca. 3.5 mm; ovary approximately globose; styles stout; pistillodes in male flowers ca. 1 mm. Capsule globose, ca. 9 × 8 mm, adaxial side of valves with small brown macula. Seeds elliptic, ca. 4 × 2 mm. Fl. May–Jul, fr. Aug–Sep.

• Mixed forests; 500–2200 m. Hubei, Hunan, Guangxi, Guizhou, Sichuan, Yunnan.

**9. *Celastrus gemmatus*** Loesener, Bot. Jahrb. Syst. 30: 468. 1902.

大芽南蛇藤 da ya nan she teng

*Embelia esquirolii* H. Léveillé.

Twining shrubs; branchlets with lenticels; lenticels elliptic to orbicular, white, prominent; winter buds large, long ovate to long conical, up to 12 mm, base ca. 5 mm in diam. Petiole 1–2.3 cm; leaf blade rectangular, ovate-elliptic, or elliptic, 6–12 × 3.5–7 cm, abaxially glabrous, or rarely with brown short tomentum on veins, adaxially glabrous, asperous, base rounded or broadly orbicular, margin shallowly serrate, apex acuminate; secondary veins 5–7 pairs, veinlets densely netted, prominent on both surfaces. Cymes terminal and axillary, terminal inflorescences ca. 3 cm, axillary ones short and few flowered; rachis 5–10 mm; pedicels 2.5–5 mm, jointed above middle. Sepals ovate, ca. 1.5 mm, margin erose; petals rectangular-ovate, 3–4 × 1.2–2 mm. Disk shallowly cupuliform, lobe approximately triangular, lobe in female flowers often obtuse. Stamens as long as corolla; filament sometimes with papillate hairs; anther sometimes apically mucronulate; staminodia in female flowers ca. 1.5 mm. Pistils ampullaceous; ovary globose; styles ca. 1.5 mm; pistillodes in male flowers 1–2 mm. Capsule globular, 10–13 mm wide; stipes with visible prominent lenticels. Seeds widely elliptic to rectangular-elliptic, 4–5.5 mm, obtuse, reddish brown, shiny. Fl. Apr–Sep, fr. Aug–Oct.

• Dense forests, thickets; 500–1800 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang.

**10. *Celastrus punctatus*** Thunberg in Murray, Syst. Veg., ed. 14, 237. 1784.

东南南蛇藤 dong nan nan she teng

*Celastrus articulatus* Thunberg var. *punctatus* (Thunberg) Rehder; *C. geminiflorus* Hayata; *C. gracillimus* Hayata; *C. leiocarpus* Hayata; *C. longeracemosus* Hayata; *C. punctatus* var. *microphyllus* Li & Ding Hou.

Deciduous twining shrubs; branchlets tenuous, spreading, glabrous; axillary buds small, ovate, ca. 2 mm; apex of outer scales acute, spinelike. Petiole 2–8 mm; leaf blade elliptic, oblong, broadly elliptic, or rectangular-elliptic, rarely obovate-elliptic, 1.5–7 × 1–3 cm, papery or thickly papery, glabrous, base cuneate, margin serrulate or obtusely serrate, apex acute or shortly acuminate; secondary veins (3 or) 4 or 5 pairs. Inflorescences generally axillary, terminal inflorescences occurring in male plants, 1- or 2-flowered or more flowers in a small cyme, somewhat racemose-monochasial; pedicels 3–5 mm, jointed above middle. Male flowers: sepals elliptic, 1–1.2 mm, margin unequally serrulate; petals oblanceolate to obovate-rectangular, ca. 4.5 × 1.5 mm; disk deeply lobed, lobe elliptic; filament slightly flat, ca. 3.5 mm; anther broadly rectangular, apex abrupt; staminodia undeveloped. Female flowers unknown. Capsule globose, 5.5–7 mm wide, valves orbicular. Seeds broadly elliptic, ca. 3.5 × 2 mm, brown or brownish. Fl. Mar–May, fr. May–Oct.

Forests, valleys, slopes; 100–2300 m. Anhui, Fujian, Taiwan, Zhejiang [Japan].

**11. *Celastrus rosthornianus*** Loesener, Bot. Jahrb. Syst. 29: 445. 1900.

短梗南蛇藤 duan geng nan she teng

Twining shrubs, to 7 m; branchlets with large and dense lenticels; axillary buds subulate or ovate, ca. 3 mm. Petiole

5–8 mm; leaf blade rectangular-elliptic to obovate-elliptic, 3.5–9(–11) × 1.5–4.5(–6.5) cm, papery, often slightly leathery during fruiting period, base cuneate or widely cuneate, margin shallowly serrulate or entire at base, apex acute or shortly acuminate; secondary veins 4–6 pairs. Inflorescences terminal and axillary, terminal inflorescences racemiform cymes, 2–4 cm, axillary ones small and short, 1- to several flowered, rachis very short; pedicels 2–6 mm, jointed at or below middle. Sepals oblong, ca. 1 mm, margin erose; petals approximately rectangular, 3–3.5 × ca. 1 mm. Disk shallowly lobed, lobe apex approximately truncate. Stamens slightly shorter than corolla; staminodes in female flowers 1–1.5 mm. Pistils 3–3.5 mm; ovary globose; styles 3-lobed, each lobe divided, subfiliform. Capsule subglobose, 5.5–8 mm wide; stipe 4–8 mm. Seeds broadly elliptic, 3–4 × 2–3 mm. Fl. Apr–May, fr. Aug–Oct.

• Dense forests, forest margins, thickets, slopes, roadsides; 500–1800 m, sometimes to 3100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, S Shaanxi, Shanxi, Sichuan, Yunnan, Zhejiang.

The root bark of this species is used as medicine to cure tumors and injuries caused by snakes, while the bark and leaves are used as a pesticide.

- 1a. Leaf blade small, rectangular-elliptic to narrowly rectangular-elliptic, rarely obovate-elliptic, 3.5–9(–11) × 1.5–4.5(–6.5) cm ..... 11a. var. *rosthornianus*  
 1b. Leaf blade large, elliptic, broadly elliptic, or rectangular-elliptic, 5–11 × 3–6.5 cm ..... 11b. var. *loeseneri*

**11a. *Celastrus rosthornianus* var. *rosthornianus***

短梗南蛇藤(原变种) duan geng nan she teng (yuan bian zhong)

*Celastrus reticulatus* Chen H. Wang.

Leaf blade small, rectangular-elliptic to narrowly rectangular-elliptic, rarely obovate-elliptic, 3.5–9(–11) × 1.5–4.5(–6.5) cm.

• Forest margins, thickets, slopes, roadsides; 500–1800 m, sometimes to 3100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, Yunnan, Zhejiang.

**11b. *Celastrus rosthornianus* var. *loeseneri*** (Rehder & E. H. Wilson) C. Y. Wu, Fl. Tsinling. 1(3): 213. 1981.

宽叶短梗南蛇藤 kuan ye duan geng nan she teng

*Celastrus loeseneri* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 350. 1915.

Leaf blade large, elliptic, broadly elliptic, or rectangular-elliptic, 5–11 × 3–6.5 cm, slightly thick, subleathery; veins thin, prominent on both surfaces. Fruit slightly large, infructescence stout, mainly with strumose lenticels.

• Dense forests, thickets on hills; 500–1500 m. Gansu, NW Guangxi, S Guizhou, Henan, N Hubei, Shanxi, E Sichuan.

**12. *Celastrus hookeri*** Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 197. 1904.

滇边南蛇藤 dian bian nan she teng

Twining shrubs; branchlets pubescent, glabrous later; axillary buds ovate, 2–3 mm. Petiole 7–15 mm; leaf blade oblong, broadly oblong, or oblong-elliptic, rarely orbicular, 6–12 × 4–7 cm, membranous during flowering period, papery or leathery during fruiting period, adaxial surface light brownish purple maculate, margin shallowly serrate, apex broadly cuneate or rounded. Inflorescences axillary and terminal, 3–9 cm, terminal inflorescences paniculate, with numerous flowers, axillary ones 3–5- or more flowered, tufted; pedicels 2–2.5 mm. Sepals obtuse-triangular, ca. 1.5 mm; petals oblong or rectangular-elliptic, 3–3.5 mm. Disk cupuliform, very shallowly lobed. Stamens ca. 2.5 mm; anther apically mucronate; staminodes in female flowers ca. 1.5 mm. Pistils ca. 4 mm; pistillodes in male flowers ca. 1.5 mm. Capsule approximately globose, 6–7 mm wide. Seeds elliptic, sometimes slightly curved, ca. 4 mm. Fl. May–Jun, fr. Jul–Oct.

Forests; 2500–3500 m. Xizang, NW Yunnan [Bhutan, India, Myanmar, Nepal, Pakistan].

**13. *Celastrus orbiculatus*** Thunberg in Murray, Syst. Veg., ed. 14, 237. 1784.

南蛇藤 nan she teng

*Celastrus articulatus* Thunberg; *C. articulatus* var. *pubescens* Makino; *C. jeholensis* Nakai; *C. oblongifolius* Hayata; *C. tartarinowii* Ruprecht.

Deciduous twining shrubs; branchlets glabrous, gray-brown or brown, with sparse and inconspicuous lenticels; axillary buds small, ovate to elliptic, 1–3 mm. Petiole slender, 1–2 cm; leaf blade generally broadly ovate, suborbicular, or rectangular-elliptic, 5–13 × 3–9 cm, glabrous or abaxially sparsely pubescent on veins, base broadly cuneate to obtuse-orbicular, margin serrate, apex broadly rounded, muriculate, or shortly acuminate; secondary veins 3–5 pairs. Cymes axillary, sometimes terminal, 1–3 cm, 1–7-flowered; pedicels jointed below middle or nearly to base. Male flowers: sepals obtuse-triangular; petals obovate-elliptic to rectangular, 3–4 × 2–2.5 mm; disk shallowly cupuliform, lobe shallow, apex rounded-obtuse; stamens 2–3 mm. Female flowers: corolla relatively shorter than that of male flower; disk slightly thick, carinose; staminodes very short; ovary approximately globose; styles ca. 1.5 mm; stigma deeply 3-lobed, lobe apex shallowly 2-lobed. Capsule approximately globose, 8–13 mm wide, yellow, 3-valved. Seeds elliptic, slightly flat, 4–5 × 2.5–3 mm, reddish brown; aril orange-red. Fl. May–Jun, fr. Jul–Oct.

Mixed forests, forest margins, thickets on grassy slopes; 400–2200 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea].

This is one of the most widely distributed *Celastrus* species in China. The ripe fruit is used in Chinese traditional medicine, called “wattle flower” in NE and N China. The bark is used for fine fiber, and seed oiliness is 50%. It is also widely distributed in Asia and its leaf morphology is very variable.

**14. *Celastrus flagellaris*** Ruprecht, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 15: 357. 1857.

刺苞南蛇藤 ci bao nan she teng

*Celastrus ciliidens* Miquel.

Deciduous twining shrubs; branchlets glabrous; winter buds small, triangular, apex obtuse, outer pairs of bud scales persistent and thornlike, 1.5–2.5 mm, reddish brown. Petiole slender, generally as long as 1/3–1/2 leaf blade; stipules filiform, deeply lacerate, 2–3 mm, deciduous; leaf blade broadly elliptic or broadly ovate-elliptic, somewhat obovate-elliptic, 3–6 × 2–4.5 cm, base narrowly cuneate, margin serrulate to serrate, teeth generally with minute spines, apex mucronate or very shortly acuminate; secondary veins 4 or 5 pairs, midvein sparsely and shortly pubescent or approximately glabrous. Cymes axillary, 1–5-flowered or more, rachis very short, 1–2 mm or absent; pedicels 2–5 mm, jointed below middle. Male flowers: sepals rectangular, ca. 1.8 mm; petals narrowly rectangular-obovate, 3–3.5 × 1–1.2 mm; disk shallowly cupuliform, apex approximately truncate; stamens slightly longer than corolla. Female flowers: staminodes ca. 1 mm; ovary globose. Capsule globose, 2–8 mm. Seeds approximately elliptic, ca. 3 × 2 mm, brown. Fl. Apr–May, fr. Aug–Sep.

Riverside forests, thickets, valleys, sunny slopes. Hebei, Heilongjiang, Jilin, Liaoning [Japan, Korea, Russia (Far East)].

**15. *Celastrus cuneatus*** (Rehder & E. H. Wilson) C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 117. 1999.

小南蛇藤 xiao nan she teng

*Celastrus articulatus* Thunberg var. *cuneatus* Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 350. 1915; *C. orbiculatus* Thunberg var. *cuneatus* (Rehder & E. H. Wilson) Wuzhi; *C. orbiculatus* f. *microphyllus* Loesener.

Tenuous twining shrubs; branchlets purplish brown, with sparse longitudinal-elliptic lenticels; axillary branchlets setulose; axillary buds approximately globose, 1–2 mm wide. Petiole 1–5 mm; leaf blade broadly obovate or rarely approximately orbicular, 1.5–4.5 × 1.5–4 cm, base cuneate to broadly cuneate, margin serrulate, apex widely rounded to approximately truncate, mucronate; secondary veins 2–5 pairs. Cymes axillary, 1–4-flowered, rarely terminal; rachis slender, 4–6.5 mm; pedicels 2–3 mm, jointed at or below middle. Male flowers: sepals triangular or triangular-elliptic, ca. 1.5 × 2 mm, broadest above middle part; disk cupuliform, lobe approximately curved or truncate; stamens shorter than petals; filament ca. 2.5 mm; anther approximately globular; pistillodes small, long triangular. Female flowers: perianths similar to male flowers; disk slightly longer than male flowers, lobe obvious; staminodes small, ca. 1.5 mm; pistils ampullaceous; ovary globose; styles ca. 1 mm; stigma sticklike, deeply 3-lobed, extrorse, apex flat and enlarged. Capsule globose, 6–7 mm wide. Seeds elliptic, 3.5–4 mm, slightly convex. Fl. Apr–May, fr. Jun–later.

• Slopes, thickets along roadsides; near sea level to 600 m. Hubei, E Sichuan.

**16. *Celastrus oblanceifolius*** Chen H. Wang & P. C. Tsoong, Chin. J. Bot. 1: 65. 1936.

窄叶南蛇藤 zhai ye nan she teng

*Celastrus aculeatus* Merrill var. *oblanceifolius* (Chen H. Wang & P. C. Tsoong) P. S. Hsu.

Twining shrubs; branchlets angulate, brown pubescent. Petioles 4–9 mm; leaf blade oblanceolate, rarely broadly oblanceolate, 6.5–12.5 × 1.5–3.5(–4) cm, glabrous or abaxially brown pubescent on veins, base narrowly cuneate or cuneate, margin sparse serrulate, apex narrow, acute or shortly acuminate; secondary veins 7–10 pairs. Cymes axillary or lateral, 1–3-flowered; rachis 2–5 mm, brown pubescent; pedicels 2–3 mm, with brown short hairs, jointed distally. Sepals elliptic-ovate, ca. 2 × 1 mm; petals rectangular-oblanceolate, ca. 4 × 1.5 mm, margin ciliate. Disk carnose, slightly flat, entire. Stamens as long as sepals; filament slender, papillate; anther broadly ovate, apex mucronulate. Capsule globose, 7.5–8.5 mm wide. Seeds crescentiform, ca. 5 mm. Fl. Mar–Apr, fr. Jun–Oct.

• Thickets, slopes, streamsides; 500–1000 m. Anhui, Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Zhejiang.

**17. *Celastrus homalifolius*** P. S. Hsu, *Observ. Fl. Hwangshan*. 141. 1965.

小果南蛇藤 xiao guo nan she teng

Evergreen twining shrubs; branchlets with russet short hairs. Petiole 1.5–2.5 cm; leaf blade elliptic, narrowly elliptic, rectangular-elliptic, or obovate, 7–14 × 3–8 cm, papery to thickly papery, abaxially sparsely hirsute on veins, adaxially glabrous, base cuneate or widely cuneate, rarely obtuse-cuneate, margin with thick obtuse teeth, apex shortly acuminate; secondary veins 5–7 pairs, obviously prominent on lower surface. Cymes mainly lateral; rachis 3–6 mm, with russet short hairs; pedicels 2–4 mm, brown hispidulous, jointed above middle. Sepals narrowly triangular, up to 2.5 mm, margin approximately entire; petals rectangular to rectangular-elliptic, ca. 2.5 mm, apex erose. Disk shallowly cupuliform, 5-lobed, lobes broadly orbicular. Staminodia in female flowers ca. 1.5 mm. Pistils ampullaceous; ovary globose; styles slender, 2–3 mm. Fruits tufted at base of branchlets. Capsule small, globose, 4–5 mm wide, valves approximately orbicular, inner side brown maculate. Seeds crescentiform, ca. 2.5 × 1.5 mm, purplish or blackish brown; aril yellowish brown. Fl. Apr–May, fr. Aug–Oct.

• Sparse forests, thickets; 1400–2300 m. Sichuan, N Yunnan.

**18. *Celastrus aculeatus*** Merrill, *Lingnan Sci. J.* 13: 37. 1934.

过山枫 guo shan feng

Twining shrubs; branchlets with brown short hairs, glabrescent later; winter buds conical, 2–3 mm, bud scales persistent, somewhat spinelike. Petioles 1–1.8 cm; leaf blade mainly elliptic or rectangular, 5–10 × 3–6 cm, glabrous, sometimes pubescent on veins, base widely cuneate, rarely approximately orbicular, margin sparsely serrulate on apical half, apex acuminate or narrowly acute; secondary veins mainly 5 pairs. Cymes short, axillary or lateral, generally 3-flowered; rachis 2–5 mm, brown pubescent; pedicels 2–3 mm, brown pubescent, jointed distally. Sepals triangular-ovate, up to 2.5 mm; petals rectangular-lanceolate, ca. 4 mm. Disk slightly carnose, entire. Filament slender, 3–4 mm, papillate; staminodia in female flowers only ca. 1.5 mm. Ovary globose. Capsule approximately globose, 7–8 mm wide, persistent sepals obviously enlarged. Seeds crescentiform or semicircular, ca. 5 mm, with tubercles. Fl. Mar–Apr, fr. Aug–Sep.

• Sparse forests, thickets, mountainous regions, roadsides; 100–1000 m. Fujian, Guangdong, Guangxi, Jiangxi, Yunnan, Zhejiang.

**19. *Celastrus hirsutus*** H. F. Comber, *Notes Roy. Bot. Gard. Edinburgh* 18: 233. 1934.

硬毛南蛇藤 ying mao nan she teng

*Ilex leiboensis* Z. M. Tan; *I. serrata* Thunberg subsp. *cathayensis* T. R. Dudley.

Twining shrubs; branchlets densely brown hirsute and glabrate later; winter buds large, ovate, 3–5 × 2.5–3.5 mm, bud scales persistent. Petiole 1.5–3 cm, brown hirsute; leaf blade ovate, broadly obovate, or obovate-elliptic, 7–14 × 4–10 cm, thickly membranous during flowering period, papery to thickly papery during fruiting period, brown hirsute-pubescent, densely so on young leaves and veins, base widely cuneate or approximately orbicular, margin with obtuse teeth, apex widely rounded, mucronate; secondary veins 6–8 pairs, prominent on both surfaces, closely parallel and curved. Cymes axillary or lateral at twig base, 7–14-flowered; rachis 5–10 mm, pubescent; pedicels 2–4 mm, pubescent, jointed near base. Sepals obtusely rounded-triangular, ca. 1.5 mm, margin sparsely ciliate; petals ovate-elliptic, ca. 4 × 2.8 mm, midribs of outer petals papillate. Disk slightly carnose, flat or slightly concave in center, lobes obvious and broad. Male flowers: filament subulate, ca. 3 mm, papillate on lower part; anther broadly ovate; pistillodes undeveloped. Female flowers: pistils 3–5 mm; styles short and thick, columnar; stigma obviously 3-lobed, ca. 1 mm; staminodia small. Capsule globose, 7–8 mm wide. Seeds crescentiform, ca. 5 × 1.5–2 mm. Fl. Mar–May, fr. Aug–Oct.

• Valleys, wetlands; 1400–2500 m. Sichuan, Yunnan.

**20. *Celastrus kusanoi*** Hayata, *J. Coll. Sci. Imp. Univ. Tokyo* 30(1): 60. 1911.

圆叶南蛇藤 yuan ye nan she teng

Deciduous and small twining shrubs; branchlets often with very short and brown setae, often glabrescent when mature; lenticels sparse and small, broadly elliptic to suborbicular. Petioles 1.5–2.8(–3.5) cm; leaf blade broadly elliptic to orbicular, 6–10 × 4–9(–10) cm, approximately membranous during fruiting, adaxially generally with brownish white short hairs at vein base, abaxially glabrous, base rounded, rarely very widely cuneate or approximately cordate, only distal margin slightly serrate, apex widely rounded and mucronate; secondary veins 3 or 4 pairs, curved, veinlets netting. Cymes axillary or terminal at top of axillary branches, small, 3–7-flowered; rachis ca. 1 cm, pubescence of very short brown setae; pedicels 2–3 mm, jointed at base, pubescence of very short setae. Sepals rectangular-triangular, apex flat and obtuse, ca. 1 mm; petals narrowly rectangular-obovate, ca. 4 mm, margin slightly erose. Disk thin, entire. Stamens ca. 3 mm, papillate-hairy on lower part of filament. Ovary approximately globose; stigma 3-lobed, extrorse. Capsule approximately globose, 7–10 mm wide, persistent sepals small and truncate; valves transversely rugose; fructiferous stipes ca. 2 cm, with very short setae. Seeds globose or subcrescentiform, 3.5–5 mm, blackish brown when ripe.

• Mountain forests; 300–2500 m. Hainan, Taiwan.

**21. *Celastrus stylosus*** Wallich in Roxburgh, Fl. Ind. 2: 401. 1824.

显柱南蛇藤 xian zhu nan she teng

Twining shrubs, 3–5 m tall; branchlets generally glabrous, rarely setaceous; winter buds small, ovate-globose, ca. 2 mm wide. Petiole 1–1.8 cm; leaf blade rectangular-elliptic, rarely rectangular-obovate, 6.5–12.5 × 3–6.5 cm, abaxially pubescent along veins, glabrous later, adaxially slightly green or light brown when dry, often membranous during flowering and leathery in fruit, base cuneate, widely cuneate to obtuse-orbicular, margin obtusely serrate, apex shortly acuminate to acute; secondary veins (4 or) 5–7 pairs. Cymes axillary and lateral, 3–7-flowered; rachis 7–20 mm; pedicels 5–7 mm, with very short yellowish white setae, jointed below middle. Sepals subovate or subelliptic, 1–2 mm, margin slightly erose; petals rectangular-obovate, 3.5–4 × ca. 2 mm, margin erose. Disk shallowly cupuliform, lobe semicircular or approximately obtuse-triangular. Stamens slightly shorter than corolla; filament glabrous or papillate proximally; staminodes in female flowers ca. 1 mm. Pistils ampullaceous, ca. 3 mm, degenerate in male flowers; stigma revolute. Capsule globose, 6.5–8 mm wide; fructiferous stipe and fruit stipe glabrous, often with elliptic lenticels. Seeds adaxially flat, slightly crescentiform, 4.5–5.5 × 1.5–2 mm. Fl. Mar–May, fr. Aug–Oct.

Forests, mountain slopes; 300–2500 m. Anhui, Chongqing, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang [Bhutan, India, Myanmar, Nepal, N Thailand].

1a. Petiole glabrous, veins of leaf blade somewhat sparsely pubescent abaxially ..... 21a. var. *stylosus*

1b. Petiole pubescent, veins of leaf blade with dense short setae ..... 21b. var. *puberulus*

**21a. *Celastrus stylosus* var. *stylosus***

显柱南蛇藤(原变种) xian zhu nan she teng (yuan bian zhong)

*Celastrus crassifolius* Chen H. Wang; *C. hypoleucus* Warburg ex Loesener f. *puberulus* Loesener; *C. stylosus* var. *angustifolius* C. Y. Cheng & T. C. Kao; *C. stylosus* subsp. *glaber* Ding Hou; *Gymnosporia neglecta* Wallich ex M. A. Lawson.

Petiole glabrous; leaf blade 6.5–12.5 × 3–6.5 cm, glabrous, somewhat sparsely pubescent along veins abaxially; secondary veins 5–7 pairs.

Forests, mountain slopes; 1000–2500 m. Anhui, Chongqing, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan [Bhutan, India, Myanmar, Nepal, N Thailand].

**21b. *Celastrus stylosus* var. *puberulus*** (P. S. Hsu) C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 121. 1999.

毛脉显柱南蛇藤 mao mai xian zhu nan she teng

*Celastrus glaucophyllus* Rehder & E. H. Wilson var. *puberulus* P. S. Hsu, Observ. Fl. Hwangshan. 141. 1965.

Petiole and veins of leaf blade densely shortly setiferous; leaf blade broadly elliptic or rectangular-elliptic, 7–14 × 4–9.5 cm; secondary veins (3 or) 4 or 5 (or 6) pairs.

• Forests in valleys; 300–1000 m. Anhui, Guangdong, Hunan, Jiangsu, Jiangxi, Zhejiang.

**3. *Celastrus* sect. *Sempervirentes*** (Maximowicz) C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 121. 1999.

独子藤组 du zi teng zu

*Celastrus* ser. *Sempervirentes* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 455. 1881.

Evergreen twining shrubs. Thyrses terminal or axillary; foliage buds at axil of branching inflorescences. Capsule ca. 3-loculed. Seed ca. 1.

About four species: S and SE Asia; four species (one endemic) in China.

**22. *Celastrus hindsii*** Bentham, Hooker's J. Bot. Kew Gard. Misc. 3: 334. 1851.

青江藤 qing jiang teng

*Celastrus cantonensis* Hance; *C. xizangensis* Y. R. Li.

Evergreen twining shrubs; branchlets terete, gray or purple, with very sparse lenticels; axial buds ovate-triangular, 1–1.5 mm. Petiole 6–10 mm; leaf blade narrowly rectangular-elliptic, or narrowly ovate-elliptic to elliptic-oblongate, 7–14 × 3–6 cm, papery or leathery, often gray-green when dry, base cuneate or rounded, margin sparsely serrate, apex acute, caudate-acuminate to acuminate; secondary veins 5–7 pairs, veinlets between secondary veins parallel, prominent. Thyrses terminal and axillary, 5–14 cm, axillary inflorescences 1–3-flowered; pedicels 4–5 mm, jointed at upper middle. Flowers lightly green; sepals approximately semicircular, imbricate, ca. 1 mm; petals

rectangular, ca. 2.5 mm, margin ciliate. Disk cupuliform, membranous, shallowly lobed, lobe triangular. Stamens inserted on margin of disk; filament subulate; anther ovate-orbicular. Pistils ampullaceous; ovary approximately globose; styles ca. 1 mm; stigma slightly 3-lobed; anther of staminodia hastate. Fruits approximately globose, 7–9 × 6.5–8.5 mm; style persistent on young fruit, up to 1.5 mm, valves slightly rugose. Seed broadly elliptic to globose, 5–8 mm; aril orange. Fl. May–Jul, fr. Jul–Oct.

Forests, thickets, mountainous regions; 300–2500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, E Xizang, Yunnan [NE India, Malaysia, Myanmar, N Vietnam].

**23. *Celastrus tonkinensis*** Pitard in Lecomte, Fl. Indo-Chine 1: 891. 1912.

皱果南蛇藤 zhou guo nan she teng

Twining shrubs, 4–5 m tall; branchlets gray-brown, lenticels absent; axillary buds triangular-ovate, ca. 2 mm. Petiole 1–1.5(–2) cm; leaf blade obovate or broadly elliptic, 7–13 × 4–6.5 cm, leathery, gray-green, margin slightly revolute, only serrulate on distal half; secondary veins 7–10 pairs, prominent on both surfaces, veinlets sparse. Inflorescences terminal or axillary. Flowers 5-merous. Fruit approximately globose or very broadly elliptic, ca. 10 mm, valves hard, lower surface transversely rugose, brown, persistent sepals thickened; stipes sturdy, 5–8 × 1–2 mm. Seed 1, broadly elliptic, ca. 7 × 5 mm. Fr. Oct.

Forests, thickets, mountainous regions; 1000–1800 m. W Guangxi, E Yunnan [N Vietnam].

**24. *Celastrus monospermus* Roxburgh, Fl. Ind. 2: 394. 1824.**

独子藤 du zi teng

*Catha benthamii* Gardner & Champion; *C. monosperma* (Roxburgh) Benth; *Celastrus benthamii* (Gardner & Champion) Rehder & E. H. Wilson; *C. championii* Benth, nom. illeg. superfl.; *Monocelastrus monospermus* (Roxburgh) F. T. Wang & T. Tang.

Evergreen twining shrubs, to 10 m tall; annotinal branchlets purplish brown; lenticels sparse, elliptic or suborbicular. Petiole 1–2 cm; leaf blade broadly rectangular-elliptic to narrowly elliptic, rarely obovate-elliptic, 5–17 × 3–7 cm, approximately leathery, glabrous, base cuneate, rarely widely cuneate, margin serrulate, apex acuminate or acute; secondary veins 5–7 pairs. Thyrses axillary, sometimes terminal; rachis 1–2.5 cm, glabrous; pedicels 1–4 mm, jointed at base, generally glabrous. Flowers yellowish green or whitish. Male flowers: sepals triangular-semiorbicular, ca. 1 mm; petals rectangular or rectangular-elliptic, ca. 2.5 × 1.8 mm, revolute during blossoming; disk carnosose, flat, shallowly 5-lobed, lobe apex approximately truncate; stamens 5, 2.5–3 mm, inserted on disk; filament subulate.

Female flowers: pistils approximately ampullaceous; styles 3-lobed, revolute; staminodes ca. 1 mm. Capsule broadly elliptic, rarely globose, 10–18 × 9–14 mm; valves elliptic, 12–20 × 8–10 mm, revolute when dry, margin crispate. Seed 1, elliptic, 10–15 × 6–9 mm, glabrous, slightly verrucose; aril purplish brown. Fl. Mar–Jun, fr. Jun–Oct.

Dense forests, thickets, slopes; 300–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Bhutan, India, Myanmar, Pakistan, Vietnam].

**25. *Celastrus virens* (F. T. Wang & T. Tang) C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 127. 1999.**

绿独子藤 lü du zi teng

*Monocelastrus virens* F. T. Wang & T. Tang, Acta Phytotax. Sin. 1: 135. 1951.

Evergreen twining shrubs; branchlets yellowish green, lenticels very few, narrowly elliptic. Petiole 7–12 mm; leaf blade oblong, rarely narrowly rectangular-elliptic, 8–13 × 3–5 cm, thickly papery, yellowish green when dry, margin sparsely serrulate; secondary veins 6–8 pairs, veinlets prominent on both surfaces. Inflorescences paniculate. Sepals broadly ovate, margin irregularly serrulate; petals rectangular, ca. 2.5 mm. Disk carnosose, shallowly discoid or flat, with 5 shallow lobes, lobe apex widely rounded. Stamens shorter than corolla, inserted on disk. Pistillodes in male flowers slightly subulate. Infructescence conical, axillary, 5–13 cm, stipes 4–6 cm. Fruit stipe 6–12 mm. Capsule broadly elliptic, yellowish green, 14–18 × 10–13 mm, valves elliptic to elliptic-ovate, 15–23 mm, leathery, straight when dry. Seed 1, elliptic, 12–17 mm; aril purplish brown. Fl. Mar, fr. Jun–Oct.

• Slopes; 800–1200 m. S Yunnan (Xishuangbanna).

**5. GYMNOSPORA (Wight & Arnott) Benth & J. D. Hooker, Gen. Pl. 1: 359, 365. 1862, nom. cons.**

裸实属 luo shi shu

Liu Quanru (刘全儒); A. Michele Funston

*Celastrus* sect. *Gymnosporia* Wight & Arnott, Prodr. Fl. Ind. Orient. 159. 1834.

Shrubs or small trees, usually erect, glabrous or pubescent; branches often thorny. Leaves alternate or fasciculate, entire or serrate, estipulate. Inflorescences axillary, fasciculate, cymose, or flowers solitary. Flowers bisexual, (4 or)5-merous. Disk fleshy, annular, (4 or)5-angled or lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary (2 or)3-locular, base confluent with disk; ovules erect, 2 per locule. Capsule obovoid or nearly globose, leathery, loculicidally dehiscent. Seeds usually 3–6, ellipsoid; aril basal to enveloping seed.

About 80 species: tropics and subtropics of both the Old and New Worlds, but mainly tropics of Africa and Asia; 11 species (seven endemic) in China.

1a. Twigs thornlike, bearing leaves and flowers, bearing needlelike thorns.

2a. Twigs and petioles pubescent with short dense hairs, gradually glabrescent; leaf blade usually 1–5 cm.

3a. Capsule 2-valved, 5–8 mm; peduncle 0.5–1 cm; flowers 3–5 mm in diam.; petiole shorter than 3 mm ... 1. *G. diversifolia*

3b. Capsule 3-valved, 1–1.2 cm; peduncle 1–2 cm; flowers 5–8 mm in diam.; petiole 3–8 mm ..... 2. *G. berberoides*

2b. Twigs and petioles glabrous; leaf blade usually 3–7(–12) cm.

4a. Leaf blade leathery, broadly obovate or broadly elliptic, rounded or orbiculate, netting veins obvious ..... 3. *G. orbiculata*

4b. Leaf blade papery or subleathery, narrowly elliptic or elliptic-lanceolate, netting veins not obvious ..... 4. *G. variabilis*

1b. Twigs without an apical thorn, bearing many thorns, rarely few thorned or unarmed.

5a. Twigs unarmed.

- 6a. Leaf blade elliptic-lanceolate or oblanceolate, 3.5–6.5 × 0.5–1.5 cm, lateral veins 6–9 pairs ..... 10. *G. tiaoloshanensis*
- 6b. Leaf blade obovate, ca. 5 × 3 cm, lateral veins 4–6 pairs ..... 11. *G. emarginata*
- 5b. Twigs thorny, thorns often axillary.
  - 7a. Ovary with 2 carpels; capsule 2-valved ..... 5. *G. esquirolii*
  - 7b. Ovary with 3 carpels; capsule 3-valved.
    - 8a. Aril saccate; cymes usually dichotomous; thorns thick ..... 8. *G. royleana*
    - 8b. Aril cupulate, only covering seed at base or not exceeding the middle; cymes usually monochasial; thorns slender.
      - 9a. Leaf blade broadly obovate, obovate, or elliptic, 1–2 cm; petiole 1–2 mm; peduncle 2–5 mm ..... 7. *G. jinyangensis*
      - 9b. Leaf blade lanceolate, narrowly elliptic, narrowly obovate, or oblanceolate, 2–8(–14) cm; petiole 2–8(–12) mm; peduncle 1–3(–4.5) cm.
        - 10a. Leaf blade lanceolate, 6.5–8 cm, subleathery; petiole 5–8 mm; peduncle 2–4.5 cm ..... 6. *G. rufa*
        - 10b. Leaf blade narrowly elliptic, narrowly obovate, or oblanceolate, 2–8(–14) cm, papery; petiole 2–7(–12) mm; peduncle 1–3 cm ..... 9. *G. graciliramula*

**1. *Gymnosporia diversifolia*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 459. 1881.

变叶裸实 bian ye luo shi

*Celastrus diversifolius* (Maximowicz) Hemsley; *Maytenus diversifolia* (Maximowicz) Ding Hou; *M. garanbiensis* C. E. Chang.

Shrubs or small trees, 1–3 m tall. Twigs spiny, pallid brown, densely covered with rust-colored punctiform short bristles, glabrescent with age. Petiole 1–3 mm; leaf blade obovate, broadly obovate, or obovate-lanceolate, 1–4.5 × 1–1.8 cm, papery, or leathery with age, base cuneate, margin crenate, apex rounded or emarginate. Cymes axillary, dichotomous; peduncle 0.4–1 cm; bracts and bracteoles shorter than ca. 1 mm. Flowers white or light yellow, 3–5 mm in diam.; sepals triangular-ovate. Ovary confluent with disk; styles absent. Capsule subobovoid, red or purple, 5–7 mm at greatest width, 4-loculed, 2-valved. Seeds ellipsoid, 3–4 mm in diam., black-brown, basally covered by aril. Fl. Jun–Sep, fr. Aug–Dec.

Sparse forests, mountain slopes, seashores, roadsides; below 100 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan [Japan (including Ryukyu Islands), Malaysia, Philippines, Thailand, Vietnam].

**2. *Gymnosporia berberoides*** W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 38. 1917.

小檗裸实 xiao bo luo shi

*Maytenus berberoides* (W. W. Smith) S. J. Pei & Y. H. Li.

Thorny shrubs, 1–2 m tall; branches sturdy, spiny, 1–5 cm, thorns terminal, sometimes axillary; twigs and petioles densely pubescent with short hairs, gradually glabrescent with age. Petiole 3–8 mm; leaf blade broadly obovate or elliptic, 1.2–5 × 1–3 cm, thickly papery or leathery, base cuneate, margin shallowly serrate or subentire, apex rounded or emarginate; lateral veins 4–7 pairs, tenuous, webbing with veinlets. Cymes axillary in spiny short branches, monochasial or first dichotomous; peduncle tenuous and long, 1–2 cm; pedicel 5–8 mm; bracts shorter than ca. 1 mm. Flowers white-green, 5–8 mm in diam.; sepals triangular-ovate or oblong-ovate; petals oblong or oblong-ovate. Filament ca. 1.5 mm. Ovary with thick and short style. Capsule subobovoid, 1–1.2 cm, 3-valved. Seeds ellipsoid, 3–4 mm in diam., basally covered by white aril. Fl. Apr–Oct, fr. Jul–Dec.

• River valleys, riversides; 300–2400 m. Sichuan, Yunnan.

**3. *Gymnosporia orbiculata*** (C. Y. Wu ex S. J. Pei & Y. H. Li) Q. R. Liu & Funston, **comb. nov.**

圆叶裸实 yuan ye luo shi

Basionym: *Maytenus orbiculata* C. Y. Wu ex S. J. Pei & Y. H. Li, Acta Bot. Yunnan. 3: 239. 1981; *M. berberoides* (W. W. Smith) S. J. Pei & Y. H. Li var. *acutissima* S. J. Pei & Y. H. Li.

Shrubs, 1–3 m tall; branches sturdy, apex spiny, short branches growing near apex. Petiole usually sturdy, 5–8 mm; leaf blade broadly obovate or broadly elliptic, rarely rounded or obcordate, 3–7 × 2–5 cm, leathery to thickly leathery, base cuneate, margin acutely serrate, apex shortly acute, rounded or emarginate; lateral veins 7–12 pairs, more obvious on abaxial surface. Cymes axillary or 2 or 3 aggregating in upper spiny short branches, 3 or 4 × branched, dichotomous or monochasial; peduncle slightly flat, 1–2 cm; branches and pedicels slightly short, 2–5 mm. Flowers white, 3–4 mm in diam.; sepals triangular or ovate-rounded; petals oblong or oblong-ovate. Capsule subobovoid, 8–10 mm, 3-valved. Fl. May–Jun, fr. Aug–Nov.

• Dry calcareous mountain slopes; 800–1500 m. Yunnan.

**4. *Gymnosporia variabilis*** (Hemsley) Loesener, Bot. Jahrb. Syst. 29: 446. 1900.

刺茶裸实 ci cha luo shi

*Celastrus variabilis* Hemsley, J. Linn. Soc., Bot. 23: 124. 1886; ?*Maytenus arborea* H. Shao; *M. variabilis* (Hemsley) C. Y. Cheng.

Shrubs, to 5 m tall; twigs spiny, glabrous; terminal thorns sturdy, axillary ones slightly tenuous. Petiole 3–6 mm; leaf blade elliptic, narrowly elliptic, or elliptic-lanceolate, 3–12 × 1–4 cm (or varying sizes), papery, base cuneate, margin crenate, apex acute or obtuse; veins and veinlets tenuous. Cymes axillary, 1–3 × dichotomous; peduncle 0.3–1.3 cm; bracteoles ca. 1 mm. Flowers light yellow, 5–6 mm in diam.; sepals ovate; petals oblong, slightly longer than stamens. Disk slightly rounded and thick. Ovary confluent with disk for ca. 1/3 of length; styles short; stigma 3-lobed. Capsule subobovoid, red or purple, 1.2–1.5 mm, 3-valved. Seeds subellipsoid, ca. 7 × 4–5 mm, brown, shiny, basally covered by light yellow shallowly cupulate aril. Fl. Jun–Oct, fr. Jul–Dec.

• Rocky mountain slopes, meadows; 100–800 m. Guangxi, Guizhou, Hubei, Sichuan, Yunnan.

*Maytenus arborea* H. Shao (Bull. Bot. Res., Harbin 20: 127. 2000 ["*arboreus*"]) was described from cultivated material in the Nanning Arboretum in Guangxi. Its affinity to *Gymnosporia variabilis* needs further study.

**5. *Gymnosporia esquirolii*** H. Léveillé, Chin. Rev. 18. 1916.

贵州裸实 *gui zhou luo shi*

*Maytenus esquirolii* (H. Léveillé) C. Y. Cheng; ?*M. mengziensis* H. Shao.

Small shrubs, 1–2 m tall; branches tenuous, black when dry, short branches spiny, 5–10 mm, thorns needlelike. Petiole 2–5 mm; leaf blade broadly elliptic or narrowly ovate, sometimes ovate-lanceolate, 2–8 × 0.5–2.5 cm, papery, slightly thick in fruit, base cuneate, margin shallowly serrate or crenate, apex shortly acute; lateral veins 5–7 pairs, webbing sparsely with veinlets, obvious on both surfaces. Cymes axillary, 1–4-flowered, monochasial; peduncle very tenuous, 0.5–1.7 cm; pedicel 3–5 mm, slightly elongate when fructiferous. Flowers white, ca. 4 mm in diam.; sepals oblong; petals narrowly ovate. Disk small. Ovary subconical; stigma slightly 2-lobed. Capsule obconical, ca. 7 mm, light reddish, usually 2-valved. Seeds reddish brown, basally covered by small aril. Fl. Jun.

• Forests, scrub, mountain slopes. S Guizhou (Luodian), Yunnan.

This species is rare in occurrence. Hong Shao (Bull. Bot. Res., Harbin 20: 126. 2000) described *Maytenus mengziensis* from Yunnan. Its affinity to *Gymnosporia esquirolii* needs further study.

**6. *Gymnosporia rufa*** (Wallich) M. A. Lawson in J. D. Hooker, Fl. Brit. India 1: 670. 1875.

淡红美登木 *dan hong mei deng mu*

*Celastrus rufus* Wallich in Roxburgh, Fl. Ind. 2: 397. 1824; *Maytenus rufa* (Wallich) Cufodontis.

Trees; branches slender, glabrous, sparsely spiny; thorns slender, 1.2–2.5 cm. Petiole 5–8 mm; leaf blade lanceolate, 6.5–8[–11] × 2–3.5 cm, subleathery, abaxially pale, adaxially green, base cuneate, margin serrate, apex acuminate; lateral veins 7–9 pairs, obvious on both surfaces. Cymes fascicled at axils, dichotomous; peduncle slender, 2–4.5 cm, with several conglomerate bracts at base, bracts reddish brown, lanceolate, 2–3 mm; pedicel tenuous, 5–8 mm when fruiting. Flowers not seen, purportedly 3–4 mm in diam. Capsule obtriangular, 0.6–1 cm, purplish, 3-valved. Seeds black. Fl. Jun.

Evergreen forests; 1700–2000 m. Xizang (Zhangmu) [Bhutan, India, Myanmar, Nepal].

**7. *Gymnosporia jinyangensis*** (C. Y. Cheng) Q. R. Liu & Funston, **comb. nov.**

金阳美登木 *jin yang mei deng mu*

Basionym: *Maytenus jinyangensis* C. Y. Cheng, J. Sichuan Univ., Nat. Sci. Ed. 1985(2): 88. 1985.

Shrubs, 0.5–1.5 m tall, spiny, glabrous; thorns slender, 1–1.8 cm; biennial branches thorny. Petiole very short, 1–2 mm;

leaf blade broadly obovate, obovate, or elliptic, 1–2 × 0.6–2.4 cm, subleathery, base subrounded, broadly cuneate or cuneate, margin crenate, apex subrounded, rarely retuse or shortly acute; lateral veins 3–5 pairs, tenuous. Cymes fascicled in short branches, ca. 3-flowered, 2–4 × branched, monochasial; peduncle slender and short, ca. 5 mm; bracts small, narrowly lanceolate, ca. 0.8 mm; pedicel slightly short, 1–2 mm. Flowers small, ca. 2 mm in diam.; sepals ovate, ca. 0.5 mm, ciliate; petals oblong-ovate, white, ca. 1.5 mm. Filament very short or absent. Ovary without style; stigma 3-lobed. Capsule reddish, obovoid, 5–8 mm, 6–9 mm in diam., 3-valved. Seeds red-brown, oblong-ellipsoid, basally covered by small aril. Fl. Jun–Aug, fr. Aug–Dec.

• Forest margins, scrub, mountain slopes; 500–1300 m. Sichuan, Yunnan.

**8. *Gymnosporia royleana*** Wallich ex M. A. Lawson, Fl. Brit. India 1: 620. 1875.

被子裸实 *bei zi luo shi*

*Maytenus royleana* (Wallich ex M. A. Lawson) Cufodontis; ?*M. yimenensis* H. Shao.

Shrubs, with very spiny straight or slightly zigzag branches; thorns sturdy, 1–2.5 cm, axillary on annual branches. Petiole 2–4 mm; leaf blade obovate or elliptic, 1.5–4 × 0.5–2 cm, thickly papery, base cuneate, margin entire or not obviously crenate, apex acute or obtuse, rarely rounded; lateral veins 5 or 6 pairs, quite tenuous. Cymes 1 to several, fascicled, 1–7-flowered; peduncle 2–5 mm when fruiting; branches and pedicels ca. 5 mm when fruiting. Petals white, oblong-ovate (flowers not seen). Capsule obtriangular, ca. 1 mm, dehiscing into 3 valves. Seeds long ellipsoid, black, ca. 6 mm; aril red, nearly covering seed. Fr. Jun.

Mountain slopes. ?Xinjiang, ?Xizang, ?Yunnan [Afghanistan, India, Kashmir, Pakistan].

Only one specimen is known from China, *Liou Tchen-Neo 5892* (PE), collected between Xinjiang and Kashmir and Pakistan.

Hong Shao (Bull. Bot. Res., Harbin 20: 126. 2000) described *Maytenus yimenensis* from Yunnan. Its affinity to *Gymnosporia royleana* needs further study.

**9. *Gymnosporia graciliramula*** (S. J. Pei & Y. H. Li) Q. R. Liu & Funston, **comb. nov.**

细梗裸实 *xi geng luo shi*

Basionym: *Maytenus graciliramula* S. J. Pei & Y. H. Li, Res. Bull. Trop. Pl. 13: 13. 1979; ?*M. guangnanensis* H. Shao; *M. longlinensis* C. Y. Cheng & W. L. Sha; *M. oligantha* C. Y. Cheng & W. L. Sha; *M. pseudoracemosa* S. J. Pei & Y. H. Li; *M. thyrsoiflora* S. J. Pei & Y. H. Li.

Shrubs, 1–2 m tall; twigs slender, with slender thorns or unarmed, old branches usually with sturdy thorns. Petiole 2–7(–12) mm; leaf blade narrowly elliptic, narrowly obovate, oblanceolate, or elliptic, 2–8(–14) × 1–4(–6) cm, papery or thickly papery, base cuneate or narrowly cuneate, margin crenate, apex acute, shortly acute, or obtuse; lateral veins tenuous, 6–9 pairs. Cymes axillary, 1–6 × branched, monochasial; pe-

duncle slender, various in length, usually 1–2 cm, up to 3 cm when fruiting; branches and pedicels slightly short, 3–5 mm, 0.5–1 cm when fruiting. Flowers small, white, 2–5 mm in diam.; sepals broadly ovate; petals oblong. Filament ca. 1 mm. Stigma 3-lobed. Capsule red-brown, subobovoid, 6–12 mm, 3-valved. Seeds oblong, 5–7 mm, basally covered by white aril. Fl. Jun–Sep, fr. Sep–Dec.

• Dry calcareous mountain slopes; 800–1500 m. Guangxi, Yunnan.

*Maytenus guangnanensis* H. Shao (Bull. Bot. Res., Harbin 20: 125. 2000) is described from Yunnan. Its affinity to *Gymnosporia gracilirmula* needs further study.

**10. *Gymnosporia tiaoloshanensis*** Chun & F. C. How, Acta Phytotax. Sin. 7: 52. 1958.

吊罗裸实 diao luo luo shi

*Maytenus tiaoloshanensis* (Chun & F. C. How) C. Y. Cheng.

Small shrubs, erect when young, vinelike with age, 1–2 m tall; thorns not seen. Petiole 2–5 mm; leaf blade elliptic-lanceolate or oblanceolate, 3.5–6.5 × 0.5–1.5 cm, thickly papery or slightly leathery, base cuneate, margin serrate, apex obtuse; lateral veins 6–9 pairs, weakly webbed with veinlets, tenuous and obvious. Cymes axillary, long and slender, 1 or 2 × dichotomously branched or 3–5 × monochasially branched; peduncle very tenuous, 0.5–1 cm; pedicel 3–5 mm, both slightly elongate when fruiting; bracts and bractlets triangular-lanceolate, ca. 1 mm. Flowers white, 2–2.5 mm in diam.; sepals semi-

orbicular; petals oblong. Disk thick, cupulate. Ovary subglobose; style absent; stigma slightly 2-lobed. Capsule obcordate, 5–8 mm, white, usually 2-valved. Aril small, covering seed at base. Fl. and fr. Dec–Feb.

• Sparse or dense forests, mountain valleys, riversides, roadsides. Hainan.

**11. *Gymnosporia emarginata*** (Willdenow) Thwaites, Enum. Pl. Zeyl. 409. 1864.

台湾裸实 tai wan luo shi

*Celastrus emarginatus* Willdenow, Sp. Pl. 1: 1128. 1798; *Catha emarginata* (Willdenow) G. Don; *Gymnosporia trilocularis* Hayata; *Maytenus emarginata* (Willdenow) Ding Hou.

Small shrubs, 1–3 m tall; branches gray-brown, shallowly longitudinally fluted, unarmed. Petiole sturdy, 3–5 mm; leaf blade obovate, 3.5–5 × 1.7–3.3 cm, leathery, base cuneate, margin remotely crenate, sometimes glandular spotted in sinus of teeth, apex rounded or subtruncate; lateral veins 4–6 pairs, quite tenuous. Cymes axillary, 1 or 2 × branched; peduncle 1–1.5 cm. Flowers white; calyx lobes deltoid; petals obovate-oblong or oblong, entire, obtuse. Stamens inserted abaxially on disk margin; anther broadly ovoid. Ovary 3-celled; style very short; stigma 3. Capsule subobovoid, trilocular, 7–8 mm in diam., dehiscent into 3 broadly rounded valves, ca. 5 mm. Seeds ellipsoid, red, ca. 3 mm, with small aril at base.

Thickets along seashores, open areas. Taiwan [Sri Lanka; Australia].

## 6. MAYTENUS Molina, Sag. Stor. Nat. Chili, 177, 349. 1782.

美登木属 mei deng mu shu

Liu Quanru (刘全儒); A. Michele Funston

Shrubs or small trees, usually erect, rarely viny or climbing, glabrous, rarely pubescent, branches often inermous. Leaves alternate, often disitichous, coriaceous, serrate, petiolate; stipules small, caducous. Inflorescences axillary, fasciculate, cymose, rarely racemose, or flowers solitary. Flowers white-green, bisexual, 5-merous. Disk fleshy, annular, undulate or 5-lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary usually 2-locular, rarely 3- or 4-locular, base confluent with disk; ovules erect, often 1 per locule. Capsule obovoid or ellipsoid, leathery, loculicidally dehiscent. Seeds 1–4, ellipsoid; aril basal to enveloping seed.

About 220 species: tropics and subtropics of America, temperate Australasia; six species (five endemic) in China.

- 1a. Capsule globose or subglobose, inflated; cymes terminal ..... 1. *M. inflata*
- 1b. Capsule obovoid or triangular-globose, not inflated; cymes usually axillary.
  - 2a. Cymes solitary; peduncle longer than 1 cm ..... 2. *M. austroyunnanensis*
  - 2b. Cymes several, fascicled; peduncle absent or very short, 2–5 mm.
    - 3a. Capsule 2-valved; cymes often 4–6-fascicled; peduncles, branches, and pedicels tenuous; peduncle 2–5 mm ..... 3. *M. hookeri*
    - 3b. Capsule 3-valved; cymes numerous, densely fascicled; peduncles, branches, and pedicels slightly sturdy; peduncle very short or absent.
      - 4a. Leaf blade elliptic or ovate-elliptic; peduncle very short; each cyme 2–4 × branched; thorns erect ..... 4. *M. guangxiensis*
      - 4b. Leaf blade broadly elliptic or obovate; peduncle usually absent; each cyme 2 or 3 × branched; thorns somewhat decurved.
        - 5a. Vinelike shrubs; flowers growing on old branches; thorns decurved, hooked; netting veins obvious ..... 5. *M. hainanensis*
        - 5b. Shrubs; flowers growing on annual or biennial branches; thorns slightly decurved; netting veins not obvious ..... 6. *M. confertiflora*

**1. *Maytenus inflata*** S. J. Pei & Y. H. Li, Res. Bull. Trop. Pl. 13: 14. 1979.

胀果美登木 zhang guo mei deng mu

Shrubs, 3–4 m tall; branches cinereous or cinereous-brown. Leaf blade elliptic or elliptic-lanceolate, 7–14 × 3–7 cm, membranous, base cuneate or narrowly cuneate, margin crenate, apex acuminate; lateral veins 8–13 pairs, webbing with veinlets, obvious on both surfaces. Cymes terminal, dichotomous or trichotomous; fructiferous cymes ca. 4 cm; peduncles and pedicels nearly equal in length. Capsule subglobose, ca. 1.5 cm in diam., inflated, valves thinly leathery. Fr. Dec.

- Mountain slopes; ca. 1200 m. Yunnan.

**2. *Maytenus austroyunnanensis*** S. J. Pei & Y. H. Li, Res. Bull. Trop. Pl. 13: 14. 1979.

滇南美登木 dian nan mei deng mu

*Maytenus diversicymosa* S. J. Pei & Y. H. Li; *M. pachycarpa* S. J. Pei & Y. H. Li; *M. shuangjiangensis* S. J. Pei & Y. H. Li.

Shrubs, 1–3 m tall; twigs usually unarmed, old branches typically thorny, thorns needlelike or slightly sturdy, erect or somewhat decurved. Petiole 5–7 mm; leaf blade obovate-elliptic, elliptic, or oblong-lanceolate, 7–12 × 4–5.5 cm, subleathery or leathery, base cuneate or narrowly cuneate, margin serrate or obtusely serrate, apex acute or obtuse, or with small mucro; lateral veins 7–13 pairs, veinlets not obvious. Cymes usually 2 or 3 × dichotomously branched, 1–3-flowered; peduncle sturdy, rarely slender, usually 1–2 cm; pedicel slender 4–6 mm, slightly elongate when fruiting. Flowers white, 5–8 mm in diam.; sepals broadly ovate; petals oblong-ovate. Capsule obovoid, ca. 1.2 cm, 3-valved. Seeds red-brown; aril white, yellowish when dry. Fl. May–Sep, fr. Sep–Dec.

- Mountain slopes, riverside scrub, roadsides; 500–1100 m. Yunnan.

**3. *Maytenus hookeri*** Loesener in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 20(b): 140. 1942.

美登木 mei deng mu

*Gymnosporia acuminata* J. D. Hooker ex M. A. Lawson, Fl. Brit. India 1: 619. 1875, not *Maytenus acuminata* (Linnaeus) Loesener (1942); *Maytenus hookeri* var. *longiradiata* S. J. Pei & Y. H. Li.

Shrubs, 1–4 m tall; twigs slender, sometimes trailing, sparsely thorny or unarmed, older branches typically thorny. Petiole 5–12 mm; leaf blade elliptic or oblong-ovate, 8–20 × 3.5–8 cm, papery, or thinly papery, base cuneate or broadly cuneate, margin crenate, apex acuminate; lateral veins tenuous, 5–8 pairs. Cymes 1–6, fascicled, each cyme 2–4(or 5) × monochasially branched or once dichotomously branched; peduncle slender, various in length, 2–5(–10) mm, sometimes absent; pedicel slender, 3–5 mm, 1–1.2 cm when fruiting. Flowers small, white-green, 3–5 mm in diam. Filament ca. 2 mm. Ovary 2-celled; stigma 2-lobed. Capsule obovoid, flat, 0.6–1.2 cm, usually 2-valved. Seeds oblong-ovate; aril white, yellowish when dry. Fl. Dec–Jun, fr. Jun–Nov.

- Sparse forests, mountain slopes, mountain valleys; 600–1200 m. Yunnan [Bhutan, India (Darjeeling)].

This species is used for medicinal purposes.

**4. *Maytenus guangxiensis*** C. Y. Cheng & W. L. Sha, Acta Phytotax. Sin. 19: 232. 1981.

广西美登木 guang xi mei deng mu

Shrubs, to 3 m tall; twigs thorny, thorns sturdy. Petiole 5–13 mm; leaf blade elliptic or ovate-elliptic, 6.5–21 × 3.5–10 cm, thickly papery, base broadly cuneate or subrounded, margin crenate, apex acute or obtuse; lateral veins tenuous, 8 or 9 pairs. Cymes fascicled, 2–4 × branched, 7–25-flowered; peduncle short, branches ca. 1 cm; pedicel 3–8 mm; bracts and bractlets small, broadly ovate, ca. 1 mm. Flowers white, 6–8 mm in diam.; sepals ovate-rounded, ciliate; petals oblong, erose. Disk thick. Filament ca. 2.5 mm. Ovary with obvious style; stigma 3-lobed. Capsule purple-brown, obovoid, 1.4–1.8 × 1–1.2 cm, 3-valved. Seeds red-brown, elliptic or ovate-elliptic, 6–8 × ca. 5 mm, covered by white aril at base. Fl. Nov–Dec.

- Dry calcareous mountain slopes, scrub. Guangxi.

The leaves of this species are used medicinally.

**5. *Maytenus hainanensis*** (Merrill & Chun) C. Y. Cheng in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 146. 1999.

海南美登木 hai nan mei deng mu

*Gymnosporia hainanensis* Merrill & Chun, Sunyatsenia 2: 267. 1935.

Shrubs, inclined, or vinelike with age, old branches thorny, thorns sturdy, decurved, hooked. Petiole sturdy, longer than ca. 1 mm; leaf blade oblong-obovate, 10–16 × 4–9 cm, leathery, base narrowly cuneate, margin nearly entire or repand-serrate, apex shortly acuminate. Flowers not seen. Fructiferous cymes fascicled, 2 or 3 × branched; peduncle nearly absent, branches sturdy, ca. 1 cm; pedicel stout, ca. 1 × 1.5 mm. Capsule triangular-globose, ca. 1.5 × 1.8 cm, 3-valved, valves rigid and thick, obviously reticulate. Seeds obovate, ca. 5 mm, red-brown, covered by orange aril at base. Fr. May.

- Sparse forests. Hainan.

**6. *Maytenus confertiflora*** J. Y. Luo & X. X. Chen, Acta Phytotax. Sin. 19: 233. 1981.

密花美登木 mi hua mei deng mu

Shrubs, to 4 m tall; twigs thorny, thorns sturdy, erect or sometimes slightly decurved. Petiole 6–10 mm; leaf blade broadly elliptic or obovate, 11–24 × 3–9 cm, papery, base cuneate, margin crenate, apex shortly acuminate; lateral veins tenuous, 9–13 pairs. Cymes numerous, fascicled at axils, ca. 60-flowered, subglobose, 1–1.5 cm; peduncle very short or absent; branches and pedicel tenuous, 4–6 mm; bracts and bractlets small, margin fimbriate. Flowers small, white, 8–10 mm in diam.; sepals triangular-ovate, purplish; petals oblong, ca. 4 × 2 mm. Filament ca. 2 mm. Stigma 3-lobed. Capsule purplish brown, obovoid, 1–1.5 cm, 3-valved. Seeds oblong, covered by white aril at base. Fl. Nov–Dec.

- Dry calcareous mountain slopes and jungles. Guangxi.

The leaves of this species are used medicinally.

## 7. BHESA Buchanan-Hamilton ex Arnott, Edinburgh New Philos. J. 16: 315. 1834.

膝柄木属 xi bing mu shu

Ma Jinshuang (马金双); A. Michele Funston

Evergreen trees with buttressed trunks, glabrous. Leaves alternate, entire, lateral veins parallel; petiole geniculate; stipules ovate or lanceolate, membranous, stipular scar conspicuous. Inflorescences axillary, cymose, paniculate, or racemose. Flowers bisexual, 5-merous. Disk fleshy, cupular to plate-form, 5-lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary 2-locular, glabrous or apically pubescent; ovules erect, 2 per locule. Capsule 2-valved or fusiform, leathery, loculicidally dehiscent. Seeds 1 or 2, oblong; aril basal or enveloping seed.

Five species: tropical Asia; one species in China.

**1. Bhesa robusta** (Roxburgh) Ding Hou, Blumea, Suppl. 4: 152. 1958.

膝柄木 xi bing mu

*Celastrus robustus* Roxburgh, Fl. Ind. 2: 395. 1824; *Kurrimia robusta* (Roxburgh) Kurz; *K. sinica* Hung T. Chang & S. Ye Liang.

Trees, 10(–40) m tall; twigs thick and strong, usually purple-brown, rough and coarse on surface, often with large leaves and bud scars; bark rather rough, brown. Leaves alternate, sometimes subopposite on young twigs; petiole cylindric, 2–3 cm; leaf blade oblong-elliptic or narrowly ovate, 11–20 × 3.5–6 cm, subleathery, glossy, base often rounded or broadly attenuate, sometimes subcuneate or slightly cordate, margin entire, apex acuminate or acute; main vein and lateral veins prominent abaxially, lateral veins 14–18 pairs, becoming dense and netted dis-

tally. Cymes 3–5-branched, many flowered; peduncle short or nearly absent; pedicel short. Flowers small, yellowish green; sepals linear-lanceolate, ca. 1.5 mm, narrowly acuminate at apex; petals narrowly obovate or oblong-lanceolate, ca. 2 mm, subrounded at apex. Filament ca. 2 mm. Ovary compressed globose, base surrounded by disk; styles 2, thick and large, basally with tufted hairs; stigma small. Capsule narrow and long ovoid, ca. 3 × 1–1.2 cm, steeply tapering to apex, with 2 vertical grooves. Seeds 1, elliptic-ovoid, ca. 1.5 cm, brown or brown-red, glossy; aril covering most of seed, white or brown.

Lowland forests; ca. 100 m. SE Guangxi (Hepu) [Bangladesh, ?Bhutan, Cambodia, E India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

According to FRPS (45(3): 147, 149. 1999), there exists only one tree of *Bhesa robusta* in Hepu, SE Guangxi.

## 8. CATHA Forsskål ex Scopoli, Intr. Hist. Nat. 228. 1777.

巧茶属 qiao cha shu

Ma Jinshuang (马金双); A. Michele Funston

Shrubs, glabrous. Leaves opposite on mature branches and alternate on juvenile branches, obtusely serrate. Inflorescences axillary, cymose. Flowers bisexual, 5-merous. Disk thin, cupuliform, weakly 5-lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary 3-locular; ovules erect, 2 per locule. Capsule cylindric, bony, loculicidally dehiscent. Seeds 1–3, with membranous, basal wing.

One species: E Africa, cultivated in N Africa, Arabian peninsula, and tropical Asia.

The leaves contain cathinone, a natural amphetamine, and are commonly chewed for the pharmaceutical effects.

**1. Catha edulis** (Vahl) Endlicher, Enchir. Bot. 575. 1841.

巧茶 qiao cha

*Celastrus edulis* Vahl, Symb. Bot. 1: 21. 1790.

Evergreen shrubs, 1–5 m tall; young branches with white, fine lenticels. Petiole 3–8 mm; leaf blade elliptic or narrowly elliptic, 4–7 × 2–4 cm, leathery, base narrowly attenuate, slightly decurrent, margin obtusely serrate, apex obtusely shortly acuminate. Cymes single, small, 1.5–2 × as wide; peduncle 5–10 mm, 2–4-branched, branches short, less than 3 mm; pedicel 1–3 mm, up to 5 mm in fruit. Flowers 3–5 mm in diam.; sepals 5,

triangular-ovate, ca. 1 mm; petals 5, white, narrowly ovate or narrowly oblong. Stamens 5, filamentous, shorter than corolla. Ovary free, surrounded by disk; stigma 3-lobed. Capsule orange-red, cylindric, ca. 8 × 3–4 mm, dehiscent from above, loculicidally in 3 valves, usually only 1 seed maturing per valve. Seeds black-brown, narrowly ovoid, 3–4 mm, with membranous basal wing.

Cultivated. Guangxi (Nanning), Hainan (Xinglong), S Yunnan (Xishuangbanna) [native to E African mountains].

The name *Catha edulis* was not validly published by Forsskål (Fl. Aegypt.-Arab. cvii, 63. 1775); see Art. 46, Ex. 22 of the *Vienna Code*.

## 9. MICROTROPIS Wallich ex Meisner, Pl. Vasc. Gen. 1: 68; 2: 49. 1837, nom. cons., not E. Meyer (1836).

假卫矛属 jia wei mao shu

Zhang Zhixiang (张志翔); A. Michele Funston

*Chingithamnus* Handel-Mazzetti; *Otherodendron* Makino; *Paracelastrus* Miquel.

Small trees or shrubs, evergreen or deciduous, glabrous, rarely pubescent; bark gray-brown; branchlets terete to somewhat quadrangular. Leaves opposite, entire, often revolute, estipulate. Inflorescences axillary, extra-axillary, or terminal, cymose, fascicled, or thyrsoid. Flowers bisexual, rarely unisexual, dioecious, 5-merous (occasionally 4-6-merous); sepals persistent in fruit, slightly enlarged; petals white or yellowish white. Disk shallowly calathiform to annular or absent, intrastaminal; anthers longitudinally dehiscent, introrse, rarely extrorse. Ovary 2- or 3-locular; ovules erect, 2 per locule. Capsule ellipsoid, leathery, not enclosed in or sitting on fleshy perianth parts, 1-locular, laterally split along one side. Seed 1, ovoid, furrowed, coat often slightly fleshy and aril-like.

More than 60 species: tropical and subtropical zones of Africa, America, and E and SE Asia; 27 species (20 endemic) in China.

This genus is divided into three sections: *Microtropis* sect. *Cymosopaniculatae*, *M.* sect. *Remotiflorae*, and *M.* sect. *Microtropis*.

- 1a. Inflorescences generally with prolonged rachis (*M.* sect. *Cymosopaniculatae*).
- 2a. Main peduncle very long, 14–18 cm; peduncle, rachis, and branches stout and slightly flat ..... 1. *M. thyrsoiflora*
- 2b. Main peduncle short, less than ca. 4 mm; peduncle, rachis, and branches terete.
- 3a. Leaf blade narrowly ovate, narrowly ovate-elliptic, or ovate-lanceolate, 4.5–9 × 1.5–3.5 cm; peduncle 2–3 mm ..... 2. *M. semipaniculata*
- 3b. Leaf blade oblong-elliptic to oblong, 19–24 × 5.5–6.5 cm; peduncle 3–3.4 mm ..... 3. *M. malipoensis*
- 1b. Inflorescences without prolonged rachis.
- 4a. Inflorescences dichasial; peduncle more than 1 cm; flowers loosely aggregated (*M.* sect. *Remotiflorae*).
- 5a. Flowers 4- or 6-merous.
- 6a. Inflorescences 3- or 4-branched; flower buds pyramidal; flowers 4-merous ..... 12. *M. pyramidalis*
- 6b. Inflorescences 1- or 2-branched; flower buds subglobose; sepals 4; petals and stamens 6.
- 7a. Leaf blade 4–7.5 × 1.5–3 cm; inflorescences 3-flowered ..... 13. *M. hexandra*
- 7b. Leaf blade 4–15 × 3–5 cm; inflorescences 3–7-flowered ..... 14. *M. henryi*
- 5b. Flowers 5-merous.
- 8a. Inflorescences 2–4-branched; peduncle 1–3 cm; flowers more than 7 per inflorescence (*M. macrophylla*: inflorescences 1- or 2-branched, but peduncle 1.5–2 cm).
- 9a. Leaf blade small, 4.5–8 cm, leathery, obelliptic to ovate-elliptic, apex obtuse or obtusely acute ..... 4. *M. japonica*
- 9b. Leaf blade large, 6.5–15 cm, papery or nearly leathery, apex acuminate, acute, or slightly caudate.
- 10a. Leaf blade apex narrowly caudate; secondary veins only 3–5 pairs ..... 5. *M. macrophylla*
- 10b. Leaf blade apex acuminate or acute; secondary veins 8–13 pairs.
- 11a. Leaf blade narrowly elliptic, small, 6.5–13 × 2–4.5 cm; secondary veins 9–13 pairs, oblique, straight; capsule ca. 5 cm ..... 6. *M. petelotii*
- 11b. Leaf blade broadly elliptic, large, 10–15 × 5–7 cm; secondary veins 8–10 pairs; capsule up to 2 cm ..... 7. *M. fallax*
- 8b. Inflorescences 1- or 2-branched; peduncle ca. 1 cm; flowers less than 7 per inflorescence.
- 12a. Leaf blade narrow, length 4–5 × width, rectangular-lanceolate or broadly oblanceolate; inflorescences ca. 3-flowered ..... 11. *M. triflora*
- 12b. Leaf blade wide, length less than 3 × width, rectangular or elliptic, rarely broadly ovate; inflorescences 3–7- or more flowered.
- 13a. Branchlets tetragonal; leaf blade 8–13 cm ..... 10. *M. tetragona*
- 13b. Branchlets terete, or becoming so at maturity; leaf blade less than 9 cm.
- 14a. Leaf blade 3.5–7 × 1.5–3.5 cm, apex caudate, secondary veins 4–7 pairs; pedicel ca. 1.5 mm ..... 8. *M. submembranacea*
- 14b. Leaf blade 4–9 × 2–4 cm, apex acuminate, secondary veins 11 or 12 pairs; pedicel ± absent ..... 9. *M. pallens*
- 4b. Inflorescences conferti-dichasial; peduncle less than 1 cm (except *M. gracilipes*: peduncle 1–2.5 cm); flowers subsessile or sessile, dense (*M.* sect. *Microtropis*).
- 15a. Peduncle long, 1–2.5 cm; branchlets, petioles, and peduncles often with sparse short hairs ..... 15. *M. gracilipes*
- 15b. Peduncle absent, very short, or up to 1 cm, generally glabrous.
- 16a. Leaf blade carnose, irregularly verrucose when dry, rarely papery and without warts when dry.
- 17a. Leaf blade thickly papery, small, 6–11 cm, secondary veins obvious; inflorescences 2–7-flowered.
- 18a. Secondary veins 8–11 pairs, oblique, straight; petiole 3–5 mm; flowers 5-merous, inflorescences generally 2-flowered ..... 23. *M. biflora*
- 18b. Secondary veins 5–8 pairs, curved; petiole 5–15 mm; flowers 4- or 5-merous, inflorescences 3–7-flowered ..... 24. *M. oligantha*
- 17b. Leaf blade carnose, slightly fleshy, large, 7–18 cm, secondary veins not obvious; inflorescences 5–20-flowered.
- 19a. Leaf blade ovate, base broadly cuneate, apex narrowly acute; inflorescences 5-flowered ..... 25. *M. osmanthoides*
- 19b. Leaf blade obovate, rectangular, rectangular-elliptic, or broadly oblanceolate; inflorescences more than 10-flowered.

- 20a. Branchlets brownish; leaf blade ovate, obovate, or rhombic, apex obtuse; petiole 4–6 mm ..... 26. *M. wui*  
 20b. Branchlets blackish purple; leaf blade rectangular, elliptic, or broadly oblanceolate, apex acute  
 or shortly acuminate; petiole 8–15 mm ..... 27. *M. obscurinervia*  
 16b. Leaf blade papery or slightly leathery, not carnosely, glabrous when dry.  
 21a. Fruit globose; secondary veins 3–5 pairs ..... 16. *M. sphaerocarpa*  
 21b. Fruits elongate; secondary veins 4–11 pairs.  
 22a. Peduncle 5–10 mm; flowers usually 4-merous, rarely 5-merous ..... 17. *M. yunnanensis*  
 22b. Peduncle short, 2–5 mm; flowers 5-merous (*M. fokiensis* 4- or 5-merous).  
 23a. Leaves obovate, oblanceolate, rarely rhombic-elliptic; flowers 4- or 5-merous ..... 18. *M. fokiensis*  
 23b. Leaves elliptic, rectangular, or rectangular-elliptic; flowers 5-merous.  
 24a. Leaves small, 3–10 × 1–4 cm, apex acute or shortly acuminate; petiole short, 3–7 mm.  
 25a. Leaves coriaceous, rhombic-elliptic or narrowly ovate-elliptic; capsule ca. 1.5 cm ..... 19. *M. paucinervia*  
 25b. Leaves thickly papery, rectangular-elliptic or narrowly ovate-elliptic; capsule ca. 2 cm ..... 20. *M. reticulata*  
 24b. Leaves large, 5–19 × 2–11 cm, apex acuminate, base narrowly cuneate; petiole long,  
 5–15 mm.  
 26a. Secondary veins 7–11 pairs, straight; leaves abaxially brownish when dry; inflorescences  
 3–7-flowered; capsule smooth without any warts ..... 21. *M. obliquinervia*  
 26b. Secondary veins 5–8 pairs, slender and curved; leaves abaxially gray-brown when dry;  
 inflorescences with 7–15 flowers; capsule surface with small warts ..... 22. *M. discolor*

**1. *Microtropis* sect. *Cymosopaniculatae*** (Merrill & F. L. Freeman) C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 153. 1999.

聚伞圆锥组 *ju san yuan zhui zu*

*Microtropis* ser. *Cymosopaniculatae* Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 304. 1940.

Inflorescences generally with prolonged rachises, thyrses arranged in dichasia, branching peduncles long and obvious, inflorescence loose. Flowers 5-merous.

About ten species; mainly in SE Asia; three species (all endemic) in China.

**1. *Microtropis thyrsoflora*** C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 26: 310. 1988.

大序假卫矛 *da xu jia wei mao*

Shrubs or small trees, 2–8 m tall; branchlets stout, internodes short, dark purplish brown. Petiole thick, 1–1.2 cm, flat up to apex; leaf blade rectangular or rectangular-elliptic, rarely obovate-elliptic, 7–11 × 3–5 cm, leathery, abaxially pale green, adaxially dark green (dark gray when dry), base broadly cuneate or decurrent, apex acute or shortly acuminate; midvein thick, obviously prominent on both surfaces, secondary veins 6–8 pairs, anastomosing at margin. Thyrses large, generally on branched axis, 8–9 × 7–8 cm, generally of 5 cymose branches, each branch stout and slightly flat; peduncle 14–18 mm, flat; rachis 10–13 mm; secondary peduncle up to 30 mm, third peduncle 10–12 mm, fourth peduncle 8–10 mm, fifth peduncle 3–5 mm; each peduncle apically with 2 triangular bracts, bracts ca. 2.5 mm; pedicels ca. 1 mm, flat, or absent; floral buds slightly globose, 2.5–3 mm wide. Flowers 5-merous; sepals fleshy, approximately leathery, nephroid; petals elliptic. Disk annular. Stamens with short filament; anther rectangular. Ovary broadly subulate; style short and thick. Capsule elliptic or obovate-elliptic, ca. 18 × 7 mm, persistent sepals slightly enlarged.

• Thick forests; ca. 2300 m. Guangxi.

**2. *Microtropis semipaniculata*** C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 26: 310. 1988.

复序假卫矛 *fu xu jia wei mao*

Small trees to shrubs; branchlets slightly tetragonal. Petiole 6–9 mm; leaf blade narrowly ovate, ovate-elliptic, or ovate-lanceolate, 4.5–9 × 1.5–3.5 cm, leathery, base widely cuneate or nearly rounded, margin slightly revolute, apex narrowly acute; secondary veins 4–6 pairs, thin. Thyrses axillary or on branched axis, broadly spreading; rachis present or absent; peduncle short, only 2–5 mm if rachis present, rachis 5–15 mm, secondary peduncle 1.2–2.2 cm, pedicels 2–3 mm; if rachis absent peduncle long, 2–3 cm. Flowers white, ca. 5 mm wide; sepals 5, semi-orbicular, 1.5–2 mm; petals 5, patent, rectangular-elliptic or slightly obovate, ca. 3 mm. Disk annular or approximately calathiform, fleshy, margin entire. Stamens 5; filament slender, 1.5–2 mm; anther rectangular-elliptic. Ovary narrowly subulate; style thick, ca. 1 mm. Capsule oblong, ca. 2 cm.

• Thick forests; 1200–1600 m. SW Guangxi.

**3. *Microtropis malipoensis*** Y. M. Shui & W. H. Chen, Acta Bot. Yunnan. 24: 707. 2002.

麻栗坡假卫矛 *ma li po jia wei mao*

Evergreen trees, to 5 m tall; branchlets terete, ca. 2 mm in diam., brown; internode 2–5 mm, with obvious and rounded leaf scars. Petiole 15–20 × 1.5–2 mm; leaf blade oblong-elliptic to oblong, 19–24 × 5.5–6.5 cm, papery, deep green, base cuneate, margin entire, apex acuminate; midvein prominent, secondary veins 12 or 13 pairs, anastomosing adjacent to margin. Corym-

biform cymes axillary, lax, 4- or 5-branched; peduncle 3–3.3 mm. Fruits ovate, 2.5–3 cm, including a rostrum, rostrum ca. 1 mm; stipes 2–4.5 mm; persistent sepals broadly ovate, ca. 2 mm, imbricate, 4-lobed, connected on base; lobe ca. 1 × 5 mm, entire,

obtuse; persistent style 0.2–0.3 mm. Capsule ovate, 2.5–3 cm, including a rostrum, ca. 1 cm. Seed 1, elliptic.

- Evergreen forests; ca. 1700 m. E Yunnan.

**2. *Microtropis* sect. *Remotiflorae*** C. Y. Cheng & T. C. Kao in C. Y. Cheng & P. H. Huang, Fl. Reipubl. Popularis Sin. 45(3): 188. 1999.

疏花组 shu hua zu

Dichasium loosely spreading, fastigiate, flabellate or broadly patent. Peduncle generally up to 1 cm; secondary peduncle and pedicels obvious or at least conspicuous. Flowers 5-merous, rarely 4- or 6-merous.

Eleven species: S and SE Asia; eleven species (six endemic) in China.

**4. *Microtropis japonica*** (Franchet & Savatier) H. Hallier, Meded. Rijks-Herb. 1910: 33. 1911.

日本假卫矛 ri ben jia wei mao

*Elaeodendron japonicum* Franchet & Savatier, Enum. Pl. Jap. 2: 310. 1879; *Cassine japonica* (Franchet & Savatier) Kuntze; *C. kotoensis* Hayata; *Microtropis kotoensis* (Hayata) Koidzumi; *Otherodendron japonicum* (Franchet & Savatier) Makino.

Evergreen small trees or shrubs; branchlets glabrous, dark gray-brown. Petiole 2–12 mm; leaf blade elliptic, broadly elliptic, rhombic-elliptic, or ovate-elliptic, 4.5–8 × 2–4 cm, leathery, base cuneate or decurrent up to 1 cm, margin slightly revolute, apex obtuse to obtusely acute, sometimes emarginate; secondary veins 4–6 pairs. Cymes axillary or terminal; peduncle 10–15 mm, 2 or 3(or 4) × dichotomously branched, secondary peduncle 1–4 cm; terminal flowers on subaxes sessile; longest pedicels up to 2.5 mm. Flowers ca. 5 mm wide, yellowish white; sepals 5, thick, broadly semiorbicular, 1–1.5 × 2–2.5 mm, margin irregularly serrulate, persistent in fruit; petals 5, slightly fleshy, oblong, ca. 3 mm. Disk annular, fleshy, with 5 very shallow lobes. Stamens 5; filament very short, inserted on disk. Ovary with short, thick style. Capsule oblong, 1.5–2 × 0.7–1 cm, apex finely mucronate, surface with fine and longitudinal crest. Seed obovate-elliptic, 1–1.2 cm, surface vermilion or dark red. Fl. ca. Apr.

Forests. Taiwan [Japan].

**5. *Microtropis macrophylla*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 229. 1940.

大叶假卫矛 da ye jia wei mao

*Microtropis macrocarpa* C. Y. Cheng & T. C. Kao.

Shrubs 1.5–3 m tall; branchlets slender, brown. Petiole 5–10 mm; leaf blade rectangular or oblong, 8–15 × 3.5–7 cm, papery, abaxially green, adaxially yellowish green, base widely cuneate or decurrent, apex widely rounded, long caudate, tail 11–15 × 1–2 mm; midvein slender, obviously prominent abaxially, secondary veins 3–5 pairs, obviously prominent abaxially, curved. Cymes mainly on branched axis, 1 or 2 × dichotomously branched; peduncle 1.5–2 cm, secondary peduncle ca. 1.5 cm; lateral pedicel ca. 1 cm or longer; terminal flowers subsessile.

Flowers 5-merous. Capsule fusiform when immature, ca. 5 × 1.3 cm, apex with subulate rostrum; persistent sepals slightly thickened, approximately leathery, semiorbicular or nephroid, 3.5–4 mm wide. Fl. Jul, fr. Oct.

Evergreen forests, thick forests, slopes; 1500–1700 m. S Xizang, SE Yunnan [Myanmar].

**6. *Microtropis petelotii*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 291. 1940.

广序假卫矛 guang xu jia wei mao

Shrubs or trees, 4–10 m tall; branchlets purplish brown, slightly tetragonal. Petiole 8–12 mm; leaf blade narrowly elliptic to narrowly rectangular, 6.5–13 × 2–4.5 cm, leathery, yellowish white when dry, base cuneate, rarely widely cuneate, apex acuminate to acute; midvein fine, prominent on both surfaces, secondary veins 9–13 pairs, oblique, straight. Cymes axillary or along branch axis, mainly 3 or 4 × dichotomously branched, loose, spreading; peduncle 10–18 mm, secondary peduncle 5–7 mm; pedicels very short; terminal flowers absent on secondary and tertiary branches. Flowers 5-merous; sepals nephroid-semi-orbicular, outer sepals obviously smaller; petals oblong, 2.5–3 mm. Disk annular or shallowly calathiform, slightly 5-lobed. Stamens short; filament shorter than ca. 1 mm; anther slightly scalariform-cordate. Ovary triangular-subulate. Capsule nearly terete, ca. 1.5 cm. Fl. Jun–Oct, fr. Jun–Oct.

Evergreen and mossy forests, thick forests; 1300–2200 m. Guangxi, S Yunnan [Vietnam].

**7. *Microtropis fallax*** Pitard in Lecomte, Fl. Indo-Chine 1: 881. 1912.

越南假卫矛 yue nan jia wei mao

Small trees, to 6 m tall; branchlets purple-brown, tetragonal when young, becoming gray, terete. Petiole 1–1.2 cm; leaf blade broadly elliptic, 8.5–15 × 3.2–7 cm, base cuneate or broadly cuneate, apex acuminate or apiculate, apiculus 3–5 mm; secondary veins 8–10 pairs, slightly prominent on abaxial surface. Cymes axillary, 3–5-flowered; peduncle short, 3–4 mm. Inflorescence 5–10 cm, 4- or 5-branched. Persistent sepals 5, ca. 2 × 3 mm, imbricate, outer ones smaller than inner ones. Capsule elliptic, to 2 × 0.5–0.7 cm, sessile, 2-valved, blackish, enclosed on persistent sepals at base; persistent style ca. 2 mm; stigma slightly 4-lobed. Seed 1, oblong to obovate; aril red. Fr. Oct.

Broad-leaved forests; 500–900 m. SE Yunnan [N Vietnam].

**8. *Microtropis submembranacea*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 291. 1940.

灵香假卫矛 *ling xiang jia wei mao*

*Cassine micrantha* Hayata; *Microtropis caudata* C. Y. Cheng & T. C. Kao; *M. micrantha* (Hayata) Koidzumi.

Shrubs, 3–4 m tall; branchlets, leaves, and flowers fragrant when dry. Petiole ca. 5 mm; leaf blade ovate, ovate-elliptic to elliptic, rarely broadly lanceolate, 3.5–7 × 1.5–3.5 cm, sometimes longer, abaxially gray, base widely cuneate or rounded, apex acuminate; secondary veins 4–7 pairs, fine, prominent on both surfaces. Cymes axillary, terminal or on branched axis, generally 3–7-flowered; peduncle 5–10 mm, secondary peduncle 2.5–3.5 mm; pedicels ca. 1.5 mm. Flowers 5-merous; sepals broadly semiorbicular; petals broadly obovate, ca. 2 mm. Disk shallowly annular, shallowly 5-lobed, lobe widely rounded. Filament ca. 1 mm; length of anther equal to width. Ovary narrowly ovate; style thick. Capsule broadly elliptic, ca. 1.5 × 0.5–0.6 cm. Fr. Apr.

• Evergreen forests, thick forests on hills; 1000–1800 m. Fujian, Guangdong, S Guangxi, Hainan, Yunnan.

**9. *Microtropis pallens*** Pierre, Fl. Forest. Cochinch. 20: t. 305b. 1895.

淡色假卫矛 *dan se jia wei mao*

Shrubs, 1–2 m tall; branchlets tetragonal when young, becoming terete, glabrous. Petiole 5–6 mm; leaf blade ovate to oblong, 4–9 × 2–4 cm, papery, abaxially pallid or slightly silver, adaxially green, glabrous, base cuneate, apex acute; secondary veins 7–12 pairs, prominent on both surfaces. Cymes densely dichasial, up to 1 cm; peduncle 2–3.5 mm; pedicels ± absent. Flowers 5-merous; sepals slightly membranous, ca. 1 mm, margin erose; petals obovate. Disk absent. Ovary conical, incompletely 2-loculed, 4 ovules per ovary; style short and thick; stigma nearly 4-lobed. Capsule ovate or oblong, 2-valved, ca. 10 × 6 mm, valve up to 1.5 mm thick. Seed ca. 9 × 5 mm. Fl. Jan–Mar, fr. Sep–Oct.

Seasonal rain forests, evergreen forests; ca. 400 m. SE Yunnan [Laos, Vietnam].

**10. *Microtropis tetragona*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 290. 1940.

方枝假卫矛 *fang zhi jia wei mao*

Small trees or shrubs; branchlets obviously tetragonal, purplish brown. Petiole 5–10 mm; leaf blade rectangular-elliptic or narrowly ovate-elliptic, 8–13 × 2.5–5 cm, papery or thinly leathery, rarely falciform-acuminate, base cuneate, apex acuminate; secondary veins 6–9 pairs, slender, obliquely arching upward, closed on margin. Cymes 3–7-flowered, rarely more, loose, spreading; peduncle fine, 5–11 mm, secondary peduncle 3–5 mm; pedicels 1.5–3 mm. Flowers 5-merous; sepals semiorbicular; petals rectangular-elliptic or slightly broadly ovate-elliptic. Disk thin, annular, shallowly 5-lobed or entire. Stamens small and short; filament very short and conspicuous. Ovary broadly triangular-ovate; style often 4-lobed. Capsule nearly

oblong, ca. 2 cm × 8–9 mm, apex often with short rostrum; valves abaxially finely angulate. Fl. Aug–Oct, fr. ca. Oct–Nov.

• Mossy evergreen forests, streamsides; 1000–2100 m. S Guangxi, Hainan, SE Xizang, SE Yunnan.

**11. *Microtropis triflora*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 288. 1940.

三花假卫矛 *san hua jia wei mao*

*Microtropis fokienensis* Dunn var. *longipedunculata* W. C. Cheng; *M. triflora* var. *szechuanensis* C. Y. Cheng & T. C. Kao.

Shrubs, 2.5–5 m tall. Petiole slender, 6–12 mm; leaf blade lanceolate, oblong-lanceolate, broadly oblanceolate, or elliptic, 5.5–10 × 1–2.5(–4) cm, nearly leathery, base cuneate or decurrent, apex acute to narrowly acuminate; secondary veins 6–8 pairs, slightly curved. Cymes axillary, terminal or on branch axis, 3-flowered; peduncle 5–10 mm; terminal flowers sessile; lateral pedicels slender, 2.5–6 mm. Flowers 5-merous; sepals broadly semiorbicular, ca. 1.5 mm wide, margin ciliate; petals ovate-elliptic, ca. 3 mm, spreading in flower. Disk calathiform to annular, slightly fleshy, rim curved. Stamens ca. 2 mm. Ovary ampullaceous; stigma present. Capsule ovate-elliptic, ca. 1.5 cm. Seed ovate-elliptic, reddish brown. Fl. Aug–Sep, fr. ca. Aug–Oct.

• Forested slopes, forest margins; 1300–2100 m. Guizhou, Hubei, Sichuan, Yunnan.

**12. *Microtropis pyramidalis*** C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 26: 313. 1988.

塔蕾假卫矛 *ta lei jia wei mao*

Small shrubs, 1–1.5 m tall; branchlets purplish brown, slightly tetragonal. Petiole 5–9 mm; leaf blade elliptic or oblong, 7–11 × 3–5.5 cm, papery, base cuneate or widely cuneate, apex caudate-acuminate to acuminate; midvein prominent on both surfaces, secondary veins 4–7 pairs, curved, small, thin. Cymes mainly on branched axis, 3 or 4 × dichotomously branched, branches slender and patent; peduncle 1–2 cm, secondary peduncle 5–15 mm; pedicels very short, less than ca. 3 mm or absent. Sepals broadly triangular-semiorbicular; petals rectangular, ca. 3 × 1 mm or more. Disk thin, narrowly annular. Stamens slightly as long as pistils; filament short and flat; anther ovate-elliptic, connective prominent, narrowly triangular. Ovary conical, ca. 1.5 mm. Fruit unknown. Fr. Apr.

• Seasonal evergreen forests, thick forests, valleys, streamsides; 800–1500 m. SW Guangxi, SE Yunnan.

**13. *Microtropis hexandra*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 289. 1940.

六蕊假卫矛 *liu rui jia wei mao*

Shrubs, to 3 m tall. Petiole 5–8 mm; leaf blade elliptic to narrowly elliptic, 4–7.5 × 1.5–3 cm, thickly papery, base cuneate to widely cuneate, apex acuminate; secondary veins 6–8 pairs, oblique, straight, curved near apex, prominent on both surfaces. Cymes often congested distally, often 3-flowered; peduncle 5–7 mm; pedicels 1–2.5 mm, sometimes sessile. Flowers white; sepals fleshy, often 4, rarely 5, semiorbicular, ca. 2 mm wide, very slightly ciliate or absent; petals 6, rarely 5, slightly fleshy,

ovate-elliptic to rectangular-elliptic, ca. 3 mm. Disk shallowly calathiform, fleshy, very slightly lobed. Stamens 6, rarely 5, as long as pistils or longer; anther slightly rectangular, connective mucronulate. Ovary elliptic-ovate; style very short; stigma slightly lobed. Fruit unknown. Fl. Jun–Aug, fr. Nov.

- Humid evergreen forests, mountains; 1000–1800 m. SE Yunnan.

**14. *Microtropis henryi*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 289. 1940.

滇东假卫矛 dian dong jia wei mao

Evergreen shrubs, 2–3 m tall. Petiole 5–12 mm; leaf blade narrowly elliptic, elliptic, or narrowly oblong, 9–15 × 3–5 cm,

thinly papery or papery, base cuneate, apex acuminate or apiculate; secondary veins 5–8 pairs, curved. Cymes axillary or on branched axis, outspread, (1–)3–7-flowered; peduncle 5–8 mm, secondary peduncle 3–5 mm; pedicels 1–3 mm or sessile. Sepals 4, rarely 5, lateral ones smaller, nephroid-semiorbicular, margin irregularly serrulate; petals 5 or 6, broadly elliptic or obovate-orbicular. Disk inconspicuous. Stamens generally 6; filaments very short; anther rectangular, connective mucronulate. Ovary rectangular-ovate; style very short to even absent. Capsule broadly elliptic, 1.3–1.7 cm × 8–10 mm, apex rounded, mucronulate, valves slightly smooth. Fl. Jun–Oct, fr. Apr–Aug.

- Humid evergreen forests, mountains; 800–2000 m. SW Yunnan.

### 3. *Microtropis* sect. *Microtropis*

密花组 mi hua zu

Inflorescences glomerulate cymes, sessile or subsessile, rarely long pedunculate. Flowers sessile or subsessile.

Thirteen species: S and SE Asia; 13 species (11 endemic) in China.

**15. *Microtropis gracilipes*** Merrill & F. P. Metcalf, Lingnan Sci. J. 16: 88. 1937.

密花假卫矛 mi hua jia wei mao

*Microtropis confertiflora* Merrill & F. L. Freeman; *M. gracilipes* var. *parvifolia* Merrill & F. P. Metcalf.

Shrubs, 2–5 m tall; branchlets slightly angulate. Petiole 3–9 mm, sparsely pubescent; leaf blade broadly oblanceolate, rarely oblong or obovate, 5–11 × 1.5–3.5 cm, leathery, glabrous, sometimes abaxially sparsely pubescent on veins, base cuneate, margin brownish white when dry, slightly revolute, apex acuminate or caudate; midvein prominent on both surfaces, secondary veins 7–11 pairs, straight, or apically slightly curved and closed. Cymes glomerate, dense, axillary or on branched axis; peduncle 1–2.5 cm, sparsely pubescent, unbranched or secondary peduncle 1–3 mm. Flowers 5-merous, sessile, clustered capitulum-like; sepals nephroid; petals slightly fleshy, broadly rectangular-elliptic, ca. 4 mm. Disk annular. Stamens ca. 1.5 mm; filament present. Ovary globose or ovate; style long, thick; stigma shallowly 4-lobed or slightly concave. Capsule broadly elliptic, 1–1.8 cm; persistent sepals slightly enlarged, sometimes slightly glaucous. Seed elliptic, dark red. Fl. Apr.

- Valley forests, slopes near streams, swamps; 700–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan.

**16. *Microtropis sphaerocarpa*** C. Y. Cheng & T. C. Kao, Acta Phytotax. Sin. 26: 314. 1988.

圆果假卫矛 yuan guo jia wei mao

Small trees, 2–3 m tall; branchlets smooth, slightly flat. Petiole short, formed by decurrent leaf base, 3–5 mm; leaf blade elliptic or rectangular-elliptic, 6–9 × 2.5–4 cm, papery, base decurrent, apex acute or acuminate; secondary veins 3–5 pairs, slender, curved, abaxially prominent. Cymes glomerate, 1–3-flowered, rarely up to 7-flowered; peduncle 3–5 mm. Flowers 4-merous, subsessile or sessile; sepals fleshy, broadly rounded, margin brown, erose with small teeth. Capsule subglobose, ca. 9 mm in diam., valves slightly smooth and flat, not obviously angulate.

- Forest margins; ca. 1200 m. NW Yunnan.

**17. *Microtropis yunnanensis*** (Hu) C. Y. Cheng & T. C. Kao ex Q. H. Chen, Fl. Guizhou. 2: 419. 1986.

云南假卫矛 yun nan jia wei mao

*Microtropis illiciifolia* (Hayata) Koidzumi var. *yunnanensis* Hu, Bull. Fan Mem. Inst. Biol. 7: 214. 1936.

Small trees or shrubs, 2.5–9 m tall. Petiole 5–9 mm; leaf blade rectangular or elliptic to ovate-elliptic, 4–10 × 1.5–3.5 cm, leathery, base cuneate or widely cuneate, margin slightly revolute, apex long acuminate or slightly caudate, often curved toward one side; secondary veins 7 or 8 pairs, ascendant. Cymes glomerate, axillary or on branched axis, 1–3-flowered, sometimes more; peduncle 5–10 mm; terminal flowers sessile or subsessile. Flowers generally 4-merous, rarely 5-merous; sepals thick, semiorbicular, ca. 2 mm wide, margin ciliate with dark brown toothlike cilia or entire; petals broadly elliptic, ca. 3 mm. Disk annular, thick, fleshy, lobe obtuse-triangular or truncate. Stamens 4, rarely 5. Ovary broadly conical; style thick, ca. 1 mm. Capsule rectangular-elliptic, 1.5–1.8 cm × 6–9 mm. Fr. Jan–Mar.

- Secondary forests on limestone hills; 1500–2000 m. W Guangxi, SW Guizhou, SE Yunnan.

In the protologue of *Microtropis yunnanensis*, Chen included *Myrsine chaffanjonii* H. Léveillé (Fl. Kouy-Tchéou, 287. 1914–1915, “*chaffanjoni*”) in synonymy. If indeed the two taxa are conspecific, the correct name is *Microtropis chaffanjonii* (H. Léveillé) Y. F. Deng (Ann. Bot. Fenn. 44: 397. 2007).

**18. *Microtropis fokienensis*** Dunn, J. Linn. Soc., Bot. 38: 375. 1908.

福建假卫矛 fu jian jia wei mao

*Cassine illiciifolia* Hayata; *C. matsudae* Hayata; *Microtropis illiciifolia* (Hayata) Koidzumi; *M. matsudae* (Hayata) Koidzumi; *Otherodendron matsudae* (Hayata) Hayata ex Loesener.

Small trees or shrubs, 1.5–4 m tall; branchlets slightly tetragonal. Petiole 2–8 mm; leaf blade narrowly obovate, broadly oblanceolate, obovate-elliptic, or rhombic-elliptic, 4–9 × 1.5–3.5 cm, thickly papery or leathery, base decurrent or narrowly cuneate, apex narrowly acute or acuminate; secondary veins 4–6 pairs. Cymes glomerate, short and small, axillary or on branched axis, rarely terminal, 3–9-flowered; peduncle short, 1.5–5 mm. Flowers very shortly pedicellate or sessile, 4-merous or 5-merous; sepals semiorbicular, imbricate; petals elliptic to broadly elliptic, ca. 2 mm. Disk annular, flat and broadly semi-orbicular. Stamens shorter than petals. Ovary ovate-globose; style obviously present; stigma shallowly 4-lobed. Capsule elliptic to ovate-elliptic, 1–1.4 × 0.5–0.7 cm.

• Slopes or forests in valleys; 800–2000 m. Anhui, Fujian, Hunan, Jiangxi, Taiwan, Zhejiang.

**19. *Microtropis paucinervia*** Merrill & Chun ex Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 285. 1940.

少脉假卫矛 shao mai jia wei mao

Small trees to shrubs; branchlets ± angulate, generally purplish brown. Petiole 3–7 mm; leaf blade elliptic, rhombic-elliptic, or obovate-elliptic, 3–8 × 1–4 cm, leathery, base cuneate or widely cuneate, rarely decurrent, margin revolute, apex obtuse-acute, rarely acuminate; secondary veins 4–7 pairs, slender, straight. Cymes axillary or on branched axis; peduncle ca. 1 cm or less. Flowers 5-merous, subsessile or sessile; sepals thick, nephroid, ca. 2 mm, margin with long cilia; petals ca. 2.5 mm, apex sometimes obtuse-emarginate. Disk shallowly calathiform, margin entire. Stamens short. Ovary conical. Capsule elliptic, ca. 1.5 cm × 8 mm, persistent sepals thick and leather-like.

• Mountain areas; ca. 1200 m. Guangdong, S Guangxi, Hainan.

**20. *Microtropis reticulata*** Dunn, J. Bot. 47: 375. 1909.

网脉假卫矛 wang mai jia wei mao

Small shrubs, 1–2 m tall. Petiole 3–6 mm; leaf blade thickly papery, rectangular-elliptic, narrowly elliptic, or narrowly ovate-elliptic, 5–10 × 2–4 cm, base cuneate or broadly cuneate, margin slightly revolute, apex acute or acuminate; secondary veins 5–7 pairs, slender, oblique, straight, apically slightly ascending, obviously prominent abaxially. Cymes glomerate, axillary or terminal; peduncle short, thick, ca. 2 mm; pedicels very short to absent. Flowers 5-merous; sepals approximately semiorbicular; petals rectangular, ca. 2.5 mm. Disk annular. Stamens short; filament slightly conical. Ovary approximately ovate; style stout; stigma obtuse. Capsule elliptic, ca. 2 cm.

• Guangdong, Hainan.

**21. *Microtropis obliquinervia*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 286. 1940.

斜脉假卫矛 xie mai jia wei mao

*Microtropis cathayensis* Merrill & F. L. Freeman.

Small trees or shrubs, to 5 m tall. Petiole 5–15 mm; leaf

blade lanceolate or oblong-elliptic to elliptic, 5–19 × 2–2.5 cm, leathery, base widely cuneate, somewhat decurrent, margin slightly revolute, apex acuminate or slightly caudate; midvein thick, secondary veins 7–11 pairs, veinlets straight, slender and prominent on both surfaces, veins anastomosing adjacent to margin. Cymes glomerate, axillary, on branch axis, rarely terminal, 3–7-flowered, rarely more than 7-flowered; peduncle 2–5(–8) mm. Flowers subsessile or sessile, 5-merous; sepals widely rounded, semiorbicular; petals rectangular-elliptic or slightly ovate-elliptic, ca. 3 × 2 mm. Disk slightly fleshy, annular, lobes somewhat absent, slightly prominent. Filament very short, up to ca. 1 mm, rectangular-ovate. Ovary triangular-conical; stigma shallowly 2–4-lobed. Capsule broadly elliptic, 12–14 × 7–8.5 mm. Fl. throughout year.

• Secondary forests near streamsides, scattered forests, valleys; 700–2100 m. Guangdong, N Guangxi, Guizhou, Hunan, E Yunnan.

**22. *Microtropis discolor*** (Wallich) Arnott, Ann. Nat. Hist. 3: 152. 1839.

异色假卫矛 yi se jia wei mao

*Cassine discolor* Wallich in Roxburgh, Fl. Ind. 2: 378. 1824; *Microtropis sessiliflora* Merrill & F. L. Freeman.

Evergreen small trees or shrubs, 2.5–7 m tall. Petiole 5–10 mm; leaf blade rectangular or oblong, sometimes broadly lanceolate to narrowly ovate-elliptic, 7.5–19 × 2.5–8 cm, thickly papery or leathery, abaxially gray-brown, adaxially generally pale green when dry, base cuneate or broadly cuneate, apex caudate, tail up to 1.5 cm; midvein prominent on both surfaces, abaxially more conspicuous, secondary veins 5–8 pairs, slender, curved, prominent on both surfaces. Cymes glomerate, axillary or on branch axis, mainly 7–15-flowered; peduncle short, 2.5–6 mm, secondary peduncle 1.5–2.5 mm, third peduncle ca. 1 mm. Flowers 5-merous, subsessile; sepals slightly semiorbicular, imbricate, margin erosely toothed, teeth dark brown; petals slightly fleshy, rectangular, 2.5–3.5 × 1.5–2.5 mm, adaxially longitudinally angulate in center. Disk annular. Filament 1.5–2.5 mm; anther rectangular. Ovary elliptic-ovate; style absent; stigma 4-lobed. Capsule broadly elliptic, 10–14 × 8–10 mm, surface with thin, longitudinal costa formed by small wartlike elevations. Fl. and fr. Sep–Mar.

Evergreen forests; 800–1600 m. S Yunnan [Bhutan, India, Malaysia (peninsular), Myanmar, Thailand (peninsular), Vietnam].

**23. *Microtropis biflora*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 288. 1940.

双花假卫矛 shuang hua jia wei mao

Shrubs, to 2 m tall; branchlets terete, generally pallid, internodes long, generally 4–8.5 cm. Petiole 3–5 mm; leaf blade ovate-oblong or rectangular-elliptic, 6–10.5 × 1.8–4.5 cm, thickly papery, dark gray when dry, base broadly cuneate, apex acuminate or narrowly acuminate; veins fine, secondary veins 8–11 pairs, oblique, straight. Inflorescences terminal, axillary or on branched axis, 2-flowered, rarely 3-flowered; peduncle very short, up to 1.5 mm. Flowers 5-merous, sessile, white or light yellow; sepals erect; petals rectangular, sometimes broad near

apex, ca. 3 mm. Stamens short; filament ca. 1 mm. Ovary ovate; stigma short, thick. Capsule broadly elliptic, 1.3–1.5 cm × ca. 9 mm. Fl. Dec to early spring, fr. winter.

- Dense forests; ca. 200 m. Guangdong.

**24. *Microtropis oligantha*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 288. 1940.

逢春假卫矛 feng chun jia wei mao

Shrubs; branchlets slender, terete, purplish brown, internodes 3–10 cm. Petiole 5–15 mm; leaf blade rectangular-elliptic, 8–11 × 3–4 cm, thickly papery, abaxially pallid, adaxially olive, base cuneate, apex acuminate to caudate-acuminate; secondary veins 5–8 pairs, curved. Cymes glomerate, axillary, 3–7-flowered; peduncle shorter than 1 mm. Flowers 4- or 5-merous, sessile; sepals slightly fleshy, semiorbicular or nephroid, 1.5–2 mm wide; petals rectangular-elliptic or elliptic, ca. 3.5 × 1.5–1.8 mm. Disk annular. Filament ca. 1 mm; anther elliptic, ca. 0.5 mm. Ovary triangular-ovate; style very short; stigma shallowly 2-lobed. Fruit unknown. Fl. Sep.

- Evergreen forests; 800–1700 m. SE Yunnan.

**25. *Microtropis osmanthoides*** (Handel-Mazzetti) Handel-Mazzetti, Sinensia 3: 189. 1933.

木樨假卫矛 mu xi jia wei mao

*Chingithamnus osmanthoides* Handel-Mazzetti, Sinensia 2: 128. 1932.

Shrubs, to 6 m tall; branchlets brown or gray-brown. Petiole thick, short, 2.5–5 mm; leaf blade ovate, broadly ovate, or ovate-lanceolate, 7–13 × 2.5–8 cm, leathery, abaxially gray-green, becoming gray-brown when dry, adaxially verrucose, becoming gray when dry, with small warts, base rounded or broadly cuneate, apex acute or narrowly acuminate; midvein obvious abaxially, yellowish white when dry, secondary veins 7–11 pairs, oblique, straight, obvious. Cymes glomerate, axillary, on branched axis or terminal, generally 5-flowered; peduncle absent, 2-bracteate, bracts triangular-ovate, ca. 1 mm. Flowers 5-merous, sessile; sepals fleshy, nephroid or cordate, 1.5–2 mm wide, margin with small teethlike cilia; petals rectangular, ca. 2.5 mm, margin sometimes erosely small toothed, base with linear, short claws. Disk thin, annular. Filament less than

0.5 mm; anther ovate, ca. 0.5 mm. Ovary triangular-subulate; stigma shallowly 2-lobed. Capsule elliptic, 1.5–2 cm. Seed elliptic-ovate, ca. 1.5 cm.

Thick forests, valleys. Guangxi, Guizhou [Vietnam].

**26. *Microtropis wui*** Y. M. Shui & W. H. Chen, Bot. Bull. Acad. Sin. 43: 306. 2002.

吴氏假卫矛 wu shi jia wei mao

Shrubs, scandent, 1–2 m tall, glabrous; branchlets terete, 0.8–1.3 cm in diam., brownish; internodes 12–15 cm; leaf scars semiorbicular. Petiole stout, 4–6 × 2.5–3.5 mm; leaf blade obovate or rhombic, 3.4–5 × 1.6–1.8 cm, abaxially gray-green, adaxially deep green, base auricular, margin slightly revolute, apex obtuse; midvein very prominent abaxially, less so adaxially, secondary veins 12–15 pairs, anastomosing adjacent to margin. Cymes axillary or on branched axis, glomerate; peduncle 1–2 mm; pedicels incrassate, 3–3.5 mm. Sepals ovate, persistent in fruit. Capsule 15–20, ellipsoid or ovoid, 1.8–2 cm × 8–9 mm (length includes rostrum), rostrum 2–3 mm. Fr. Nov–Jan.

- Secondary forests on limestone hills; 600–800 m. SE Yunnan [?Vietnam].

**27. *Microtropis obscurinervia*** Merrill & F. L. Freeman, Proc. Amer. Acad. Arts 73: 283. 1940.

隐脉假卫矛 yin mai jia wei mao

Evergreen shrubs, 1–2 m tall; branchlets purplish brown or blackish purple. Petiole thick, 8–15 mm; leaf blade slightly fleshy, narrowly rectangular, narrowly rectangular-elliptic, or broadly oblanceolate, 8–18 × 2.5–7 cm, leathery, with irregular and small warts when dry; midvein prominent abaxially, secondary veins 7–11 pairs, oblique, straight, not obvious. Cymes glomerate, more than 10-flowered; peduncle absent. Flowers white, 5-merous, sessile, slightly urn-shaped in flower, 4–5 mm; sepals leathery, slightly nephroid, 1.2–1.4 mm; petals rectangular, 2.5–3 mm, with short claws at base. Disk thin, annular, margin entire. Ovary ovate; style short and thick; stigma shallowly 2-lobed. Capsule elliptic or approximately elliptic-ovate, 1.5–2 cm. Seed ovate-elliptic, ca. 1.5 cm.

- Forests, valleys; 800–1500 m. Hainan.

## 10. *TRIPTERYGIUM* J. D. Hooker, Gen. Pl. 1: 360, 368. 1862.

雷公藤属 lei gong teng shu

Ma Jinshuang (马金双); A. Michele Funston

Scandent shrubs or sometimes semiwoody vines, glabrous or tomentose; branchlets sometimes 4–6-angled. Leaves alternate, serrate, stipulate. Inflorescences axillary or terminal, thyrsoid. Flowers bisexual or unisexual (polygamous), 5-merous. Disk fleshy, cupuliform, 5-lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary 3-locular; ovules erect, 2 per locule. Samara 3-winged, chartaceous. Seed 1, trigonous.

One species: from NE Myanmar through China and Korea to Japan.

**1. *Tripterygium wilfordii*** J. D. Hooker, Gen. Pl. 1: 368. 1862.

雷公藤 lei gong teng

*Aspidopterys hypoglauca* H. Léveillé; *Tripterygium hypoglaucum* (H. Léveillé) Hutchinson; *T. regelii* Sprague & Takeda.

Deciduous subshrubs, or scandent and scrambling, or

sometimes semiwoody vines, 2–6(–10) m; branching distally, slender or scrambling, minutely pubescent when young or in open sunlight, becoming glabrous when old or in shade, slightly angled, verrucose or not. Petiole 1–2 cm; stipules linear, caducous; leaf blade usually ovate or rounded-ovate, sometimes oblong or elliptic-ovate, (4.6–)8.6–12.5(–18.4) × (3.1–)5.7–8.9(–12.3) cm, papery, herbaceous (in shade or low light) to leathery (in direct sunlight or very dry conditions), glabrous or sparsely scurfy tomentose with reddish brown hairs, abaxially ± farinose, base broadly cuneate, or rounded to cordate, margin entire or less often crenulate, apex short to long acuminate or acute, tip often blunt. Thyrses large, composed of several to dozens of thyrslets, (4.5–)12.5–23.6(–38) × (2.3–)4.7–9.3(–15) cm; flowers 1 normal and 1 an unfertilized male. Flowers whitish, greenish, or yellow-green, small, 4–6 × 4–6 mm; calyx

5-lobed, hemispheric, ca. 1 mm; petals 5, oblong to subovate, slightly narrowed to base, 2–2.5 mm, apex rounded. Stamens 5, inserted at margin of cup-shaped and compressed disk. Disk bright green, fleshy, ca. 2 mm in diam. Ovary superior, 3-edged, combined with disk at base, incompletely 3-locular, with 3 prominent ca. 1 mm lobes, short style at apex; stigma capitate, bright purple. Samara usually green or greenish brown when mature, sometimes pink or pinkish purple, (1–)1.3–1.9(–2.3) × (0.7–)1.2–1.5(–1.9) cm. Seed compressed, 3-angled, ca. 5 × 1.3–3 mm. Fl. May–Oct, fr. Aug–Nov.

Mixed forests, forest margins, woodlands, scrub; 100–3500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, S Jilin, SE Liaoning, Sichuan, N Taiwan, Xizang, Yunnan, Zhejiang [Japan, Korea, NE Myanmar].

### 11. PLEUROSTYLIA Wight & Arnott, Prodr. Fl. Ind. Orient. 157. 1834.

盾柱属 *dun zhu shu*

Ma Jinshuang (马金双); A. Michele Funston

Evergreen trees or shrubs, glabrous. Leaves opposite, decussate, entire, stipulate. Inflorescence axillary, cymose. Flowers bisexual, 5-merous. Disk fleshy, cupular, 5-lobed, intrastaminal; anthers longitudinally dehiscent, introrse. Ovary 2-locular or reduced to 1-locular; ovules erect, 2–8 per locule. Nut ellipsoid or obovoid, bony, with a prominent persistent lateral style. Seed 1, ovoid.

About five species: Old World tropics and subtropics; one species in China.

**1. *Pleurostylia opposita*** (Wallich) Alston in Trimen, Handb. Fl. Ceylon 6(suppl.): 48. 1931.

盾柱 *dun zhu*

*Celastrus oppositus* Wallich in Roxburgh, Fl. Ind. 2: 393. 1824.

Trees, to 15 m tall, sometimes shrubs; branchlets subterete or obscurely 4-angled. Petiole short, 2–5 mm; leaf blade ovate to obovate-oblong, rarely suborbicular, 3–8 × 1.5–5.2 cm, papery, base cuneate, margin entire, sometimes slightly recurved, apex obtuse, acute, rarely acuminate, very rarely retuse; veins 5 or 6 pairs, thin and obvious. Cymes of 1 or 2 branches, few flowered;

peduncle very short, 2–3 mm; pedicel 1–2 mm. Flowers green; calyx lobes rounded or subreniform, ca. 0.5 × 0.75–1 mm; petals elliptic or broadly ovate, 1.25–1.5 × ca. 1 mm, reflexed at anthesis, obtuse or slightly acute. Disk margin slightly crenate. Stamens attached just abaxially on disk margin; filament subulate, fleshy, slightly flattened; anther slightly ovoid. Ovary adnate to disk at base; style very short; stigma capitate. Nut ellipsoid or sometimes slightly obovoid, 5–7 × 4–5 mm. Seed sustained by persistent floral parts. Fl. May–Dec, fr. Jul–Jan.

Lower primary and secondary light rain forests; near sea level to 700 m. Hainan [S India, Indonesia, Malaysia, New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia (Queensland), Pacific islands (New Caledonia)].

### 12. SALACIA Linnaeus, Mant. Pl. 2: 159. 1771, nom. cons.

五层龙属 *wu ceng long shu*

Peng Hua (彭华); A. Michele Funston

*Courondi* Adanson.

Climbing or scrambling shrubs or small trees, glabrous or glabrescent; branchlets subterete, internode usually dilated or slightly flat. Leaves opposite to subopposite, rarely alternate, entire, crenate, or serrate, stipulate. Inflorescences axillary or cauliflorous, thyrsoid, cymose, or fasciculate. Flowers bisexual, 5-merous. Disk fleshy, pulvinate or cupular, entire or lobed, extrastaminal. Stamens (2 or)3; anthers longitudinally, obliquely, or transversely dehiscent, extrorse or apical. Ovary (2 or)3-locular, whole or mostly concealed in disk; ovules axile, 2–9 per locule. Berry spheroid, fleshy or subligneous. Seeds 2–12, angular, exalbuminous, surrounded by mucilaginous arils.

About 200 species: chiefly in tropical regions; ten species (eight endemic) in China.

1a. Berry usually up to 2 cm in diam.; leaf blade small, 5–11 × 2–5 cm.

2a. Leaf blade entire; axillary or terminal cymes, many flowered, peduncle 4–7 mm; berry ca. 1.6 cm in diam.

..... 9. *S. confertiflora*

2b. Leaf blade sinuate; axillary fascicles, 3–6-flowered, peduncle absent; berry ca. 1 cm in diam. .... 10. *S. chinensis*

- 1b. Berry 2–5 cm in diam.; leaf blade large, (8–)10–25 × 4–10 cm.
- 3a. Flowers many, fasciculate, peduncle ca. 1 cm.
- 4a. Leaf blade oblong or oblong-elliptic, abaxially not glaucous ..... 1. *S. polysperma*
- 4b. Leaf blade ovate to narrowly ovate, abaxially glaucous ..... 2. *S. glaucifolia*
- 3b. Flowers many or few, fasciculate, peduncle absent.
- 5a. Leaf blade margin entire.
- 6a. Leaf blade lanceolate ..... 3. *S. cochinchinensis*
- 6b. Leaf blade obovate-elliptic or oblong-elliptic.
- 7a. Leaf blade obovate-elliptic, 15–20 × 7–11 cm; flowers 3 or 4, axillary or extra-axillary; sepal margin ciliolate ..... 4. *S. obovatilimba*
- 7b. Leaf blade oblong-elliptic, 12–17 × 5–7.5 cm; flowers many, axillary; sepal margin membranous ..... 5. *S. hainanensis*
- 5b. Leaf blade margin subentire to denticulate or serrulate.
- 8a. Branches slender, smooth, glabrous, sparsely lenticellate; leaf blade papery ..... 8. *S. aurantiaca*
- 8b. Branches robust, densely lenticellate; leaf blade leathery or subleathery.
- 9a. Leaf blade narrowly or broadly oblong-elliptic, 13–23 × 6–8 cm; flowers many, pedicel 8–9 mm; berry up to 4.5 cm in diam. .... 6. *S. amplifolia*
- 9b. Leaf blade oblong-lanceolate, 10–15 × 3.5–5 cm; flowers 3 or 4, pedicel ca. 1 mm; berry commonly 2–2.5 cm in diam. .... 7. *S. sessiliflora*

**1. *Salacia polysperma*** Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 153. 1940.

多籽五层龙 duo zi wu ceng long

*Salacia polysperma* subsp. *verrucosorugosa* H. W. Li.

Climbing shrubs, ca. 5 m tall; branches slender, brown-red when young, brown-gray at maturity, densely lenticellate, lentils tumorlike, minute. Leaves alternate; petiole thick, up to 1 cm; leaf blade oblong or oblong-elliptic, (8–)10–25 × (2.5–)3–7 cm, thinly leathery, base subrounded to broadly cuneate, margin sinuate, weakly serrulate, apex shortly acuminate; midvein abaxially prominent, adaxially concave, lateral veins 9–11 pairs, obliquely ascendant, reticulate near margin, reticulate veins abaxially convex. Fascicles axillary, many flowered; peduncle up to 1 cm; petiole 5–7 mm. Flowers light green; sepals deltoid-orbicular, up to 1.5 mm, margin erose, apex obtuse; petals sub-orbicular, recurved. Disk cupular, subpentagonous, ca. 0.5 mm. Stamens 3; filaments very short, inserted at margin of disk; anthers forked, dehiscing horizontally. Ovary mostly concealed in disk; style terete. Berry up to 5 cm in diam., exocarp ligneous when dry, minutely verruciform or smooth, usually 12-seeded. Fl. Aug–Sep, fr. Oct–Nov.

• Montane sparsely wooded valleys; 500–1800 m. Guangxi, S Yunnan.

**2. *Salacia glaucifolia*** C. Y. Wu in S. Y. Bao, Fl. Reipubl. Popularis Sin. 46: 290. 1981.

粉叶五层龙 fen ye wu ceng long

Climbing shrubs, ca. 5 m tall; branchlets terete, slightly compressed when young, brown-gray, sparsely lenticellate. Petiole ca. 1 cm, thick, rugose, canaliculate; leaf blade ovate to oblong, 10–15 × 5–7 cm, abaxially glaucous, light brown-gray, adaxially yellow-green when dry, shiny, margin entire; lateral veins 8–10 pairs, abaxially prominent. Cymes axillary; peduncle ca. 1 cm; pedicel slender, 2–5 mm. Flowers green; sepals elliptic, 1–1.5 × ca. 1 mm, margin lacerate; petals broadly elliptic, 1.5–2 × 1–1.5 mm, verrucose, margin membranous, apex

mucronate. Disk cupular. Stamens 3; filaments flat; anthers forked. Ovary concealed in disk; ovules 2 per locule; style short. Fruit not seen. Fl. unknown.

• Humid forest valleys; ca. 400 m. SE Yunnan (Pingbian).

**3. *Salacia cochinchinensis*** Loureiro, Fl. Cochinch. 2: 526. 1790.

柳叶五层龙 liu ye wu ceng long

Shrubs, to 2 m tall; branchlets subtetragonous, compressed, becoming terete, brown-gray, ± minutely lenticellate. Petiole 4–5 mm, canaliculate; leaf blade oblong-lanceolate, 9–11(–15) × (2–)3–4 cm, papery or thinly leathery, adaxially chestnut brown to light black, not shiny, base narrowly cuneate, margin entire; lateral veins (6 or)7 or 8 pairs, reticulate veins conspicuous. Fascicles axillary, many flowered; pedicel 6–10 mm, base with multicolumn small scales. Flowers light green; sepals broadly deltoid, margin membranous, apex rounded; petals up to 3 mm, obovate, fleshy, margin membranous. Stamens 3; filaments flat, tongue-like, inserted at margin of disk, reflexed; anther sacs forked. Ovary 3-locular, concealed in disk; ovules 2 per locule. Berry globose, up to 2 cm in diam., exocarp fleshy when fresh, 1–3-seeded. Seeds angular. Fl. Feb–Apr, fr. May–Jul.

Sparse woods along roadsides; ca. 500 m. S Yunnan (Xishuangbanna) [Cambodia, Vietnam].

**4. *Salacia obovatilimba*** S. Y. Bao, Fl. Reipubl. Popularis Sin. 46: 290. 1981.

河口五层龙 he kou wu ceng long

Shrubs, ca. 2 m tall; branchlets brown-gray, glabrous, densely verrucose lenticellate. Petiole robust, up to 1 cm, grooved; leaf blade obovate-elliptic, 15–20 × 7–11 cm, leathery, adaxially shiny, base broadly cuneate, margin entire, apex mucronate, mucro 5–10 mm; midvein abaxially prominent, adaxially slightly concave, lateral veins 7–9 pairs, reticulate veins horizontally spreading, abaxially prominent, adaxially inconspicuous. Fascicles axillary or extra-axillary, 3- or 4-flowered; pedicel tenuous, 6–8 mm, glabrous, base with multicolumn deltoid scales. Sepals broadly deltoid, ca. 2 mm, margin ciliolate,

apex subacute; petals ovate, ca. 4 mm, margin membranous, apex subrounded. Disk cupular, ca. 2 mm tall, pentagonous. Stamens 3; filaments flat, inserted at margin of disk; anthers forked, oblong. Ovary 3-locular, concealed in disk; ovules 2 per locule; style very short, subulate. Fruit not seen.

• Forest shade; below 100–200 m. S and SE Yunnan (Hekou, Maguan, Mengla).

**5. *Salacia hainanensis*** Chun & F. C. How, Acta Phytotax. Sin. 7: 56. 1958.

海南五层龙 hai nan wu ceng long

Climbing shrubs; branchlets gray-brown; annual branches densely verrucose lenticellate. Petiole strong and robust, 1.5–2 cm; leaf blade oblong-elliptic, 12–17 × 5–7.5 cm, leathery, abaxially light yellow, inconspicuously papillate, adaxially light black, shiny, base rounded to cuneate, margin entire, apex shortly and broadly mucronate or inconspicuously acuminate; lateral veins 7 or 8 pairs, broadly spreading, ascending. Fascicles axillary, several flowered; pedicel 1–1.5 cm, base with multicolumn small scales. Flowers yellow-green; sepals broadly elliptic, ca. 1 × 1.5 mm, margin membranous; petals horizontally spreading, elliptic, ca. 4.3 × 2.6 mm, apex rounded. Disk fleshy, cupular, 1–1.5 mm tall. Stamens 3; filaments flat, inserted at margin of disk. Ovary concealed in disk; ovules 2 per locule; style very short, thick. Fruit globose, ca. 4 cm in diam., glabrous, red when ripe, 1–3-seeded. Seeds elliptic, ca. 2.8 × 1.8 cm, black-brown when dry. Fl. May–Jun, fr. Aug–Oct.

• Mountainous forests; below 100–400 m. Hainan (Baoting).

**6. *Salacia amplifolia*** Merrill ex Chun & F. C. How, Acta Phytotax. Sin. 7: 55. 1958.

阔叶五层龙 kuo ye wu ceng long

Climbing or erect shrubs, to 4 m tall; branchlets green-yellow, glabrous. Petiole strong and robust, 1–1.5 cm, canalicate; leaf blade narrowly or broadly elliptic, 13–23 × (4–)6–8 cm, thickly papery, abaxially light yellow when dry, inconspicuously papillate, adaxially green-yellow, shiny, base broadly cuneate to rounded, margin weakly crimped, subentire or repando-crenulate, rarely serrulate, apex shortly acuminate to subacute; lateral veins 9–10 pairs, abaxially prominent, adaxially plane, reticulate veins conspicuous. Fascicles axillary or extra-axillary, several flowered; pedicel 8–9 mm, tenuous, base squamate; squamellae serrate, imbricate. Flowers green-white or light yellow; sepals broadly ovate, ca. 1.4 mm, apex subacute to obtuse, margin ciliate; petals subrounded, ca. 2.2 mm, broadly spreading. Disk cupular, brown-red when fresh, subpentagonous, flexing outward. Anthers transversely dehiscent. Ovary triangular; ovules 4 per locule, 2-columned; style very short. Fruit globose, yellow or red when ripe, up to 4.5 cm in diam., 4- or 5-seeded. Seeds ca. 3 × 1.6–2 cm, black when dry. Fl. Apr–May, fr. Aug–Oct.

• Thick forests; 200–300 m. S Hainan (Sanya).

**7. *Salacia sessiliflora*** Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 59: 56. 1922.

无柄五层龙 wu bing wu ceng long

Shrubs, to 4 m tall; branchlets dark gray, with verruciform

lenticels. Petiole 5–10 mm; leaf blade oblong-elliptic or oblong-lanceolate, 10–15 × 3.5–5 cm, thinly leathery, shiny, base rounded or broadly cuneate, margin weakly serrulate, apex acuminate to subacute; lateral veins 8 or 9 pairs, abaxially permanent, reticulate veins horizontally spreading. Fascicles axillary, few flowered; pedicel very short, ca. 1 mm. Flowers light green; sepals ca. 1 mm, ovate, margin ciliate, apex subacute; petals oblong, ca. 2 mm, apex subacute. Disk cupular, less than 1 mm tall. Stamens 3; filaments short, flat, inserted at margin of disk; anthers nephroid. Ovary concealed in disk, 3-loculed; style robust, conical, ca. 0.5 mm. Berry orange-yellow to orange-red, 2(–4.5) cm in diam., exocarp thinly leathery when dry, 3- or 4-seeded. Fl. Jun, fr. Oct.

• Mountainous bosks; (200–)600–1600 m. Guangdong (Lianxian), Guangxi, Guizhou (N to Guanling), S Hunan, SE Yunnan.

The fruits of this species are slightly sweet and edible.

**8. *Salacia aurantiaca*** C. Y. Wu in S. Y. Bao, Fl. Reipubl. Popularis Sin. 46: 290. 1981.

橙果五层龙 cheng guo wu ceng long

Climbing shrubs; branches slender, flat when young, becoming cylindrical, brown, glabrous, sparsely lenticellate. Petiole ca. 5 mm, grooved; leaf blade long elliptic, 9–14 × 4–6 cm, papery, shiny, base obtuse, margin sparsely denticulate to serrulate, apex acuminate; midvein prominent on both surfaces, lateral veins tenuous, reticulate veins horizontally spreading, conspicuous abaxially. Flowers not seen. Berry orange, 2–3 cm in diam., exocarp thinly leathery when dry, glabrous, 4-seeded. Seeds ca. 2 × 1.2 cm, angular. Fr. Nov.

• Sparse forests; 100–200 m. S and SE Yunnan (Hekou, Jinghong, Mengla).

**9. *Salacia confertiflora*** Merrill, Lingnan Sci. J. 14: 27. 1935.

密花五层龙 mi hua wu ceng long

Climbing shrubs, to 10 m tall; branchlets slightly compressed, glabrous. Petiole 5–7 mm; leaf blade elliptic or ovate-elliptic, 5–11 × 2–5 cm, subleathery, abaxially gray-white, adaxially dark green, shiny, base obtuse or broadly acute, margin entire, apex shortly acuminate to mucronate; lateral veins 7 or 8 pairs, abaxially prominent. Cymes glomerulate, axillary or terminal; peduncle 4–7 mm; pedicel 2–3 mm. Flowers green or light yellow, ca. 2.5 mm in diam.; sepals subrounded, margin erose; petals broadly obovate, 1.5–2 mm, apex rounded. Disk robust. Berry oblong, ca. 2 × 1.6 cm. Fl. Aug, fr. Nov.

• Forests; low to middle elevations. Hainan (Baoting, Sanya).

**10. *Salacia chinensis*** Linnaeus, Mant. Pl. 2: 293. 1771.

五层龙 wu ceng long

*Salacia prinoides* (Willdenow) Candolle; *Tontelea prinoides* Willdenow.

Climbing shrubs, to 4 m tall; branchlets angular. Petiole 8–10 mm; leaf blade elliptic, narrowly ovate-rotund or obovate-elliptic, (3–)5–11 × (1.5–)2–5 cm, leathery, abaxially brown-green when dry, adaxially shiny olive-green, base cuneate, mar-

gin sparsely denticulate, apex subacute to shortly acuminate; lateral veins 6 or 7 pairs. Fascicles axillary, 3–6-flowered; pedicel 6–10 mm. Sepals deltoid, up to 1 mm, margin ciliolate; petals broadly ovate, ca. 3 mm, broadly spreading or curved outward, apex rounded. Disk cupular, ca. 1 mm tall. Stamens 3; filaments short, flat, inserted at margin of disk; anthers forked. Ovary concealed in disk, 3-loculed; ovules 2 per locule; style very

short, conic. Berry globose or ovate, ca. 1 cm in diam., red when ripe, 1-seeded. Fl. Dec, fr. Jan–Feb.

Forests; below 100–700 m. Guangdong, Guangxi [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

The roots of this species have medicinal uses, including normalizing menstruation and invigorating circulation.

### 13. LOESENERIELLA A. C. Smith, Amer. J. Bot. 28: 438. 1941.

翅子藤属 *chi zi teng shu*

Peng Hua (彭华); A. Michele Funston

Woody lianas, puberulent or glabrescent, lenticellate, internodes slightly enlarged. Leaves opposite or subopposite, entire or crenulate. Inflorescences axillary or terminal, cymose. Flowers bisexual, 5-merous. Disk fleshy, cupular, sometimes arranged in rings, extrastaminal. Stamens 3; filaments tongue-like; anthers transversely dehiscent, extrorse. Ovary weakly triangular, partially or wholly concealed in disk, 3-locular; ovules 4–8 per locule. Fruits 1–3-fascicled capsules; capsule transversely flattened, leathery, loculicidally dehiscent. Seeds 4–8, with membranous basal wings, exalbuminous.

About 20 species: tropical Africa and Asia; five species (all endemic) in China.

1a. Leaf blade elliptic, 3–7 × 1.5–3.5 cm.

2a. Leaf blade narrowly elliptic, adaxially shiny, margin sparsely denticulate; peduncle 15–18 mm ..... 1. *L. concinna*

2b. Leaf blade elliptic, adaxially not shiny, margin sinuate, cartilaginous; peduncle less than 10 mm ..... 2. *L. griseoramula*

1b. Leaf blade lanceolate, ovate, or oblong-elliptic, 5–12(–21) × 2.5–6(–7.5) cm.

3a. Leaf blade lanceolate or broadly lanceolate, apex long caudate ..... 3. *L. lenticellata*

3b. Leaf blade ovate or oblong-elliptic, apex not caudate.

4a. Peduncle 1.5–3 cm; petals 4–5 × 1.7–2.5 mm; fruit elliptic ..... 4. *L. merrilliana*

4b. Peduncle 1–1.2 cm; petals 5–8 × 2.5–4 mm; fruit ovate-oblong ..... 5. *L. yunnanensis*

1. *Loeseneriella concinna* A. C. Smith, J. Arnold Arbor. 26: 170. 1945.

程香仔树 *cheng xiang zi shu*

Lianas; branchlets slender, glabrous, early brown-purple, then gray, conspicuously scabrous-lenticellate. Petiole 2–4 mm; leaf blade oblong-elliptic, (3–)4–7 × (1.2–)1.5–3.5 cm, papery, shiny, base rounded, margin sparsely denticulate; lateral veins 4–6 pairs, reticulate veins conspicuous. Cymes axillary or terminal, 2–3.5 cm, few flowered; peduncle slender, 15–18 mm, glabrescent; bracts and bractlets deltoid, less than 1 mm, margin ciliolate; pedicel 5–7 mm, pubescent. Flowers light yellow; sepals deltoid, ca. 0.7 × 1 mm, margin slightly ciliolate; petals oblong-lanceolate, 4–5 × 1.5–2 mm, thin, fleshy, margin ciliolate, apex abaxially appendiculate. Disk fleshy, cupular, ca. 1.5 mm tall, base subpentagonal, 2–2.5 mm in diam. Filaments ca. 1.3 mm; anthers slightly globose. Ovary triangular, partially concealed in disk, 3-loculed; ovules 4 per locule; style conic-subulate, ca. 1 mm, apex truncate. Fruit 1–3-fascicled capsules, peduncle not dilated; capsule obovate-elliptic, 3–5 × 2–3.5 cm, apex emarginate, 4-seeded. Seeds ca. 3 × 2 cm. Fl. May–Jun, fr. Oct–Dec.

• Valley forests, eastern regions and inshore islands. Guangdong, SE Guangxi.

2. *Loeseneriella griseoramula* S. Y. Bao, Fl. Reipubl. Popularis Sin. 46: 290. 1981.

灰枝翅子藤 *hui zhi chi zi teng*

Lianas; branchlets light gray, subcylindric, glabrous, inter-

nodes slightly dilated, lenticellate; lenticels thick, rounded, coarse. Petiole ca. 5 mm, grooved; leaf blade elliptic, 3–5 × 2.5–3.5 cm, papery, not shiny, base rounded, margin cartilaginous, sinuate, apex subacute; lateral veins 5 or 6 pairs, reticulate veins conspicuous. Cymes axillary or terminal; bracts deltoid, farinose, pubescent, margin ciliolate; peduncle slender, glabrescent, 8–10 mm; pedicel 1.5–3 mm, farinose, pubescent. Sepals deltoid, ca. 1 × 1.2 mm, densely farinose, pubescent; petals lanceolate, 5–6 mm, apex acuminate, abaxially farinose, pubescent, margin ciliolate. Disk fleshy, cupular, base pentagonal. Ovary 3-loculed, concealed in disk; style columnar. Fruits 3-fascicled capsules, peduncle dilated, exocarp grooved; capsule elliptic, ca. 4 × 2 cm. Fr. Jan.

• Mountainous slopes; 600–700 m. W Guangxi (Bose).

3. *Loeseneriella lenticellata* S. Y. Bao in Z. Y. Zhu et al., Legumes China, 638. 2007.

皮孔翅子藤 *pi kong chi zi teng*

Lianas; branchlets gray-green, compressed, grooved, becoming bottle-green with age, glabrous, densely lenticellate; lenticels small, rounded. Petiole 5–6 mm; leaf blade lanceolate or broadly lanceolate, 7–12(–21) × 2.5–3(–7.5) cm, leathery, glabrous, adaxially shiny, base cuneate, margin distally sparsely denticulate, apex long caudate; lateral veins 6–8 pairs, adaxially and abaxially prominent, reticulate veins conspicuous. Cymes few, 3–4 cm; branchlets and pedicels slender, farinose, pubescent; bracts and bractlets deltoid, less than 1 mm; peduncle typically 2–2.5 cm; pedicel ca. 0.5 mm. Flowers yellow-green; sepals membranous, ovate-deltoid, densely farinose, pubescent;

petals lanceolate, 6–7 mm, margin ciliolate, apex acute. Disk fleshy, base subpentagonous, ca. 3.5 mm in diam. Filaments ca. 1.5 mm; anthers nearly globose. Ovary triangular, concealed in disk; style ca. 1 mm, apex truncate. Fruits 3-fascicled capsules, base attenuate to a dilated peduncle; capsule ovate-oblong, 5–6.5 × 2.5–4 cm, apex rounded, 4- or 5-seeded. Seeds ca. 2.8 × 2 cm, base broadly winged. Fl. May–Jun, fr. Aug–Oct.

- Sparse forest valleys; 600–1100 m. W Guangxi, S Yunnan.

This name was originally published by S. Y. Bao (in W. P. Fang, FRPS 46: 290. 1981) but not validly so because two gatherings were indicated as types (*Vienna Code*, Art. 37.2).

**4. Loeseneriella merrilliana** A. C. Smith, J. Arnold Arbor. 26: 172. 1945.

翅子藤 chi zi teng

Lianas; branchlets brown-gray, slightly tetragonous, glabrous, sometimes densely scabrous lenticellate. Petiole 5–8 mm, robust; leaf blade oblong-elliptic, 5–10(–18) × 3–6 cm, leathery, base obtuse or narrowly rounded, margin sparsely denticulate to crenulate-serrate, apex abruptly cuspidate, cusp 5–10 mm; lateral veins 4–6 pairs, reticulate veins conspicuous. Cymes axillary or terminal, 2.5–6 cm; branchlet and peduncle slender, densely farinose, puberulent; peduncle 1.5–3 cm; bracts and bractlets deltoid, entire, farinose, puberulent; pedicel slender, 3–8 mm. Flowers light green; sepals ovate-deltoid, less than 1.5 mm, margin ciliolate, apex obtuse, abaxially farinose, puberulent; petals oblong-lanceolate, 4–5 × 1.7–2.5 mm, abaxially farinose, puberulent. Disk fleshy, cupular, 1–1.5 mm tall, base subpentagonous, 2–3 mm in diam. Style conic-subulate, 1–1.5 mm, apex truncate. Fruits 1–3-fascicled capsules, peduncle not

dilated; capsule elliptic or obovate-elliptic, 4.4–6 × 2.5–3.2 cm, base obtuse, apex rounded or emarginate, 3- or 4-seeded. Seeds broadly elliptic, basally winged, wing membranous. Fl. May–Jun, fr. Jul–Sep.

- Valley forests; 300–700 m. SW Guangxi, Hainan, S Yunnan.

**5. Loeseneriella yunnanensis** (Hu) A. C. Smith, J. Arnold Arbor. 26: 174. 1945.

云南翅子藤 yun nan chi zi teng

*Hippocratea yunnanensis* Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 152. 1940.

Lianas; branchlets brown, nearly quadrate, glabrous, scabrous lenticellate. Petiole up to 1 cm, grooved; leaf blade ovate or ovate-oblong, 5–10 × 3.5–6 cm, papery, base rounded or broadly cuneate, margin entire or weakly denticulate, apex acuminate or acute; lateral veins 7–9 pairs, reticulate veins conspicuous. Cymes axillary or terminal, ca. 3 cm; bracts and bractlets deltoid, margin ciliolate; peduncle short, 1–1.2 cm; pedicel 8–10 mm. Flowers light yellow; sepals deltoid-ovate, up to 2 mm, densely farinose, pubescent; petals ovate-oblong, ca. 5 mm, margin ciliolate, apex subacute. Disk fleshy, ca. 1.5 mm tall, base subpentagonous, ca. 3 mm in diam. Filaments flat, 2–2.5 mm; anther nearly globose. Ovary nearly triangular, mostly concealed in disk, 3-loculed; style conical, 1.2–1.6 mm, apex truncate. Fruits 1–3-fascicled capsules, peduncle not dilated; capsule ovate-oblong, 7–8 × 3–4 cm, base attenuate, 4-seeded. Seeds winged, ca. 2 × 1.2 cm. Fl. Mar–Jul, fr. Oct–Nov.

- Sparse limestone forests; 700–1200 m. W Guangxi, S and SE Yunnan.

**14. PRISTIMERA** Miers, Trans. Linn. Soc. London 28: 360. 1872.

扁蒴藤属 bian shuo teng shu

Peng Hua (彭华); A. Michele Funston

Woody lianas, glabrous or puberulent; branches terete to quadrate, internodes slightly dilate, lenticellate. Leaves opposite or subopposite, entire or serrate. Inflorescences axillary, rarely terminal, cymose, rarely thyrsoid. Flowers bisexual, 5-merous, light yellow. Disk fleshy, inconspicuous, annular or cupular, extrastaminal. Stamens 3; anthers transversely dehiscent, extrorse. Ovary compressed, triangular, 3-locular; ovules axile, 2–6 per locule, binate or imbricate from apex to base per locule. Fruits commonly 3-fascicled capsules or degenerating into only 1 capsule; capsule transversely flattened, thinly leathery, grooved, loculicidally dehiscent. Seeds 2–6, with membranous basal wing, conspicuously 1-grooved at middle, exalbuminous.

About 30 species: mainly in Central and South America and tropical Asia; four species (one endemic) in China.

- 1a. Petals 2–3 mm; capsule 6-seeded; leaf blade leathery ..... 4. *P. cambodiana*
- 1b. Petals ca. 1.5 mm; capsule 1-seeded; leaf blade papery.
  - 2a. Leaf blade usually 8–15 × 5–7 cm; ripe capsule 6.5–8.5(–12) × 2.5–3(–3.8) cm ..... 3. *P. arborea*
  - 2b. Leaf blade usually 3.5–8(–10) × 2–4(–5) cm; ripe capsule 2.5–4(–4.5) × 1–1.5 cm.
    - 3a. Young branches and inflorescence branches glabrous, usually subterete ..... 1. *P. indica*
    - 3b. Young branches and inflorescence branches densely glandular, setulose, sharply quadrangular ..... 2. *P. setulosa*

**1. Pristimera indica** (Willdenow) A. C. Smith, Amer. J. Bot. 28: 440. 1941.

扁蒴藤 bian shuo teng

*Hippocratea indica* Willdenow, Sp. Pl. 1: 193. 1797;  
*Reissantia indica* (Willdenow) N. Hallé.

Lianas; branchlets green, early slightly quadrangular, then cylindrical, glabrous. Petiole 1–1.5 cm, grooved; leaf blade ovate, ovate-elliptic, or rarely lanceolate, 3.5–7(–10) × 2.5–4(–5) cm, papery, base cuneate, distal margin sparsely denticulate, apex subacute; lateral veins 5 or 6 pairs, slender, reticulate veins horizontally spreading. Cymes 3–5 cm; bracts lanceolate, margin sparingly ciliolate; pedicel 8–10 mm. Flowers green-white;

sepals ovate-deltoid, ca. 1 mm, membranous, margin irregularly denticulate; petals oblong-deltoid, ca. 1.5 mm. Stamens longer than style; anthers slightly square. Ovary with 4 ovules per locule; style subtriangular. Fruits 1–3-fascicled capsules; capsule narrowly oblong-elliptic, 3–4 × 1–1.5 cm, apex emarginate. Seeds 2, ca. 2.5 cm, wing apex emarginate. Fl. May–Jul, fr. Sep–Oct.

Rare, shrubs of low-lying areas; below 100–1600 m. Guangdong (Xuwen), Hainan [India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

**2. *Pristimera setulosa*** A. C. Smith, *J. Arnold Arbor.* 26: 175. 1945.

毛扁蒴藤 mao bian shuo teng

Lianas; young branchlets slightly quadrangular, copiously setulose, annually glabrescent; old branches terete, cinereous. Petiole slender, 3–5 mm, slightly grooved on 2 sides; leaf blade elliptic, 4–7 × 2–4 cm, papery, yellow-green when dry, base obtuse or subacute to decurrent, margin sparsely denticulate to crenulate-serrate, apex obtuse or shortly cuspidate; lateral veins 4 or 5 pairs, reticulate veins conspicuous. Cymes solitary or binate, axillary, 1.5–3 cm; inflorescence branches copiously setulose; bracts papery, deltoid-oblong, 0.5–0.8 mm, glabrous; pedicel slender, shorter than 1 mm, obscurely setulose. Flowers yellow-white; sepals membranous, deltoid-oblong, ca. 0.5 mm, margin erosulate; petals papyraceous, elliptic-oblong, ca. 1 mm, entire, glabrous. Disk inconspicuous. Filaments ligulate; anthers nearly globose. Ovary depressed globose; ovules 2 per locule; style less than 1 mm, apex truncate. Fruits 1–3-fascicled capsules; capsule oblong-elliptic, 3.5–4 × 2–2.5 cm, flattened, apex rounded. Seeds 2, black-brown when dry. Fl. Jun–Feb, fr. Sep–Oct.

• Sparse limestone forests; 600–1600 m. SW Guangxi, SE Yunnan.

**3. *Pristimera arborea*** (Roxburgh) A. C. Smith, *J. Arnold Arbor.* 26: 176. 1945.

二籽扁蒴藤 er zi bian shuo teng

*Hippocratea arborea* Roxburgh, *Pl. Coromandel* 3: 3. 1811.

Lianas; branchlets brown-yellow, brown when old, glabrous, oblong lenticellate. Petiole 1–1.5 cm, grooved; leaf blade broadly ovate or ovate-oblong, 8–15 × 5–17 cm, papery, base rounded or broadly cuneate, margin sparsely dentate, apex acuminate; lateral veins 6 or 7 pairs, reticulate veins horizontally spreading. Cymes solitary, axillary or terminal, usually 5–6 cm, glabrous. Flowers light yellow; sepals oblong, less than 1 mm, apex rounded, entire. Stamens longer than style; filaments flattened; anthers nearly square. Ovary with 2 ovules per locule; style ca. 1 mm, apex truncate. Fruits 1–3-fascicled capsules; capsule narrowly elliptic, 6.5–8.5(–12) × 2.5–3(–3.8) cm, base cuneate, apex subacute, 2-seeded. Seed wing ca. 6 cm, apex emarginate. Fl. Jun, fr. Oct.

Shrubs of mountainous slopes and valleys; 300–1100 m. SW Guangxi, S Yunnan [Bhutan, India, Myanmar].

**4. *Pristimera cambodiana*** (Pierre) A. C. Smith, *J. Arnold Arbor.* 26: 177. 1945.

风车果 feng che guo

*Hippocratea cambodiana* Pierre, *Fl. Forest. Cochinch.* 4: t. 302b. 1893.

Lianas; branches terete, gray-brown and glabrous when young. Petiole 1–1.5 mm; leaf blade ovate-oblong, ovate-elliptic, or ovate-lanceolate, 12–15 × 5–9 cm, subleathery, base broadly cuneate, margin sparsely denticulate, apex acuminate or subacute; lateral veins 6 or 7 pairs, reticulate veins abaxially conspicuous, horizontally spreading. Flowers light green; sepals oblong, 2–3 × ca. 0.7 mm; petals involute. Filaments flat; anthers subglobose, basifixed. Ovary with 6 ovules per locule; style less than 1 mm; stigma slightly 3-lobed. Fruits 1–3-fascicled capsules; capsule oblong, 7–8(–12.5) cm, flattened, base rounded, apex obliquely truncate or obliquely emarginate, 6-seeded. Seeds flattened, black when dry. Fl. May–Jun, fr. Jun–Feb.

Sparse forests of mountainous slopes; 200–1500 m. S and SW Guangxi, S and SW Yunnan [Cambodia, Myanmar, Thailand, Vietnam].