

ICACINACEAE

茶茱萸科 cha zhu yu ke

Peng Hua (彭华)¹; Richard A. Howard²

Trees, shrubs, or lianas, occasionally with tendrils. Leaves alternate, rarely opposite, estipulate, veins mostly pinnate, sometimes palmate, margin usually entire, rarely lobed or denticulate. Inflorescences spikes, racemes, panicles, or cymes, axillary or terminal, rarely opposite leaves, with small bracts or not. Flowers regular, bisexual, sometimes polygamous or unisexual, (3 or)4- or 5(or 6)-merous. Calyx generally articulate to pedicel, usually persistent, small; lobes imbricate, rarely valvate. Petals present, rarely absent, free or connate at base, imbricate, rarely valvate, apices mostly inflexed or incurved. Stamens as many as petals; filaments free or on corolla tube, alternate with corolla lobes, often pilose at apex; anthers 2-celled, introrse. Disk rarely developed, cupular or divided. Ovary superior, 2-carpellate, coherent, 1-loculed, rarely 3–5-loculed; ovules 2, rarely 1 per locule, pendulous from apex, anatropous with abaxial raphe and micropyle facing upward; funicle usually thickened above micropyle; style rarely developed, simple; stigmas 2(or 3–5), or coherent to capitate or peltate. Fruit 1-loculed, 1-seeded, rarely 2-seeded, usually a drupe, rarely samaroid. Seeds pendulous, with a thin testa; endosperm usually present, embryo small, straight or curved; cotyledons usually ovate.

About 57 genera and 400 species: mainly in tropical or subtropical regions, especially in the S Hemisphere; 12 genera and 24 species (eight endemic) in China.

Chuang Hsuan. 1981. Icacinaceae (excluding *Peripterygium*). In: Fang Wen-pei, ed., Fl. Reipubl. Popularis Sin. 46: 37–65.

The Icacinaceae were treated in a broad sense in FRPS, i.e., including *Cardiopteris* (*Peripterygium*), which is here recognized as a distinct monogeneric family.

1a. Trees or erect shrubs.

2a. Flowers unisexual or plants polygamo-dioecious.

3a. Large trees; young branches, young leaves, and inflorescences with appressed stellate scales; filaments shorter than anthers 1. *Platea*

3b. Shrubs or small trees; branches, leaves, and inflorescences without stellate scales; filaments ca. 2 × or more longer than anthers.

4a. Cymes di- or trichotomous, axillary, terminal, or opposite leaves; drupe usually with persistent stigma; calyx gamosepalous, cupular; filaments free from corolla tube, often pilose 2. *Gomphandra*

4b. Spikes or racemes axillary; drupe without persistent stigma; calyx chorisepalous at least apically; filaments inserted on corolla tube, glabrous 3. *Gonocaryum*

2b. Flowers bisexual.

5a. Ovary obliquely gibbous, style eccentric; fruit with basal disciform fleshy appendage 4. *Apodytes*

5b. Ovary gibbous, style centric; fruit without fleshy appendage.

6a. Petals spatulate, free at base, inside glabrous; connective protruding; disk complete, connate with ovary; fruit with a thin mesocarp; leaf margin sinuate 5. *Pittosporopsis*

6b. Petals loriform, connate at base, hairy; connective not protruding; disk divided into 5 leaflike lobes; fruit with a fleshy mesocarp; leaf margin entire 6. *Nothapodytes*

1b. Lianas or climbing shrubs.

7a. Leaves opposite or subopposite, tendrils present; leaf margin entire.

8a. Petals hairy, coherent, campanulate-funnelform, fleshy; filaments slender, upward gradually dilated into a connective 7. *Mappianthus*

8b. Petals outside densely hairy, coherent only at base; filaments much shorter than anthers 8. *Iodes*

7b. Leaves alternate, tendrils absent; leaf margin serrulate.

9a. Flowers bisexual, in cymes 9. *Hosiea*

9b. Flowers unisexual, in spikes or racemes.

10a. Petals absent; flowers in spikes 10. *Pyrenacantha*

10b. Petals present; flowers in racemes.

11a. Calyx 5-lobed; corolla choripetalous; leaf blade sparsely serrulate, palmately veined; flowers in extra-axillary racemes 11. *Natsiatum*

11b. Calyx 4-lobed; corolla gamopetalous, tubular; leaf margin sinuate; flowers in several axillary fascicled racemes 12. *Natsiatopsis*

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1. PLATEA Blume, Bijdr. 646. 1826.

肖榄属 xiao lan shu

Trees. Young branches, young leaves, and inflorescences with rust-colored stellate scales or simple hairs. Leaf blade leathery, with palmate veins, margin entire. Plants polygamous or dioecious; staminate flowers in axillary interrupted spikes, or in panicles; pistillate flowers in short, axillary racemes. Sepals 5, free or united at base, imbricate. Petals 5, connate at base into a very short tube, apex free, valvate, in pistillate flowers early deciduous or absent. Stamens 5, inserted at corolla base, alternate with corolla lobes; filaments shorter than anthers; anthers retrorse. Ovary (in staminate flowers reduced or absent) globose to terete; stigma broadly discoid. Drupe terete; exocarp blue-black, thin; endocarp woody, with reticulate ribs.

About five species: tropical Asia; two species (one endemic) in China.

- 1a. Leaf blade apically acuminate, base rounded or obtuse; petiole 2–3.5 cm 1. *P. latifolia*
 1b. Leaf blade apically obtuse, base broadly cuneate; petiole 1–1.5 cm 2. *P. parvifolia*

1. *Platea latifolia* Blume, Bijdr. 647. 1826.

阔叶肖榄 kuo ye xiao lan

Platea hainanensis R. A. Howard; *Platystigma myristicum* R. Brown ex J. D. Hooker; *Sideroxylon gamblei* C. B. Clarke.

Trees 6–25 m tall. Bark gray; young parts with rust-colored stellate scales or hairy. Petiole 2–3.5 cm; leaf blade abaxially light green, adaxially dark green, elliptic or oblong, 10–19 × 4–9 cm, midvein abaxially prominent, adaxially minutely concave, lateral veins 6–14 pairs, prominent abaxially, anastomosing near margin, reticulate veins slightly conspicuous, slender, base rounded or obtuse, apex acuminate. Staminate flowers in large axillary panicles 4–10 cm, densely tomentose; bracts ovate, ca. 1 mm; sepals ovate, 0.5–0.8 mm, ciliate; petals green, ovate-elliptic, 1.5–1.8 mm, glabrous, apex incurved; filaments white; anthers yellow, oblong, ca. 0.8 mm; ovary reduced, conical. Pistillate flowers in short axillary racemes 1–2 cm, densely tomentose; bracts lanceolate, 4–7 mm; pedicels 3–4 mm, stout; sepals triangular, ca. 3 mm, outside with dense scales, inside glabrous, margin ciliate; ovary terete; stigma discoid. Drupe ellipsoid-ovoid, 3–4 cm, 1.5–2 cm in diam., with persistent stig-

ma and persistent calyx. Fl. Feb–Apr, fr. Jun–Nov.

Dense forests in valleys; 900–1300 m. S Guangdong, S Guangxi, Hainan, SE Yunnan [Bangladesh, India, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, Vietnam].

2. *Platea parvifolia* Merrill & Chun, Sunyatsenia 5: 112. 1940.

东方肖榄 dong fang xiao lan

Trees 8–18 m tall. Bark gray; branchlets glabrate. Petiole 1–1.5 cm, adaxially grooved; leaf blade abaxially light green, adaxially dark green, oblong, 6–10 × 2.5–4 cm, leathery or thinly so, midvein prominent abaxially, slightly concave adaxially, lateral veins 6 or 7 pairs, slightly prominent abaxially, reticulate veins inconspicuous, base broadly cuneate, apex obtusely acuminate. Flowers reddish green in bud. Staminate flowers in many-flowered axillary panicles, not seen. Pistillate flowers in few-flowered axillary racemes; racemes ca. 1 cm, densely tomentose; bracts ovate, ca. 2 mm; sepals triangular, ca. 2 mm, denticulate; ovary terete; stigma discoid. Drupe green, ellipsoid-ovoid, ca. 3 × 1.5 cm, apex obtuse; fruiting peduncle 1–1.5 cm. Fl. after Feb, fr. Oct.

• Forests; 700–900 m. Hainan (Dongfang).

2. GOMPHANDRA Wallich ex Lindley, Nat. Syst. Bot., ed. 2, 439. 1836.

粗丝木属 cu si mu shu

Trees or shrubs. Leaves alternate, entire. Flowers small, unisexual (plants dioecious), in di- or trichotomous cymes, axillary, terminal, or opposite leaves; staminate cymes many flowered; pistillate cymes few flowered; bracts small. Sepals united in a 4- or 5-lobed cup. Petals 4 or 5, cohering in a short tube, valvate. Staminate flowers with stamens 4 or 5; filaments fleshy, clavate, 2 or 3 × as long as anthers, pilose, rarely glabrous, free from corolla tube. Disk pulvinate, coherent with ovary or reduced ovary. Pistillate flowers with stamens undeveloped or without pollen; disk often absent; ovary terete or obovoid; stigma capitate or discoid, sometimes 2- or 3-lobed, sessile. Drupe usually with persistent stigma at apex.

About 33 species: tropical Asia to NE Australia; three species in China.

Gomphandra, traditionally in the Icacinaceae, is resolved as one of the five genera contained in a strongly supported clade based on *ndhF*, *rbcL*, *atpB*, and 18S rDNA genes, which led to the establishment of a new family, Stemonuraceae (Kårehed, Amer. J. Bot. 88: 2259–2274. 2001).

- 1a. Leaf blade abaxially persistently velutinous or tomentose 1. *G. mollis*
 1b. Leaf blade densely or sparsely yellow pubescent, glabrescent, or glabrous from beginning.
 2a. Leaf blade narrowly lanceolate or narrowly or broadly elliptic, glabrescent 2. *G. tetrandra*
 2b. Leaf blade obovate-elliptic, glabrous from beginning 3. *G. luzoniensis*

1. *Gomphandra mollis* Merrill, J. Arnold Arbor. 23: 175. 1942.

毛粗丝木 mao cu si mu

Gomphandra tonkinensis Gagnepain; *Stemonurus mollis* (Merrill) R. A. Howard.

Shrubs or small trees, 2–7 m tall. Branchlets terete, pubescent. Petiole 1(–3) cm, densely yellow pubescent; leaf blade dark black or black-olivaceous, shiny when dry, oblong to obovate-oblong, 11–28 × 3–13 cm, papery or submembranous when young, abaxially densely light yellow pubescent, adaxially gla-

brous, sparsely hairy or densely yellow pubescent on midvein when young, lateral veins 8–10 pairs, prominent abaxially, usually conspicuous adaxially, base subrounded, apex acuminate to acute. Cymes opposite leaves, 4–5 cm, densely yellow pubescent, with peduncle 1–3 cm, with 4 obviously whorled branches. Flowers many, in cymose heads at apices of branches. Staminate flowers white, ca. 5 mm, with very short pedicel or subsessile; calyx forming a cup ca. 0.5 mm, truncate or 5-lobed, margin shortly ciliate; petals ca. 3 mm, united at base; stamens ca. 4 mm; filaments flat, apex pilose, ca. 1 mm wide, gradually thinner toward base; pili 1–1.5 mm, apex clavate; anthers ellipsoid, 0.7–1 mm; ovary undeveloped, conical, ca. 1 mm, glabrous. Pistillate flowers unknown. Drupe ellipsoid, ca. 15 × 7 mm; fruiting peduncle densely yellow villous. Fl. Mar–Jun, fr. Apr–Jul.

Forests, valleys, roadsides; 100–1100 m. SE Yunnan [N Vietnam].

2. *Gomphandra tetrandra* (Wallich) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 15: 238. 1940.

粗丝木 cu si mu

Lasianthera tetrandra Wallich in Roxburgh, Fl. Ind. 2: 328. 1824; *Gomphandra cambodiana* Pierre ex Gagnepain; *G. chingiana* (Handel-Mazzetti) Sleumer; *G. hainanensis* Merrill; *G. pauciflora* Craib; *Nyssa sinensis* Oliver var. *oblongifolia* W. P. Fang & T. P. Soong; *Stemonurus chingianus* Handel-Mazzetti; *S. hainanensis* (Merrill) Hu.

Shrubs or small trees, 2–10 m tall. Bark gray; young branches green, densely or sparsely yellow pubescent. Petiole 0.5–1.5 cm, minutely pubescent; leaf blade shiny, abaxially light green, adaxially dark green, narrowly lanceolate or narrowly or broadly elliptic, 6–15 × 2–6 cm, membranous when young, glabrate or abaxially yellowish pubescent, midvein conspicuously prominent abaxially, lateral veins 6–8 pairs, obliquely ascending, reticulate veins inconspicuous, base cuneate, apex acuminate or caudate. Cymes opposite leaves, sometimes axillary, 2–4 cm, densely yellow-white pubescent; peduncle 2–5

mm. Staminate flowers yellow-white or white-green, 5-merous, ca. 5 mm; calyx short, to 0.5 mm, shallowly 5-lobed; corolla campanulate, 3–4 mm; lobes subtriangular, apex abruptly acuminate, incurved; stamens slightly longer than petals, 3.5–4.5 mm; filaments flat, ca. 1 mm wide, fleshy, apex white clavate pilose; anthers yellow-white, ovoid, ca. 0.5 mm; ovary undeveloped, small, 0.5–1 mm. Pistillate flowers yellow-white, ca. 5 mm; calyx as in staminate flowers; corolla campanulate, ca. 5 mm; lobes narrowly triangular, margin involute, apex incurved; stamens undeveloped, shorter than corolla; filaments as in staminate flowers; ovary terete, glabrous or sometimes pubescent; stigma small, 5-lobed to ovary. Drupe berrylike, changing from green to yellow to white, ellipsoid, (1.2–)2–2.5 cm × (5–)7–12 mm, conspicuously longitudinally ribbed when dry; fruiting peduncle slightly pubescent. Fl. and fr. all seasons.

Sparse woods, dense forests, roadside scrub, valleys; 500–2200 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Cambodia, India, Laos, Myanmar, Sri Lanka, Thailand, Vietnam].

3. *Gomphandra luzoniensis* (Merrill) Merrill, Enum. Philipp. Fl. Pl. 2: 490. 1923.

吕宋毛蕊木 lü song mao rui mu

Urandra luzoniensis Merrill, Philipp. J. Sci., C, 3: 242. 1908; *Stemonurus luzoniensis* (Merrill) R. A. Howard.

Trees. Branchlets terete, glabrous. Petiole 1–1.5 cm, stout, glabrescent, strongly grooved abaxially; leaf blade obovate-elliptic, 7–9 × 5–6.5 cm, glabrous, lateral veins 3 or 4 pairs, veinlets obsolete, base obtuse-rounded or cuneate, apex obtuse or rounded. Inflorescences axillary, with 3–5 cymes on a common peduncle, densely pubescent. Calyx cupular, minutely 5-toothed, glabrescent. Petals 5, whitish, oblong, 4–5 mm, glabrous. Stamens 5; filaments flattened, with long hairs below anthers and on connective. Ovary cylindrical, glabrous; stigma discoid, sessile. Drupe oblong, ca. 2 cm × 8–10 mm, glabrous, with many longitudinal ridges. Fl. and fr. Feb.

Taiwan (Huoshao Dao, Lan Yu) [Philippines].

3. GONOCARYUM Miquel, Fl. Ned. Ind., Eerste Bijv. 343. 1861.

琼榄属 qiong lan shu

Shrubs or small trees. Leaves alternate, leathery, glabrous, margin entire. Plants polygamo-dioecious or flowers bisexual, in 1 to several axillary dense or interrupted spikes or racemes. Calyx free at least at apical 3/4; sepals 5 or 6, imbricate. Corolla tubular; lobes 5, valvate. Stamens 5, rudimentary in pistillate plants; filaments glabrous, 3–5 × as long as anthers, rarely very short, adnate on corolla tube, alternate petals; anthers ovoid or narrowly ellipsoid. Ovary conical, reduced and sterile in staminate flowers; style subulate or terete; stigma thickly peltate. Drupe ellipsoid, apex subtruncate; exocarp thick, corky-spongy; endocarp thin, woody.

Nine or ten species: S and SE Asia; two species in China.

1a. Plants polygamo-dioecious; sepals 5; filaments 3–4 mm; leaves flat, midvein flat 1. *G. lobbianum*
1b. Flowers bisexual; sepals 6; anthers sessile; leaves folded, midvein curved 2. *G. calleryanum*

1. *Gonocaryum lobbianum* (Miers) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 39: 72. 1870.

琼榄 qiong lan

Platea lobbiana Miers, Ann. Mag. Nat. Hist., ser. 2, 10: 110. 1852; *Gonocaryum maclurei* Merrill.

Shrubs or small trees, 1.5–8(–10) m tall. Bark gray; branchlets light olive green to light gray-brown, glabrous. Petiole 1–2 cm, stout; leaf blade shiny, olive green when dry, abaxially slightly light green and adaxially dark green when fresh, narrowly to broadly elliptic, 9–20(–25) × 4–10(–14) cm, leathery, glabrous, midvein abaxially conspicuously prominent, flat, adaxially conspicuous, slightly concave, lateral veins 5 or

6(–9) pairs, abaxially prominent, adaxially slightly prominent, reticulate veins inconspicuous, slender, base broadly cuneate or subrounded to oblique on one side. Plants polygamo-dioecious. Staminate flowers in dense interrupted short spikes, 7–8 mm, with short pedicel; sepals 5, broadly elliptic, ca. 2 mm, valvate, connate only at base, margin ciliate; corolla white, tubular, ca. 6 mm, slightly fleshy, glabrous, with 5 triangular lobes; lobes incurved; stamens 5, on corolla tube, filaments 3–4 mm; anthers ovoid, ca. 1.5 mm; ovary ca. 2.5 mm, pubescent. Pistillate or bisexual flowers few, in racemes on short peduncles; calyx lobes 5, ovate, ca. 2.5 mm, valvate; corolla tubular, ca. 6 mm, 5-lobed, lobes triangular; filaments ca. 4 mm; anthers ca. 0.5 mm; ovary broadly ovoid, glabrous; style hairy; stigma small, 3-lobed. Drupe changing from green to purple-black, ellipsoid to narrowly ellipsoid, 3–4.5(–6) × 1.8–2.5 cm, with longitudinal ribs when dry, apex with a short mucro; exocarp 3–4 mm thick. Fl. Jan–Apr, fr. Mar–Oct.

Dense valley forests; 500–1800 m. Hainan, Yunnan [Cambodia, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

This is a rare species. The seed oil is used for making soap and lubricating oil.

2. *Gonocaryum calleryanum* (Baillon) Beccari, Malesia 1: 123. 1877.

台湾琼榄 tai wan qiong lan

Phlebocalymna calleryana Baillon, Adansonia 9: 147. 1869; *Gonocaryum diospyrosifolium* Hayata.

Shrubs. Branchlets and young branches curved, terete; branchlets gray; young branches light brown or black when dry. Petiole 1–2 cm; leaf blade light yellow-green when dry, abaxially not shiny, adaxially shiny, orbicular or broadly ovate, 8–14 × 5–7 cm, leathery, midvein and lateral veins abaxially prominent, reticulate veins inconspicuous abaxially, conspicuously prominent adaxially, base rounded to cuneate, usually unequal, margin entire. Racemes short, 1–2 cm, few flowered. Flowers bisexual, without or with short pedicel, pubescent; bractlets broadly triangular, ca. 1.5 mm. Sepals 6, unequal, orbicular, ca. 2 × 2 mm, ciliate. Corolla cylindric, ca. 5 mm; tube ca. 3 mm, apically 5-lobed; lobes triangular, ca. 2 mm, base ca. 2 mm wide, valvate, apex acute, thickened, incurved. Stamens 5, inserted at corolla throat; anthers sessile, ovoid-triangular, ca. 0.8 × 0.8 mm. Ovary conical, ca. 1.5 × 1.5 mm, minutely hispid, with a very short stalk; stigma ca. 0.2 mm. Drupe black, ovoid to ellipsoid, 2.5–3.5 × 2–2.2 cm, glabrous; exocarp thin, fragile. Fl. and fr. unknown.

Forests on coral reef islands; sea level. Taiwan (Hengchun peninsula, Lan Yu) [Indonesia, Philippines].

This is a rare species.

4. **APODYTES** E. Meyer ex Arnott, J. Bot. (Hooker) 3: 155. 1840.

柴龙树属 chai long shu shu

Trees or shrubs. Leaves alternate, petiolate, usually black when dry, veins pinnate, margin entire. Flowers bisexual, small, in terminal or axillary panicles or cymose panicles. Calyx cupular, small, 5-toothed. Petals 5, free or slightly united at base, valvate, usually glabrous. Stamens 5, alternate petals and inserted at petal base; filaments dilated above; anthers sagittate, 2-lobed, dorsifixed. Ovary obliquely gibbous; style eccentric, slightly curved; stigma small, oblique. Drupe ovoid or ellipsoid, oblique; exocarp fragile, crustaceous.

One variable species (see H. Sleumer, Blumea 17: 189. 1969): tropical and subtropical Africa and tropical Asia, also extending into S China.

1. *Apodytes dimidiata* E. Meyer ex Arnott, J. Bot. (Hooker) 3: 155. 1840.

柴龙树 chai long shu

Apodytes cambodiana Pierre; *A. yunnanensis* Hu.

Shrubs or trees, (3–)7–10(–20) m tall. Bark gray-white, smooth; branchlets gray-brown, lenticellate; young branches densely yellow puberulent. Petiole 1–2.5 cm, densely puberulent when young, becoming sparsely so; leaf blade adaxially yellow-green, black or black-brown when dry, elliptic or narrowly elliptic, 6–15 × 3–7.5 cm, glabrous or abaxially on midvein slightly hairy, lateral veins 5–8 pairs, conspicuous abaxially, reticulate veins slender, base cuneate, apex acute or shortly

acuminate. Panicles terminal, densely yellow puberulent. Flowers light yellow or white; pedicel shorter than 1 mm, densely yellow puberulent. Calyx yellow-green, ca. 0.5 mm, outside sparsely puberulent. Petals yellow-green, oblong, ca. 4 × 1 mm. Filaments purple-green, ca. 1.5 mm; anthers yellow-green, ca. 1.5 mm. Ovary ca. 1.5 mm, densely yellow pubescent; style ca. 2.5 mm, glabrous. Drupe green when young, red to black-red when mature, oblong, ca. 10 × 7 mm, base with a discoid fleshy appendage, with persistent style. Fl. and fr. all seasons.

Sparse woods, dense forests, scrub; 500–1900 m. W Guangxi, S Hainan, S Yunnan [India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand; tropical and subtropical Africa].

Also known as “white pear,” it is a good timber species.

5. **PITOSPOROPSIS** Craib, Bull. Misc. Inform. Kew 1911: 28. 1911.

假海桐属 jia hai tong shu

Shrubs or small trees. Leaves alternate, narrowly elliptic-oblongate or narrowly elliptic, margin sinuate, cartilaginous, glabrescent. Flowers large, bisexual, in axillary few-flowered cymes; peduncle short, jointed; bracts 3 or 4. Calyx deeply 5-lobed, accrescent, persistent at base of drupe in fruit. Petals 5, spatulate, free, valvate, outside puberulent, apex introrse. Stamens 5, alternate petals and adnate at base of petals; filaments flat, abruptly contracted upward; anthers ellipsoid, base 2-lobed; connective extended into

an acute mucro. Disk connate with ovary. Ovary ellipsoid; style strict at first, becoming geniculate, persistent. Drupe large, subglobose to oblong, slightly oblique; mesocarp thin; endocarp sub-bony, rather thin; endosperm ruminant.

One species: China, Laos, Myanmar, Thailand, N Vietnam.

1. *Pittosporopsis kerrii* Craib, Bull. Misc. Inform. Kew 1911: 28. 1911.

假海桐 *jia hai tong*

Pittosporopsis nervosa Gagnepain; *Pittosporum nervosum* (Gagnepain) Gowda; *Stemonurus yunnanensis* Hu.

Plants (1)–4–7(–17) m tall. Bark red-brown; branchlets brown-green, sparsely lenticellate; young branches green, slightly puberulent. Petiole 1.5–2.5 cm, glabrescent, adaxially grooved; leaf blade shiny, abaxially light green, adaxially dark green, 12–22 × 4–8.5 cm, abaxially slightly hairy on midvein, lateral veins 5–7 pairs, midvein and lateral veins prominent abaxially, slightly concave adaxially, reticulate veins sparse and conspicuous, base gradually narrowed, apex acuminate or obtuse. Cymes 3–4.5 mm, puberulent; peduncle 1.5–2.5 mm, with

branches 0.4–0.8 cm; pedicel yellow puberulent; bractlets 3 or 4, scalelike. Flower buds green, oblong. Calyx ca. 2 mm; lobes triangular, ca. 1 × 1 mm, outside sparsely golden puberulent. Petals yellow-green at first, becoming white-green to white, 5–7 × 1.5–2 mm, except for lateral margins densely golden puberulent outside in bud, glabrescent to glabrous, fragrant. Stamens ca. as long as petals; filaments ca. 1 mm wide; anthers white, 1–1.5 mm. Disk to 1 mm. Ovary conical, 1.5–2 mm; style clavate, 3–4 mm. Drupe white-green, edible when young, brown and 2-ribbed when dry, 2.5–3.5 × 2–2.5 cm. Seeds with a light red-brown, very thin testa; endosperm yellow-white. Fl. Oct–May, fr. Feb–Oct.

Dense valley forests; 300–1600 m. S Yunnan [Laos, Myanmar, Thailand, N Vietnam].

The seeds are edible and are said to be used medicinally.

6. NOTHAPODYTES Blume, Mus. Bot. 1: 248. 1851.

假柴龙树属 *jia chai long shu shu*

Trees or shrubs. Branchlets usually angular. Leaves alternate, rarely opposite; petiole grooved; leaf blade entire, veins pinnate. Cymes or corymbs terminal, rarely axillary. Flowers usually foetid, bisexual or polygamous, without bracts. Calyx persistent, cupular or campanulate, small, shallowly 5-lobed. Petals 5, loriform, valvate, outside strigose, inside villous, apex reflexed, usually glabrous. Stamens usually free; filaments filiform, usually flat, fleshy, basally slightly dilated; anthers ovoid. Disk leaflike, inside hairy, 5–10-lobed. Ovary hispid, rarely glabrous; style filiform to shortly conical; stigma capitate, truncate, rarely 2-lobed or concave. Drupe ellipsoid, ovoid, or oblong-obovoid, berrylike; mesocarp fleshy; endocarp thin, rugose or smooth. Seeds with copious endosperm.

Seven species: tropical Asia, reaching into temperate regions of China; six species (five endemic) in China.

1a. Leaf blade glabrous.

2a. Leaf blade apically obtuse or rounded; drupe oblong-ovoid 1. *N. obtusifolia*

2b. Leaf blade apically acuminate; drupe ellipsoid 2. *N. collina*

1b. Leaf blade ± hairy.

3a. Leaf bases usually equal, blade oblong or oblanceolate; petals 6.3–7.4 mm 3. *N. pittosporoides*

3b. Leaf bases unequal, blade usually elliptic; petals shorter than 6 mm.

4a. Leaf blade 10–20 cm, disk hirsute inside and at margin 4. *N. nimmoniana*

4b. Leaf blade 3–13 cm, disk glabrous.

5a. Leaf blade abaxially densely villous or shortly strigose; drupe ellipsoid 5. *N. tomentosa*

5b. Leaf blade abaxially glabrescent, or more sparsely, somewhat rigidly strigose; drupe ovoid 6. *N. obscura*

1. *Nothapodytes obtusifolia* (Merrill) R. A. Howard, J. Arnold Arbor. 23: 70. 1942.

假柴龙树 *jia chai long shu*

Mappia obtusifolia Merrill, Lingnan Sci. J. 14: 28. 1935.

Shrubs or trees, 3–8(–24) m tall. Bark gray; branches terete, glabrous. Leaves alternate or nearly opposite at apices of branches; petiole terete, 1.5–2.5 cm; leaf blade olive green, oblanceolate-oblong, rarely oblong, 9–18 × 3–6.5 cm, thinly leathery, glabrous, lateral veins 6–8 pairs, arcuate ascending, forking abruptly midway to margin, laxly reticulate, prominent, reticulate veins sparse, base cuneate to acute, apex obtuse or rounded. Cymes terminal, 3–6 cm in diam.; peduncle 3–4 cm; axis slightly flattened, moderately strigose. Calyx campanulate, ca. 1.5 mm, outside strigose, margin 5-toothed. Petals white, oblong to lan-

ceolate, 6–7.2 mm, outside densely yellow shortly strigose, inside weakly hirsute, apex inflexed. Stamens 5.5–6.4 mm; filaments 4–5 mm; anthers ovoid-oblong, 2–2.7 mm. Disk thin, ca. 0.3 mm tall, fleshy, outside glabrous, margin crenulate, ciliate, inside hirsute. Ovary ca. 1 mm in diam., hirsute; style ca. 2 mm, slightly hirsute; stigma 2-lobed, oblique. Drupe oblong-ovoid, 0.9–1.3 cm, 6–9 mm in diam., flattened, apex with a short mucro, glabrescent, endocarp thin, nearly smooth. Seeds 7.8–9 mm; cotyledons ovate, 5.2–6 mm wide, strongly 3-veined, base cordate; radicle cylindrical, ca. 2.3 mm. Fl. and fr. Dec–Apr.

• Forests; low elevations. S Hainan (Sanya).

2. *Nothapodytes collina* C. Y. Wu, Fl. Yunnan. 1: 169. 1977.

厚叶假柴龙树 *hou ye jia chai long shu*

Trees, sometimes small, 4–12 m tall. Branchlets angular,

glabrous or slightly hairy. Petiole 1.5–3 cm, glabrous or adaxially slightly pubescent when young; leaf blade becoming black when dry, elliptic, 10–21 × 4–8 cm, firmly papery, glabrous, midvein conspicuously prominent abaxially, lateral veins 6–9 pairs, abaxially prominent, reticulate veins slender, conspicuous, base broadly cuneate, unequal, apex acuminate; axillary buds densely white hispid. Cymes terminal, ca. 3.5 cm, hispid; flowers not seen. Drupe green when young, black when mature, ellipsoid, ca. 1.5 × 1 cm. Seeds ca. 10 × 7 mm; cotyledons cordate, large, ca. 7 mm, conspicuously 5-veined. Fl. unknown, fr. Nov–Mar.

• Dense forests, sparse woods in valleys; ca. 700 m. S Yunnan (Xishuangbanna).

3. *Nothapodytes pittosporoides* (Oliver) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 15: 247. 1940.

马比木 ma bi mu

Mappia pittosporoides Oliver, Hooker's Icon. Pl. 18: t. 1762. 1888; *Neoleretia pittosporoides* (Oliver) Baehni.

Shrubs small, rarely trees, 1.5–5(–10) m tall. Bark gray; branches mostly gray-green, terete, rarely angular; younger branches strigose, glabrescent. Petiole 1–3 cm, adaxially broadly sulcate, commonly strigose at least in grooves; leaf blade abaxially light green, black when dry, adaxially dark green, shiny, oblong or oblanceolate, (7–)10–15(–24) × 2–4.5(–6) cm, thinly leathery, golden strigose, abaxially glabrous at maturity, midvein usually yellow, abaxially prominent, commonly hirsute, lateral veins 6–8 pairs, arcuate ascending, reticulate far from margin, abaxially very conspicuously prominent, often hirsute, base cuneate, apex long acuminate. Cymes terminal; peduncle usually flat, hirsute. Calyx green, campanulate, ca. 2 mm, membranous, outside sparsely strigose, margin ciliate, 5-toothed, teeth deltoid. Petals yellow, loriform, 6.3–7.4 × 1–2 mm, outside strigose, inside long villous, apex reflexed, ca. 1 mm. Filaments 4–5 mm, bases slightly thickened; anthers ovoid, ca. 1 mm. Disk persistent in fruit, fleshy, irregularly lobed or deeply crenulate, inside sparsely hirsute. Ovary subglobose, 1.1–1.4 mm in diam. at anthesis, densely hirsute; style green, 1.5–2 mm; stigma capitate. Drupe green when young, becoming yellow, then red when ripe, ellipsoid to oblong-ovoid, slightly flattened, 1–2 cm × 6–8 mm, usually minutely pubescent when mature, apex distinctly umbonate; endocarp thin, rugose; endosperm foetid; cotyledons ovate, ca. 4.5 × 3.5–4 mm; radicle terete, ca. 2 mm. Fl. Apr–Jun, fr. Jun–Aug.

• Forests; 100–1600(–2500) m. Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan.

4. *Nothapodytes nimmoniana* (J. Graham) Mabblerley in K. S. Manilal, Bot. Hist. Hort. Malab. 88. 1980; Taxon 29: 606. 1980.

臭味假柴龙树 chou wei jia chai long shu

Premna nimmoniana J. Graham, Cat. Pl. Bombay 155. 1839; *Mappia insularis* (Matsumura) Hatusima; *M. ovata* Miers; *M. ovata* var. *insularis* Matsumura; *Nothapodytes dimorpha* (Craib) Sleumer; *N. foetida* (Wight) Sleumer; *Stemonurus foetidus* Wight.

Trees ca. 15 m tall; branches conspicuously angular. Leaves alternate; petiole (1.5–)3(–5) cm, adaxially sulcate, strigose, especially in grooves; leaf blade black when dry, elliptic-ovate or lanceolate-oblong, 10–20 × 5–12 cm, membranous to thinly leathery, abaxially glabrous or sparsely hispid or pubescent, adaxially sparsely tomentose, lateral veins 7 or 8 pairs, abaxially prominent, base attenuate or rounded, unequal, apex acuminate. Cymes or cymose corymbs terminal; peduncle flattened or angled, tomentose. Calyx campanulate, 2.5–3 mm in diam., strigose or glabrous, 5-toothed. Petals lanceolate-oblong, 4.2–5 × 1.5–1.8 mm, outside appressed strigose, inside villous, apices incurved. Filaments 3–4 mm; anthers ovoid, 1–1.2 mm. Disk slightly lobed, outside glabrous, margin and inside hirsute. Ovary ovoid, 1–1.5 mm in diam., densely hirsute or pubescent; style 1.1–1.4 mm, stout, densely hirsute to glabrous; stigma 2-lobed. Drupe black, oblong-ovoid, 1–2 × 0.8–1 cm, usually minutely pubescent; endocarp thin, woody, endosperm foetid; embryo usually ca. 1/2 as long as seeds; cotyledons ovate, usually displaced laterally, margin superimposed. Fl. and fr. unknown.

Islands; sea level. Taiwan (Taidong) [Cambodia, India, Indonesia (Sumatra), Japan (Ryukyu Islands), Myanmar, Philippines (Luzon), Sri Lanka, Thailand].

5. *Nothapodytes tomentosa* C. Y. Wu, Fl. Yunnan. 1: 169. 1977.

毛假柴龙树 mao jia chai long shu

Shrubs 2–3 m tall. Branches angular, sparsely lenticellate; young branches yellow, villous, glabrescent. Leaves alternate; petiole (1–)1.9(–3) cm, pubescent; leaf blade elliptic to oblong-elliptic, rarely obovate-oblong, 3–12(–17) × 2–8 cm, abaxially densely villous, mixed shortly strigose, glabrescent, adaxially sparsely villous when young, only on midvein and lateral veins villous at maturity, lateral veins 4–7 pairs, abaxially prominent, reticulate veins inconspicuous, base obtuse or rounded, oblique, apex acuminate. Cymes terminal or subterminal, 3.5–4.5 cm, with peduncle densely yellow pubescent. Flowers bisexual, yellow; pedicel 1–3 mm, long yellow somewhat rigidly pilose. Calyx cupular, ca. 2 mm, 5-lobed, lobes triangular, outside glabrous or slightly hairy, inside glabrous. Petals loriform, 4–6 × ca. 1 mm, outside somewhat rigidly long pilose, inside except for base and apex villous, apex slightly inflexed. Stamens alternate with petals; filaments filiform, 3–5 mm, flat, fleshy, bases widened; anthers oblong, ca. 1 mm, introrse. Disk shallowly 5-lobed, glabrous. Ovary globose, ca. 1 mm, densely somewhat rigidly long pilose; style 1–2 mm; stigma capitate. Drupe changing from yellow-green to dark purple, ellipsoid, compressed, ca. 2 mm, ca. 1 mm in diam. Fl. Mar–May, fr. May–Nov.

• Scrub on slopes, valleys, roadsides; (1400–)2000–2500 m. C Yunnan.

6. *Nothapodytes obscura* C. Y. Wu, Fl. Yunnan. 1: 170. 1977.

薄叶假柴龙树 bao ye jia chai long shu

Shrubs or small trees, 1.8–10 m tall. Branchlets angular, lenticellate, slightly and somewhat rigidly shortly strigose, glabrescent. Leaves alternate; petiole 1–3 cm, somewhat rigidly shortly strigose; leaf blade elliptic, 6–13 × 2.5–6 cm, papery,

glabrous or very sparsely shortly and somewhat rigidly strigose, midvein and lateral veins smooth, densely and somewhat rigidly minutely strigose, lateral veins 6 or 7 pairs, reticulate veins inconspicuous, base broadly cuneate, oblique, apex acuminate. Cymes terminal, 3–3.5 cm, somewhat rigidly shortly strigose. Flowers bisexual, light yellow; pedicel 1–2 mm, stout. Calyx ca. 1 mm, 5-lobed, outside somewhat rigidly shortly strigose and ciliate, inside glabrous. Petals loriform, 4–5 × ca. 1 mm, outside densely shortly strigose, inside villous except for base and apex,

apex reflexed at anthesis. Stamens ca. 2.5(–4) mm; filaments filiform, flat; anthers oblong, shorter than 1 mm. Disk ca. 0.5 mm tall, thin, glabrous. Ovary globose, ca. 1 mm, sparsely somewhat rigidly shortly strigose, rarely glabrous; style ca. 1.5 mm; stigma capitate. Drupe black, ovoid, ca. 1.6 × 1.2 mm, apex truncate. Seeds ca. 1 cm, ca. 0.8 mm wide; cotyledons cordate, ca. 0.5 mm; radicle extended straight. Fl. Nov–Dec, fr. Jan–Feb.

• Mixed valley forests; 1200–1800 m. SE Yunnan.

7. MAPPIANTHUS Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 150. 1921.

定心藤属 ding xin teng shu

Lianas woody, roughly and somewhat rigidly strigose; tendrils thick. Leaves opposite, or subopposite, petiolate, entire, leathery, veins pinnate. Plants dioecious. Flowers rather small, somewhat rigidly pilose, in short, few-flowered, axillary cymes. Staminate calyx cupular, small, shallowly 5-lobed. Petals campanulate-funneliform, large, 5-lobed to 1/3 or very few to 2/3; lobes valvate, hairy. Disk absent. Staminate flowers with stamens 5, free, slightly shorter than corolla; filaments flat, base slightly slender, upward gradually dilated, glabrous; anthers narrowly ovoid; ovary hairy; style stout, apex obtuse. Pistillate flowers as in staminate flowers but slightly smaller; rudimentary stamens present. Drupe narrowly ellipsoid, compressed; exocarp yellowish red, thin, fleshy, somewhat rigidly strigose; endocarp thinly crustaceous, with concave reticulate wrinkles and some longitudinal grooves, inside smooth; embryo small.

Two very closely related species: tropical Asia; one species in China.

1. *Mappianthus iodoides* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 150. 1921.

定心藤 ding xin teng

Mappianthus tomentosus D. Fang.

Young branches dark brown, yellowish brown strigose, angular; branchlets gray, terete, glabrescent, with gray-white, orbicular or oblong lenticels. Petiole terete, 0.6–1.4 cm, adaxially narrowly grooved, yellow-brown strigose; leaf blade abaxially brown-yellow to purple-red, adaxially olive green, narrowly elliptic to oblong, rarely lanceolate, 8–17 × 3–7 cm, glabrescent or abaxially slightly hairy, midvein prominent abaxially, narrowly grooved adaxially, lateral veins 3–6, usually 5 pairs, arcuate ascending, prominent abaxially, reticulate veins slender, prominent abaxially, base rounded or cuneate, apex acuminate or caudate, caudae rounded. Staminate cymes alternate and axillary, 1–2.5 cm; peduncle ca. 1 cm, yellow-brown strigose; bractlets rather small. Staminate flowers fragrant, light green, globose to oblong in bud; pedicel 1–2 mm, ca. 0.5 mm in diam.; calyx 1.5–2 mm; lobes subacute, outside densely yellow-brown strigose, inside glabrous; corolla yellow, 4–6 mm, 5-lobed; lobes ovate, outside densely yellow strigose, inside tomentulose,

apices incurved; filaments orange-yellow when dried, 3–4 mm; anthers yellow, ovoid, ca. 1.5 mm; ovary undeveloped, ca. 2 mm; style 2–3 mm. Pistillate cymes alternately axillary, 1–1.5 cm, thick, yellow-brown strigose; bractlets shorter than 1 mm; peduncle 5–8 mm. Pistillate flowers ovoid in bud; pedicel 2–10 mm, 1–2 mm in diam.; calyx shallowly cupular, 1–1.5 mm, 5-lobed; lobes triangular, outside densely yellow-brown strigose, apex obtuse; petals 5, oblong, 3–4 mm, outside densely yellow-brown strigose, inside tomentulose, apices incurved; reduced stamens ca. 2 mm; filaments flat-filiform, ca. 1.5 mm; anthers ovoid-triangular, ca. 0.5 mm; ovary subglobose, ca. 2 mm, densely yellow-brown somewhat rigidly strigose; style very short or absent; stigma discoid, rounded, 5-lobed. Drupe from light green or yellow-green to orange-yellow or orange-red, ellipsoid, 2–3.7 × 1–1.7 cm, sparsely yellow-brown somewhat rigidly strigose, base with persistent, slightly accrescent calyx. Fl. Apr–Aug, fr. Jun–Dec.

Sparse woods, scrub, valley forests; 700–1900 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Yunnan, Zhejiang [N Vietnam].

The fruit is edible; the roots and ripe stems are used medicinally.

8. IODES Blume, Bijdr. 29. 1825.

微花藤属 wei hua teng shu

Lianas, woody, usually densely rust-colored hairy. Leaves opposite, rarely subopposite, petiolate, entire, papery, with pinnate veins, with tendrils between leaf pairs. Plants dioecious. Cymose panicles axillary or extra-axillary. Flowers small; pedicel jointed. Staminate flowers: calyx cupular, 5-toothed; corolla deeply (3 or)4- or 5-lobed, coherent at base, outside densely hairy; stamens 3–5, alternate with corolla lobes; filaments broad, short, rarely absent; reduced ovary small or absent. Pistillate flowers: calyx as in staminate flowers, persistent; corolla 4- or 5-lobed, base tubular and often inflated; reduced stamens absent; ovary sessile or with short pedicel, 1-loculed; ovules 2, pendulous from apex; stigma thick, peltate, apex concave, sometimes slightly oblique. Drupe obliquely obovoid, with persistent calyx; exocarp thinly crustaceous; mesocarp thin; endocarp outside reticulate polygonous concave. Seeds with fleshy endosperm; cotyledons flat, leafy.

About 19 species: Africa, tropical Asia (nine species); four species (one endemic) in China.

- 1a. Branchlets with many tumorlike lenticels, conspicuously prominent with age 1. *I. seguinii*
 1b. Branchlets without tumorlike lenticels.
 2a. Drupe 3–3.8 cm; leaf blade abaxially with veins light yellow crispate pubescent 2. *I. balansae*
 2b. Drupe shorter than 3 cm, leaf blade abaxially not crispate pubescent.
 3a. Staminate flowers with petals basally connate; leaf blade abaxially on veins spreading villous 3. *I. cirrhosa*
 3b. Staminate flowers with petals connate to middle; leaf blade abaxially rigidly strigose 4. *I. vitiginea*

1. *Iodes seguinii* (H. Léveillé) Rehder, J. Arnold Arbor. 15: 3. 1934.

瘤枝微花藤 liu zhi wei hua teng

Vitis seguinii H. Léveillé, Repert. Spec. Nov. Regni Veg. 4: 331. 1907; *Iodes vitiginea* Hance var. *levitestis* Handel-Mazzetti.

Branchlets gray-brown, terete, with many tumorlike lenticels, conspicuously prominent with age; young branches densely rust-colored crispate pubescent. Petiole 0.5–2 cm, densely rust-colored crispate pubescent; leaf blade adaxially shiny green, ovate or suborbicular, 4–14 × 3–10.5 cm, abaxially densely somewhat rigidly strigose and less puberulent, on veins only sparsely puberulent, adaxially slightly hairy only on concave midvein, midvein abaxially prominent, lateral veins 4–6 pairs, anastomosing near margin, tertiary veins usually inconspicuous, all veins and slender reticulate veins conspicuous when old especially abaxially, base cordate, apex obtuse to acute. Corymb conical, axillary or lateral, 2–3 cm, densely rust-colored crispate pubescent. Staminate flowers: calyx 4- or 5-lobed to middle, narrowly ovate, ca. 1 mm, outside densely rust-colored crispate pubescent; petals 4- or 5-lobed, basal 1/3 united, ovate to elliptic, 3–4 mm, outside densely rust-colored crispate pubescent and puberulent, inside glabrous, apex incurved; stamens 5, alternate with petals; filaments ca. 3 mm, tapering upward, incurved, near base adaxially rust-colored pubescent; anthers ovoid or oblong, ca. 0.5 mm; ovary undeveloped. Pistillate flowers unknown. Drupe yellow-green when young, red when mature, obovoid-oblong, 1.8–2.3 cm, ca. 1.2 cm in diam., densely appressed pubescent; endocarp smooth, slightly grooved or reticulate. Fl. Jan–May, fr. Apr–Jun.

• Forests in karst areas; 200–1200 m. W Guangxi, SW Guizhou, SE Yunnan.

The fruit is edible and sweet, becoming pungent.

2. *Iodes balansae* Gagnepain in Lecomte, Notul. Syst. (Paris) 1: 200. 1910.

大果微花藤 da guo wei hua teng

Branchlets terete, yellow tomentose, inconspicuously angular, without lenticels; tendrils lateral and opposite inflorescences. Petiole 1–1.5 cm, densely yellow pubescent; leaf blade ovate, 5–12 × 2–7 cm, abaxially light yellow crispate pubescent on veins, adaxially yellow crispate pubescent only on midvein and lateral veins, lateral veins 4–6 pairs, anastomosing near margin, tertiary veins dense, subparallel, reticulate veins slender but conspicuous, all veins prominent abaxially, base slightly cordate, oblique, apex acuminate to long acuminate. Corymbs axillary or lateral, conical, 4–10 cm, densely yellow pubescent; staminate inflorescences sparse; peduncle long, 4–9 cm. Stami-

nate flowers: calyx 0.5–1 mm, 4- or 5-lobed, lobes outside densely yellow-white somewhat rigidly strigose, apex obtuse or rounded; petals 4 or 5, oblong-ovate, 2–3 mm, outside yellow-white somewhat rigidly strigose, united at base; stamens (3 or)4 or 5, alternate petals; filaments filiform, ca. 1.5 mm; anthers ovoid, ca. 0.5 mm; ovary undeveloped, flat, globose. Pistillate flowers unknown. Drupe oblong, compressed, 3–3.8 × 1.5–2 cm, densely yellow tomentulose, longitudinally 3-ribbed per side when dry and larger polygonous reticulate-lacunose, with slender prominent ridges in pits, tapering downward, with persistent, accrescent calyx and petals. Seeds oblong, 2–2.5 × 1–1.5 cm; endosperm copious; embryo ca. 1.2 × 0.8 cm; radicle very short. Fl. Apr–Jul, fr. May–Aug.

Valleys, sparse woods; 100–1300 m. SW Guangxi, SE Yunnan [N Vietnam].

This plant is used in Guangxi for curing nephritis.

3. *Iodes cirrhosa* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 27(2): 281. 1854.

微花藤 wei hua teng

Branchlets terete, densely rust-colored soft pubescent; old branches angular, occasionally very sparsely lenticellate, with axillary or extra-axillary tendrils, sometimes opposite leaves. Petiole 1–2 cm, densely rust-colored pubescent; leaf blade ovate or broadly ovate, 5–15 × 2–10 cm, abaxially densely yellow spreading pubescent, adaxially rust-colored pubescent only on midvein and lateral veins, lateral veins 3–5 pairs, tertiary veins subparallel, veins prominent abaxially, conspicuous adaxially, base subrounded to shallowly cordate, oblique, apex acute or shortly acuminate. Inflorescences shortly pedunculate, densely yellow-brown tomentose; staminate corymbs dense, sometimes combined into large panicles; pistillate few flowered. Staminate flowers small, subglobose in bud; calyx very short, ca. 0.5 mm, deeply 5-lobed, lobes triangular, outside densely rust-colored pubescent; corolla yellow, 5-lobed, united near base, lobes oblong, 2.5–3.5 mm, outside densely rust-colored pubescent, apex with caudae ca. 1 mm, densely white ciliate, incurved; stamens 5, light yellow, 1–1.5 mm; filaments very short; anthers oblong-obovoid; ovary setiform-villous. Pistillate flowers: calyx larger; ovary with a pedicel, ovoid, laterally compressed, densely villous; style short; stigma apex slightly concave. Drupe red when mature, ovoid-globose, 2–2.6 × 1.2–2 cm, pulp thick, laterally compressed, pubescent, polygonous reticulate-lacunose when dry. Fl. Jan–Apr, fr. May–Oct.

Sparse woods in valleys; 400–1000(–1300) m. S Guangxi, S Yunnan [NE India, Indonesia, Laos, Malaysia, S Myanmar, Philippines, Thailand, Vietnam].

The roots are used in Guangxi for curing rheumatism.

4. *Iodes vitiginea* (Hance) Hemsley, J. Linn. Soc., Bot. 23: 115. 1886.

小果微花藤 xiao guo wei hua teng

Erythrostaphyle vitiginea Hance, J. Bot. 11: 266. 1873;
Iodes ovalis Blume var. *vitiginea* (Hance) Gagnepain.

Branchlets compressed, light yellow somewhat rigidly strigose, with axillary or lateral tendrils. Petiole 1–1.5(–3) cm, light yellow somewhat rigidly strigose; leaf blade narrowly ovate to ovate, 6–17 × 3–11 cm, abaxially densely white or light yellow roughly and somewhat rigidly strigose and with few strict hairs, adaxially densely minutely granular protuberant, sparsely somewhat rigidly strigose when young, only on veins when old, lateral veins 4–6 pairs, tertiary veins parallel, reticulate veins usu-

ally not prominent, base rounded or minutely cordate, apex long acuminate or sometimes acute. Corymb-panicles axillary. Staminate inflorescences 8–20 cm; flowers yellow-green; sepals 5, triangular, 0.5–1 mm, outside pubescent, apex acuminate; corolla 5(or 6)-lobed, united to middle, lobes narrowly elliptic, 1–1.5 mm, apex mucronate, incurved; stamens light yellow, ca. 1 mm; filaments very short; anthers oblong; ovary undeveloped, setiform-villous. Pistillate inflorescences shorter; flowers larger; ovary red when mature, ovoid-globose. Drupe compressed when mature, polygonous reticulate-lacunose, 1.3–2.2 × 1.2–1.6 cm, yellow tomentose. Fl. Dec–Jun, fr. May–Aug.

Monsoon valley forests, secondary scrub; 100–1300 m. Guangxi, Guizhou, Hainan, SE Yunnan [N Laos, N Thailand, N Vietnam].

9. *HOSIEA* Hemsley & E. H. Wilson, Bull. Misc. Inform. Kew 1906: 154. 1906.

无须藤属 wu xu teng shu

Shrubs climbing, without tendrils. Branches terete, lenticellate, sparsely hairy. Leaves alternate, long petiolate; leaf blade ovate, papery, pubescent, margin serrate. Cymes axillary, pubescent. Flowers bisexual, green. Calyx small, 5-lobed. Petals 5, much longer than calyx, coherent at base, outside pubescent, inside puberulent. Stamens 5, alternate petals; filaments stout; anthers rather small; glands 5, fleshy, each inserted between 2 stamens. Ovary with style conspicuous; stigma 4-lobed. Drupe compressed ellipsoid, with nonaccrescent persistent calyx.

Two species: China, Japan; one species (endemic) in China.

1. *Hosiea sinensis* (Oliver) Hemsley & E. H. Wilson, Bull. Misc. Inform. Kew 1906: 154. 1906.

无须藤 wu xu teng

Natsiatum sinense Oliver, Hooker's Icon. Pl. 19: t. 1900. 1889.

Bark gray or yellow-gray, smooth, conspicuously lenticellate; branchlets gray-brown, terete, with sparse orbicular or oblong lenticels, coarsely yellow-brown puberulent; annual branches light green, yellow puberulent; winter buds terminal or axillary, conical, densely yellow-brown pubescent. Petiole 2–7.5 cm, puberulent, glabrescent; leaf blade abaxially light green, adaxially dark green, ovate, triangular-ovate, or cordate-ovate, 4–13 × 3–9 cm, adaxially yellow-brown puberulent, glabrescent, adaxially also densely minutely granular, lateral veins 6 pairs, like midvein adaxially prominent, abaxially slightly concave,

base cordate or rarely truncate, margin sparsely acutely serrate or densely serrate, apex long acuminate. Cymes many flowered, 2–8 cm, yellow-brown pubescent; peduncle 1–2.5 cm; flower buds obovoid, ca. 3 mm. Flowers small; pedicels 3–5 mm. Calyx dark brown, deeply 5-lobed; lobes oblong, ca. 1 mm, outside densely yellow-brown pubescent. Petals green, lanceolate, ca. 5 × 1.5 mm, outside pubescent, inside puberulent, apex acuminate with reflexed caudae. Filaments 1.5–2 mm, glabrous; anthers yellow, subglobose; glands oblong, shorter than 0.5 mm. Ovary ovoid, ca. 1 mm; style terete, ca. 1 mm; stigma 4-lobed. Drupe green when young, red or red-brown when mature, 1.5–1.8 cm, polygonous reticulate-lacunose when dry. Seeds albuminous; cotyledons elliptic. Fl. Apr–May, fr. Jun–Aug.

• Forests, twining on trees; 1200–2100 m. Hubei, Hunan, Sichuan (Emei Shan), Zhejiang.

10. *PYRENACANTHA* Hooker ex Wight, Bot. Misc. 2: 107. 1830, nom. cons.

刺核藤属 ci he teng shu

Lianas woody, without tendrils and latex. Leaves alternate, petiolate, scabrid or sparsely hairy, entire or serrate. Plants dioecious. Flowers small, apetalous. Staminate flowers in slender spikes, with bractlets; calyx 4-cleft, rarely 3- or 5-cleft; lobes valvate; stamens 4, alternate with calyx lobes; anthers introrse; gynoecium reduced. Pistillate flowers in dense spikes, without bractlets; calyx as in male flowers, persistent, recurved; rudimentary stamens very short; ovary with stigma capitate, sessile. Drupe slightly compressed; endocarp thin, fragile crustaceous, outside wrinkled, inside with warty or spinose protuberances penetrating endosperm. Seeds with fleshy endosperm; cotyledons large, leaflike.

About ten species: tropical Africa and Asia; one species in China.

1. *Pyrenacantha volubilis* Wight in Hooker, Bot. Misc. 2: 107. 1830.

刺核藤 ci he teng

Young branches slender, densely tomentose, glabrescent. Petiole 5–10 mm, densely tomentose when young; leaf blade narrowly elliptic-obovate, 5–10 × 2.5–5 cm, abaxially appressed strigose, adaxially glabrous except for midvein, lateral veins 3–5

pairs, reticulate near margin, veins conspicuous, base cuneate or narrowly truncate, margin entire or sparsely sinuately toothed, apex obtuse or acute, with mucro. Staminate inflorescences in slender and curved long spikes, axillary, 3–8 cm, puberulent; flowers subglobose, sessile; bractlets subulate, ca. 1 mm; calyx deeply 4-lobed, lobes ovate, ca. 1.5 mm; filaments ca. 0.5 mm; anthers subglobose, ca. as long as filaments, basifixed, dehiscing longitudinally; ovary undeveloped, globose, tomentose when young. Pistillate inflorescences in dense narrow spikes, extra-axillary, 5–8 cm, puberulent; peduncle 1.5–2.5 cm; sepals 4,

ovate-oblong, ca. 2 mm, outside densely hairy, apex thick and recurved; stamens absent; ovary ovoid, shorter than calyx, densely tomentose; stigma as wide as ovary. Drupe light red or orange, ovoid, compressed, ca. 1.5 × 1–1.2 cm, apex mucronate, slightly hairy; endocarp with spinose ca. 1 mm protuberances penetrating endosperm. Seeds pendulous, ovoid, ca. 0.8 mm; endosperm ruminant; embryo ovate; cotyledons elliptic, flat. Fl. May–Aug, fr. Sep–Jan.

Sparse woods; low elevations. Hainan [Cambodia, India, Sri Lanka, Vietnam].

11. NATSIATUM Buchanan-Hamilton ex Arnott, Edinburgh New Philos. J. 16: 314. 1834.

薄核藤属 bao he teng shu

Shrubs climbing, lenticellate. Leaves alternate, petiolate; leaf blade cordate-ovate, veins 7–9, basally palmate, margin sparsely serrulate. Plants dioecious. Flowers small, in simple or complex extra-axillary racemes. Staminate flowers: calyx 5-lobed, persistent, not accrescent; petals 5, slightly coherent at base, apex inflexed, valvate; stamens alternate with petals; filaments broad, short, with 2 compressed, lateral, bottle-shaped appendages at base; anthers erect, 2-lobed; connectives small, protruding; ovary undeveloped. Pistillate flowers: calyx and petals as in staminate flowers; reduced stamens 4–6; anthers absent or subsagittate, undeveloped, alternate with 5 glands; glands unequal, rounded-toothed; ovary ovoid, sessile; style short, cylindrical, apex 2- or 3-lobed; stigma capitate. Drupe obliquely ovoid, compressed; mesocarp thin; endocarp crustaceous. Cotyledons broadly orbicular or unequally orbiculate-ovate, thin.

One species: tropical Asia.

1. Natsiatum herpeticum Buchanan-Hamilton ex Arnott, Edinburgh New Philos. J. 16: 314. 1834.

薄核藤 bao he teng

Natsiatum tonkinense Gagnepain.

Young branches yellow-brown strigose; old branches conspicuously lenticellate. Petiole 3.5–7.5 cm, slender, yellow-brown crispate pubescent; leaf blade cordate-ovate, 8–12 × 5–8 cm, membranous, sparsely hirsute, lateral veins 3–5 pairs, like midvein prominent abaxially, concave adaxially, tertiary veins

subparallel, reticulate veins very conspicuous abaxially, base cordate, margin minutely mucronate by excurrent veins, apex acute. Flowers yellow-green; pedicel ca. as long as flowers, slender, hirsute. Sepals lanceolate, ca. 1 mm, valvate, outside hairy. Petals narrowly lanceolate, ca. 3 mm, outside hairy. Drupe yellow-green, becoming black with age, ca. 1.5 × 1 cm. Fl. unknown, fr. Aug.

Evergreen broad-leaved forests on limestone mountains; ca. 2400 m. W Yunnan (Lushui) [Bangladesh, Bhutan, N India, NE Laos, S Myanmar, Nepal, Sri Lanka, NE Thailand, N Vietnam].

12. NATSIATOPSIS Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 44: 201. 1875.

麻核藤属 ma he teng shu

Shrubs climbing. Leaves alternate, very long petiolate, abaxially densely hairy, adaxially sparsely strigose, margin sinuate, mucronate by excurrent veins. Plants dioecious. Racemes elongate, sparsely flowered, fascicled in axils. Flowers small. Staminate flowers: calyx 4-lobed; corolla tubular, connate for more than 2/3, apex 4-cleft; stamens 4; filaments broadly filiform, flat, free; anthers elliptic-ovoid, small; ovary densely tawny hispid. Pistillate flowers: calyx and corolla as in staminate flowers; anthers small; ovary ovoid, hirsute. Drupe ovoid, compressed, polygonous reticulate.

One species: China, Myanmar.

1. Natsiatopsis thunbergiiifolia Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 44: 201. 1875.

麻核藤 ma he teng

Young branches terete, grooved longitudinally, minutely scabrous-pubescent; old branches gray-white. Petiole 2–3 cm, minutely scabrous-pubescent; leaf blade ovate-oblong, 11–14 × 5–7 cm, abaxially densely yellow-brown or yellow-white pubescent, adaxially sparsely yellow-brown strigose, basal veins 7, midvein prominent, lateral 2 pairs together with basal veins anastomosing far from margin, reticulate veins conspicuous abaxially, base cordate, margin sinuate, apex acuminate. Staminate inflorescences 2- or 3-fascicled in axil, tomentulose; pedicel

short, ca. 4.5 mm; calyx pubescent; corolla lobes reflexed, short, outside appressed pubescent; filaments broadly filiform, long; ovary undeveloped, densely yellow-brown hispid. Pistillate inflorescences several fascicled in axil, yellow-white tomentulose; calyx lobes ovate-triangular, ca. 1 mm, outside yellow pubescent; corolla ca. 1.5 mm, outside pubescent; stamens ca. 1.5 mm; anthers very small; ovary ovoid, densely tawny hispid. Drupe ovoid, compressed, 15–17 × 12–15 cm, densely yellow pubescent, with persistent calyx, fruiting peduncle short, 1–2 mm; exocarp thin; mesocarp fleshy; endocarp outside polygonous reticulate-lacunose. Fl. Mar, fr. May.

Twining on limestone in dense forests; 600–700 m. S Yunnan (Xishuangbanna) [Myanmar].