

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) Raeschel, 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. Pflanzfam. 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 puberulent. 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-lobed, 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].

Fl. China 11: 108–110. 2008.

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].

Fl. China 11: 108–110. 2008.