

## BURSERACEAE

橄榄科 gan lan ke

Peng Hua (彭华)<sup>1</sup>; Mats Thulin<sup>2</sup>

Trees or shrubs, resiniferous. Leaves alternate or rarely opposite, odd-pinnate, 3-foliolate (or rarely 1-foliolate), stipulate or exstipulate. Inflorescence racemose or paniculate. Flowers regular, small, unisexual or bisexual, often polygamous. Calyx 3–6-lobed, imbricate or valvate. Petals 3–6, free or rarely connate, imbricate or valvate. Disk annular or cupular, usually conspicuous. Stamens as many as or 2 × as many as petals, inserted at base or margin of disk, equal or unequal; filaments free, rarely connate at base; anthers dorsifixed or rarely adnate, 2-thecate, dehiscent longitudinally. Ovary superior, usually 2–5-celled; ovules 2 or rarely 1 in each cell, usually anatropous, axile, pendulous or rarely ascending, micropyle superior, raphe adaxial; style simple; stigma undivided or 2–5-lobed. Fruit drupaceous, indehiscent, containing 2–5 pyrenes, or rarely pseudocapsular and dehiscent. Seeds solitary, exalbuminous; testa membranous; cotyledons usually membranous, contortuplicate, rarely fleshy and planoconvex; radicle superior.

About 16 genera and 550 species: tropical regions of both hemispheres; three genera and 13 species (two endemic) in China.

Li Hen. 1997. Burseraceae. In: Chen Shukun, ed., Fl. Reipubl. Popularis Sin. 43(3): 17–33.

- 1a. Trees evergreen; flowers 3-merous; fruit with only 1 pyrene; leaflets with margin entire or almost so; branchlet pith usually with vascular strands ..... 3. *Canarium*  
1b. Trees often deciduous; flowers 4- or 5-merous; fruit with 1 or more pyrenes; leaflets with margin usually serrate; branchlet pith without vascular strands.  
2a. Stipules and stipels absent; flowers usually unisexual; disk usually annular; sepals, petals, and stamens inserted outside of disk ..... 1. *Protium*  
2b. Stipules and stipels usually present; flowers usually bisexual; disk cupular; sepals, petals, and stamens inserted at edge of disk ..... 2. *Garuga*

### 1. *PROTIUM* N. L. Burman, Fl. Indica, 88. 1768, nom. cons.

马蹄果属 ma ti guo shu

Small trees. Branchlet pith without vascular strands. Leaves odd-pinnate, alternate, exstipulate; leaflets with petiolule, apex cuspidate. Flowers in axillary or terminal panicles, unisexual, bisexual, or polygamous. Calyx cupular or campanulate, shallowly 4- or 5-lobed, lobes imbricate in bud, recurved, persistent but not enlarged in fruit. Petals 5, valvate, apex incurved in bud, later recurved. Stamens as many as or 2 × as many as petals or more, distinct, inserted outside of disk, reduced in females but probably fertile; disk fleshy and thick, glabrous, flattened in male flowers, annular or cupular in female or bisexual flowers, grooved; filaments glabrous. Ovary 4- or 5-celled, glabrous or pubescent, globose or ovoid, reduced in male flowers; ovules 2 in each cell; style short or long; stigma capitate or shallowly 4- or 5-lobed. Drupe globose, ovoid, or somewhat compressed, apex with rudiment of style; pyrenes 4 or 5 (some often degenerated), rarely 1 or 2, bony with thin coat; cotyledons folded, palmate.

About 90 species: mostly in tropical America, the rest scattered in all parts of tropical Asia; two species (one endemic) in China.

- 1a. Rachis, leaflets, and inflorescences densely yellow pubescent; drupe ca. 1 cm in diam. .... 1. *P. serratum*  
1b. Rachis, leaflets, and inflorescences sparsely shortly pubescent; drupe 1.5–2 cm in diam. .... 2. *P. yunnanense*

**1. *Protium serratum*** (Wallich ex Colebrooke) Engler, Monogr. Phan. 4: 88. 1883.

马蹄果 ma ti guo

*Bursera serrata* Wallich ex Colebrooke, Trans. Linn. Soc. London 15: 361. 1827.

Trees deciduous. Branchlets densely yellow pubescent, gray pubescent when old. Leaflets 5–9; petiolules 5–13 mm; blades oblong or ovate-oblong, 7–10 × 2.5–4.5 cm, papery or rigidly papery, base rounded or broadly cuneate, margin serrulate or sometimes entire, apex acute or caudate-acuminate; lateral veins prominent on both surfaces, ± densely pubescent. Panicles axillary, 6–14 cm, densely pubescent. Flowers light

green; pedicel ca. 2 mm. Sepals less than 1 mm. Petals oblong-lanceolate, 1.5–2 mm. Drupe nearly ovoid to globose, ca. 1 cm in diam., persistent style oblique, glabrous; pyrenes 2 or 3. Fl. Apr–May, fr. Jun.

Montane sparse or dense woods; 600–1000 m. SW and W Yunnan (Longling, Luxi, Mengding) [Bhutan, Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

**2. *Protium yunnanense*** (Hu) Kalkman, Blumea 7: 546. 1954.

滇马蹄果 dian ma ti guo

*Santiria yunnanensis* Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 159. 1940.

Trees deciduous, up to 15 m tall, up to 60 cm d.b.h.

<sup>1</sup> Kunming Institute of Botany, Chinese Academy of Sciences, Heilongtan, Kunming, Yunnan 650204, People's Republic of China.

<sup>2</sup> Department of Systematic Botany, Evolutionary Biology Centre, Uppsala University, Norbyvägen 18D, SE-752 36 Uppsala, Sweden.

Branchlets longitudinally striped, lenticellate, sparsely pubescent. Leaves ca. 20 cm; leaflets 5–9; petiolules 5–10 mm; rachis and petiolules striped, shortly pubescent or nearly glabrous; blades oblong-ovate or oblong-rounded, 6–13 × 4–5 cm, rigidly papery, base rounded or broadly cuneate, oblique, margin sparsely serrate near apex, apex acute or caudate; lateral veins 9–11 pairs, sparsely shortly pubescent, midrib and lateral veins

prominent on both surfaces, especially abaxially. Flowers unseen. Infructescence paniculate, axillary, ca. 8 cm; rachis and peduncle sparsely shortly pubescent, peduncle ca. 1 cm. Drupe subglobose, 1.5–2 cm in diam., dark purple; exocarp shallowly wrinkled. Fr. Nov.

- Secondary forests; 500–600 m. S Yunnan (Mengla).

## 2. GARUGA Roxburgh, Pl. Coromandel 3: 5. 1811.

白头树属 bai tou shu shu

Trees or shrubs deciduous. Branchlet pith without vascular strands, pubescent. Leaves odd-pinnate, alternate, usually stipulate, crowded toward ends of branches; leaflets opposite, subsessile or with petiolule, serrate; stipels usually present. Flowers bisexual, in much-branched panicles, present before leaves, usually crowded toward end of branches, 5-merous; receptacle concave, globose or cupular. Sepals nearly free, deltoid, valvate. Petals inserted at edge of disk, valvate, apex incurved in bud, later recurved. Disk 10-grooved. Stamens 10, inserted in grooves at margin of disk; filaments subulate, base hairy; anthers oblong. Ovary subsessile or sessile, 4- or 5-celled; ovules 2 in each cell; style short; stigma capitate, shallowly 4- or 5-lobed. Drupe subglobose; pyrenes 1–5, small, bony, grooved. Seeds with membranous testa; cotyledons folded.

About four species: tropical Asia, N Oceania, and some Pacific islands; four species (one endemic) in China.

- 1a. Flowers 3–6 mm; drupe 5–10 × 5–12 mm.  
 2a. Inflorescences densely tomentose; flowers ca. 3 mm; drupe ovoid, ± deltoid in cross section, base with persistent calyx ..... 1. *G. forrestii*  
 2b. Inflorescences pubescent or glabrescent; flowers 4–6 mm; drupe subglobose, base without persistent calyx ..... 2. *G. floribunda*  
 1b. Flowers 6–10 mm; drupe 10–23 × (9–)11–18 mm.  
 3a. Rachis and leaflets sparsely pubescent with short hairs; flowers ca. 6 mm; ovary glabrous ..... 3. *G. pierrei*  
 3b. Rachis and leaflets pubescent with long hairs, especially when young; flowers 7–10 mm; ovary sparsely pubescent ..... 4. *G. pinnata*

1. *Garuga forrestii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 13: 162. 1921.

白头树 bai tou shu

*Garuga yunnanensis* Hu.

Trees, 10–15(–20) m tall. Branchlets densely pubescent when young, glabrescent, purple-brown, longitudinally striped and conspicuously lenticellate. Leaflets 11–19, nearly without petiolules; blades lanceolate or elliptic-oblong, densely pubescent when young, glabrescent, base rounded or broadly cuneate, margin shallowly serrate, apex acuminate, lowest pairs small, ca. 1 cm, often early deciduous, middle pairs 7–12 × 2–4 cm, with lateral veins 10–16 pairs, terminal leaflet 5–7 cm, with petiolule ca. 15 mm. Panicles 14–25(–35) cm, axillary or lateral, usually crowded toward ends of branchlets, multibranched; rachis and branches slender, densely tomentose. Flowers white, ca. 3 mm; receptacle cup-shaped, abaxially tomentose. Sepals nearly subulate, ca. 2 mm, hairy on both surfaces. Petals ovate, ca. 3 mm, abaxially tomentose. Stamens nearly equal. Ovary sessile, globose; style sparsely pubescent; stigma shallowly 5-lobed. Infructescence with many linear pedicels without fruits. Drupe nearly ovoid, one side dilated, 7–10 × 6–8 mm, ± obtusely deltoid in cross section, attenuate at both ends, apex with a point, base with persistent shallowly cupular calyx. Fl. Apr, fr. May–Nov.

- Sparse forests in dry hot valleys; 700–2400 m. SW Sichuan, Yunnan.

2. *Garuga floribunda* Decaisne var. *gamblei* (King ex Smith) Kalkman, Blumea 7: 466. 1953.

多花白头树 duo hua bai tou shu

*Garuga gamblei* King ex Smith, Rec. Bot. Surv. India 4: 262. 1911.

Trees, 8–26 m tall. Branchlets glabrous except young parts, conspicuously lenticellate. Leaflets 9–19, without stipels, rachis and midrib sparsely pubescent; blades elliptic or oblong-lanceolate, membranous or papery, base rounded, oblique, margin serrate, lowest pair stipulelike, 5–8 mm, middle pair 9–11 × 3–5 cm, terminal leaflet with petiolule 6–25 mm. Panicles lateral or axillary, 25–35 cm, fascicled toward ends of branches, pubescent or glabrescent. Flowers yellow, 4–6 mm; receptacle cupular, abaxially pubescent. Sepals deltoid, abaxially pubescent. Petals oblong-lanceolate, ca. 3 mm, both surfaces villous. Stamens pubescent at base; disk lobes deltoid or quadrangular. Ovary globose, with short stipe, tomentose; style tomentose or pubescent; stigma shallowly 5-lobed. Fruit nearly globose, 5–9 × 5–12 mm, base without persistent calyx. Fl. May, fr. Aug–Nov.

Thick forests; 200–900 m. Guangdong, Guangxi, Hainan, S Yunnan [Bangladesh, Bhutan, India].

*Garuga floribunda* var. *floribunda* is distributed in tropical SE Asia to NE Oceania and the Pacific islands; it is not known to occur in China.

3. *Garuga pierrei* Guillaumin, Rev. Gén. Bot. 19: 164. 1907.

光叶白头树 guang ye bai tou shu

Trees, 8–15 m tall; bark greenish brown. Leaves with 11–17 leaflets; rachis and leaflet blades shortly pubescent; petiolules absent to 3 mm, terminal petiolule 2–25 mm; lowest leaflet blades stipulelike, oblong-elliptic, ca. 3 mm, early deciduous, middle blades ovate-elliptic or oblong-elliptic, 4–10 × 2–4 cm, base rounded or broadly cuneate, margin crenate-serrate, apex acute; lateral veins 10–15 pairs. Panicles axillary or lateral, fascicled toward ends of branches, 10–18 cm, pubescent with pale yellow hairs. Flowers yellowish white, ca. 6 mm; pedicel 1–4 mm. Sepals deltoid, pubescent on both surfaces. Petals oblong-lanceolate, 4–5 mm, abaxially pubescent. Stamens nearly equal; filaments tomentose at base; disk lobes deltoid-trapeziform. Ovary globose, ± shallowly 5-lobed, glabrous, with short stipe; style ± sparsely pubescent; stigma shallowly 5-lobed. Fruit globose, 10–23 × 12–16 mm. Fl. Apr–May, fr. Sep–Oct.

Sparse forests in valleys or at roadsides; 700–1000 m. S Yunnan (Xishuangbanna) [Cambodia, Thailand, Vietnam].

**4. *Garuga pinnata*** Roxburgh, Pl. Coromandel 3: 5. 1819.

羽叶白头树 *yu ye bai tou shu*

Trees 4–10 m tall; bark gray-brown, rough. Branchlets glabrous except very young parts, with conspicuous lenticels and

leaf scars. Leaves with 9–23 leaflets; rachis and leaflets pubescent with long hairs, especially when young and on veins; petiolules absent to 4 mm, terminal petiolule 5–10 mm; lowest leaflet blades stipulelike, spoon-shaped or linear, 5–10 mm, early deciduous, middle blades elliptic, oblong, or lanceolate, 5–11 × 2–3 cm, base rounded, sometimes obliquely cuneate, margin sparsely serrate, apex usually narrowly acuminate; lateral veins 10–15 pairs. Panicles lateral or axillary, 7.5–19(–22) cm, densely pubescent with long hairs when young; peduncle 2–6 cm. Flowers white, yellowish white, or greenish yellow, 7–10 mm; pedicel 1–3 mm, long pubescent. Sepals deltoid, 2.5–3.5(–4) mm, pubescent on both surfaces. Petals oblong, 5–5.5 × 1.5–2 mm, pubescent with short somewhat curved hairs. Stamens slightly unequal; filaments with long hairs at base; disk lobes trapeziform or deltoid. Ovary oblong, with short stipe, sparsely pilose, especially when young; style pilose; stigma shallowly 5-lobed. Fruit globose, yellow when ripe, 11–15(–18) × (9–)11–18 mm, sometimes pubescent. Fl. Mar–Apr, fr. Apr–Oct.

Mixed forests, sparse mountain forests, valley scrub; 400–1400 m. SW Guangxi (Longzhou), Sichuan (Leibo), S and SE Yunnan (Funing, Xishuangbanna) [Bangladesh, Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

**3. CANARIUM** Linnaeus, *Amoen. Acad.* 4: 121. 1759.

橄榄属 *gan lan shu*

Trees evergreen. Branchlet pith usually with vascular strands. Leaves alternate, odd-pinnate, stipulate or exstipulate. Flowers in terminal or axillary panicles, unisexual. Calyx cupular or campanulate, 3-lobed or -fid, valvate. Petals 3, imbricate below or valvate, usually exceeding calyx. Stamens 6, free to connate, inserted on margin or outside of disk. Ovary 2- or 3-celled; ovules 2 in each cell; style short to long; stigma capitate. Drupe usually ellipsoid, ± distinctly trigonous, with a 1–3-celled, 1–3-seeded pyrene; cotyledons often partite, contortuplicate.

About 75 species: mainly in tropical Africa, Asia to NE Oceania and Pacific islands; seven species in China.

1a. Plants exstipulate or stipules very early deciduous.

2a. Center of branchlet pith without vascular strands; cross section of drupe acutely triangular ..... 4. *C. parvum*

2b. Center of branchlet pith with scattered vascular strands; cross section of drupe not acutely triangular.

3a. Leaflet blades with entire margin; cross section of drupe nearly rounded ..... 2. *C. pimela*

3b. Leaflet blades with somewhat sinuate or toothed margin; cross section of drupe rounded or rounded triangular ..... 7. *C. strictum*

1b. Plants stipulate, stipules usually early deciduous but leaving a scar.

4a. Leaflets 6–8(–10) pairs; cross section of drupe acutely triangular, apex of drupe sometimes truncate ..... 6. *C. bengalense*

4b. Leaflets usually less than 6 pairs; cross section of drupe not acutely triangular, apex of drupe acuminate or obtuse.

5a. Leaflet blades with shallowly serrate or sinuate margin, both surfaces ± pubescent ..... 5. *C. subulatum*

5b. Leaflet blades with entire margin, abaxially minutely verrucose.

6a. Leaflet blades 13–20 × 6–8 cm; inflorescences extra-axillary (2–3 cm from axil), infructescences ca. 30 cm ..... 3. *C. tonkinense*

6b. Leaflet blades 6–14 × 2–5.5 cm; inflorescences axillary, infructescences 1.5–15 cm ..... 1. *C. album*

**1. *Canarium album*** (Loureiro) Raenschel, *Nomencl. Bot.* 287. 1797.

橄榄 *gan lan*

*Pimela alba* Loureiro, Fl. Cochinch. 2: 408. 1790.

Trees, 7–25(–35) m tall. Branchlets 5–6 mm in diam., tomentose with yellowish brown hairs when young, glabrescent.

Leaves stipulate; leaflets 3–6 pairs; blades lanceolate, elliptic, or ovate, 6–14 × 2–5.5 cm, glabrous or abaxially sparsely setose on veins, base rounded or obliquely cuneate, margin entire, apex acuminate with acumen up to ca. 2 cm; lateral veins 12–16 pairs. Inflorescences axillary, minutely tomentose or glabrescent. Male flowers numerous in cymose panicles 15–30 cm; female inflorescence racemose, with less than 8 flowers. Calyx 2.5–3 mm, 3-fid in male flowers, nearly truncate in female flowers. Stamens

glabrous; filaments connate for more than 1/2 of length; disk globose or terete and slightly 6-lobed in male flowers, annular, thick and fleshy, with 3 shallowly sinuate teeth and adaxially somewhat pubescent in female flowers. Infructescences 1.5–15 cm, with 1–6 fruits; persistent calyx flat, ca. 5 mm in diam., with recurved lobes. Drupe ovoid or spindle-shaped, 25–35 mm, yellow-green, glabrous; exocarp thick, wrinkled when dry; pyrene acuminate. Fl. Apr–May, fr. Oct–Dec.

Forests on slopes, valleys, also cultivated; 100–1300 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan [Vietnam].

**2. *Canarium pimela*** K. D. Koenig, Ann. Bot. (König & Sims) 1: 361. 1804, nom. cons. prop.

乌榄 wu lan

*Canarium nigrum* (Loureiro) Engler (1896), not Roxburgh (1832); *C. pimeloides* Govaerts, nom. illeg. superfl.; *C. trandenum* C. D. Dai & Yakovlev; *Pimela nigra* Loureiro.

Trees, up to 20 m tall, ca. 45 cm d.b.h. Branchlets ca. 1 cm in diam., glabrous. Leaves exstipulate; leaflets 4–6 pairs; blades broadly elliptic, ovate, or rounded, 6–17 × 2–7.5 cm, glabrous, base cuneate, margin entire, apex acute; lateral veins 8–15 pairs, reticulate veins conspicuous. Flowers in cymose panicles or inflorescences rarely racemose, glabrous, with more flowers in male plants. Calyx ca. 2.5 mm, shallowly lobed in male flowers, 3.5–4 mm, shallowly lobed or nearly truncate in female flowers. Petals ca. 8 mm in female flowers. Filaments connate for about 1/2 of length; disk fleshy with center depressed in male flowers, thin and shallowly 6-lobed in female flowers; anthers with 2 lines of bristles. Infructescences 8–35 cm, 1–4-fruited; pedicel ca. 2 cm; persistent calyx nearly flat, 8–10 mm in diam. Drupe purple-black when ripe, narrowly ovoid, 3–4 × 1.7–2 cm, cross section nearly rounded. Fl. Apr–May, fr. May–Nov.

Forests; 500–1300 m. Guangdong, Guangxi, Hainan, S Yunnan [Cambodia, Laos, Vietnam].

Deng and Zhu (Taxon 54: 550. 2005) proposed the name *Canarium pimela* for conservation, which was subsequently recommended by the Committee for Vascular Plants (Brummitt, Taxon 56: 592. 2007).

**3. *Canarium tonkinense*** Engler in Engler & Prantl, Nat. Pflanzenfam. 3(4): 240. 1896.

越榄 yue lan

*Hearnia balansae* C. Candolle, Bull. Herb. Boissier 2: 580. 1894, not *Canarium balansae* Engler (1883).

Trees, ca. 15 m tall. Branchlets light gray when dry, puberulent, lenticellate. Leaves stipulate; rachis sparsely pubescent, lenticellate; leaflets 5(–7) pairs; blades ovate or oblong, 13–20 × 6–8 cm, adaxially glabrous except sparsely shortly pubescent on midrib, abaxially minutely verrucose, rigidly papery or leathery, base rounded, oblique, margin entire, apex with acumen ca. 15 mm; lateral veins 13–15 pairs, abaxially prominent, shortly pubescent. Inflorescences extra-axillary, 2–3 cm from axil, 20–30 cm, puberulent, unknown in female plants; male inflorescences with 3–4 cm peduncle, lower branches 5–6 cm, cymose, cymelets with 3 or 4 flowers. Male flowers 5–6 mm; calyx ca. 2 mm, shallowly 2- or 3-lobed, abaxially shortly hairy. Petals ca. 5 mm, abaxially very sparsely puber-

lent. Stamens glabrous; filaments connate for nearly all of length; anthers oblong-ovate, ca. 1.5 mm; disk annular, fleshy, margin sinuate, center excavate. Ovary absent. Infructescences ca. 30 cm, nearly glabrous; persistent calyx disk-shaped, ca. 7 mm in diam. Drupe reddish brown when dry, ellipsoid with obtuse ends, ca. 32 × 20 mm, exocarp thin, with conspicuous midrib; cross section of pyrene rounded triangular. Fl. Apr–Jun, fr. Jul–Aug.

Mountainous areas; 100–200 m. SE Yunnan (Hekou) [Vietnam].

Li (FRPS 43(3): 29. 1997) expressed doubt as to whether this species is wild or cultivated in China.

**4. *Canarium parvum*** Leenhouts, Blumea 9: 408. 1959.

小叶榄 xiao ye lan

Trees or shrubs, 3–8 m tall, 15–30 cm d.b.h. Branchlets 3–5 mm in diam. Leaves exstipulate; leaflets 2–4 pairs; blades ovate, elliptic-ovate, or nearly rounded, 4.5–10 × 2–5 cm, adaxially pubescent near base of midrib, abaxially shortly pubescent especially on veins, base rounded or cuneate, oblique, margin entire, apex with acumen 5–15 mm; lateral veins 10–12 pairs. Inflorescences extra-axillary, puberulent or nearly glabrescent; male flowers in narrow cymose panicles 4.5–9 cm, female flowers few, in racemes 3–7 cm. Male flowers 7–10 mm, sparsely pubescent, female flowers ca. 5.5 mm, nearly glabrescent. Calyx 1.5–2 mm in male flowers, ca. 3 mm in female flowers. Stamens glabrous, smaller in female flowers; filaments connate for 1/3 of length in male flowers, 1/2 or more in female flowers; disk annular, ca. 1 mm high, fleshy, margin truncate, somewhat 6-lobed, ciliate, center excavate in male flowers, margin long hispid in female flowers. Ovary densely rusty tomentose, absent in male flowers. Infructescences 4–11 cm, minutely gray pubescent, 1–4-fruited; persistent calyx shallowly 3-lobed, ca. 5 mm in diam., lobes recurved. Drupe yellow-green, glabrous, spindle-shaped, both ends acute, 3–4 × 1–2.5 cm; cross section of pyrene triangular. Fl. Nov–May, fr. Aug–Nov.

Valley forests; 100–700 m. SE Yunnan (Hekou) [Vietnam].

**5. *Canarium subulatum*** Guillaumin, Bull. Soc. Bot. France 55: 613. 1908.

毛叶榄 mao ye lan

Trees, 20–35 m tall, 30–65 cm d.b.h. Branchlets 4–9(–15) mm in diam., brown tomentose when young, glabrescent, lenticellate, with conspicuous leaf scars. Leaves stipulate; stipules subulate or linear, 7–25 mm, tomentose; leaflets 2–5 pairs; blades broadly ovate or lanceolate, (6–)9–18(–20) × 3.5–11 cm, adaxially sparsely pubescent on midrib, abaxially tomentose or rarely nearly glabrous, papery or leathery, base rounded or cuneate, sometimes oblique, margin shallowly serrate or sinuate, apex acuminate, with acumen blunt or acute; lateral veins 12–20 pairs, abaxially prominent. Inflorescences axillary, narrow cymose panicles 7–25 cm in male plants, racemose and 8–10 cm in female plants, scattered villous. Flowers 7–11 mm, slender, puberulent. Calyx 2.5–3.5 mm, shallowly lobed. Stamens glabrous; filaments connate for ca. 1/2 of length in male flowers, stamens smaller in female flowers; disk fimbriate, in male flowers thickly annular, ca. 1 mm high, center sometimes excavated, in female flowers annular, 6-lobed. Ovary with upper part ± pubescent or glabrous, absent in male

flowers. Infructescences 2.5–8 cm, 1–4-fruited, tomentose; persistent calyx disk-shaped, (6–)15 mm in diam., shallowly 3-lobed, lobes often recurved. Drupe ovoid or ellipsoid, up to 4.5 cm, sparsely pubescent or glabrescent, cross section rounded; cross section of pyrene rounded triangular. Fr. Sep.

Valley forests; 200–1500 m. S Yunnan [Cambodia, Laos, Thailand, Vietnam].

**6. *Canarium bengalense*** Roxburgh, Fl. Ind. 136. 1832.

方榄 fang lan

Trees, up to 25 m tall, ca. 1.2 m d.b.h. Branchlets 1–1.5 cm in diam., sparsely gray pubescent when young; top bud yellow pubescent. Leaves stipulate; stipules subulate, pubescent, early deciduous; leaflets 6–8(–10) pairs; blades oblong or obovate-lanceolate, 10–20 × 4.5–6 cm, adaxially glabrous, abaxially pubescent, base rounded, margin sinuate or entire, apex acuminate with acumen 10–15 mm; lateral veins 18–25 pairs. Inflorescences axillary, cymose panicles in male plants, 30–40 cm, nearly glabrous, branches 3–4 cm. Calyx ca. 2 mm. Stamens glabrous; filaments united for ca. 1/2 of length; disk tubular, 1.5–1.8 mm high, margin and abaxial surface hirsute in male flowers, annular, 3-fid, fimbriate in female flowers. Infructescences extra-axillary or axillary, 5–8 cm, 1–3-fruited; persistent calyx disk-shaped, shallowly 3-lobed, ca. 10 mm in diam. Drupe green, spindle-shaped, 3-ribbed, 4.5–5 × 1.8–2 cm, glabrous, or obovoid and 3- or 4-ribbed, apex acute, truncate or excavated; stigma persistent; cross section of pyrene acutely triangular or rounded. Fr. Jul–Oct.

Mixed forests; 400–1300 m. SW Guangxi, SE Yunnan [India, Laos, Myanmar, Thailand].

**7. *Canarium strictum*** Roxburgh, Fl. Ind. 138. 1832.

滇榄 dian lan

Trees, up to 50 m tall, ca. 1 m d.b.h.; bark gray-white. Branchlets 5–25 mm in diam., at first densely rusty tomentose. Leaves stipulate; stipules very early deciduous; leaflets 5 or 6 pairs; blades ovate-lanceolate or elliptic, 10–20 × 4–6.5 cm, adaxially glabrous, abaxially nearly glabrous or densely rusty tomentose, rigid papery or leathery, base broadly cuneate, oblique, margin with small rounded teeth or slightly sinuate, apex acuminate, with acumen acute or obtuse; lateral veins 20–22 pairs, on both surfaces ± prominent. Inflorescences axillary, sometimes fascicled at ends of branches, narrow cymose panicles in male plants, racemose in female, densely rusty or yellow tomentose, glabrescent, 15–40 cm and many flowered in male plants, 7–20 cm and few flowered in female. Male flowers ca. 7 mm, female flowers ca. 9 mm. Calyx nearly glabrous or rusty tomentose abaxially, with short obtuse lobes, ca. 4 mm in male flowers, ca. 5.5 mm in female. Petals abaxially nearly glabrous to densely tomentose. Stamens glabrous; filaments connate for 1/4–3/4 of length; anthers acuminate; disk margin and inside long pubescent, annular and ca. 1 mm high in male flowers, somewhat 6-lobed, ca. 0.5 mm high, fleshy in female flowers. Ovary glabrous or with scattered hairs, nearly absent in male flowers. Infructescences racemose, 10–20 cm, glabrous, 1–3-fruited; persistent calyx disk-shaped, slightly 3-lobed or deltoid, ca. 12.5 mm in diam. Drupe with pedicel, obovoid or ellipsoid, cross section nearly rounded or rounded triangular, both ends obtuse, 35–45 × 17–23 mm; pyrene smooth, ribs obtuse, without conspicuous midrib. Fr. Apr–May.

Valley forests. S Yunnan (Xishuangbanna) [India, Myanmar].