

11. **AGLAIA** Loureiro, Fl. Cochinch. 1: 98, 173. 1790, nom. cons., not F. Allamand (1770).

米仔兰属 mi zi lan shu

Peng Hua (彭华); Caroline M. Pannell

Trees or shrubs, dioecious, young parts usually lepidote or stellately pubescent. Leaves alternate to subopposite, odd-pinnate, 3-foliolate, or rarely simple; leaflet blade margins entire. Flowers in axillary thyrses, small, usually globose. Calyx slightly or deeply 3–5-lobed. Petals 3–5, short, concave, quincuncial or imbricate in bud, distinct or rarely basally connate and adnate to staminal tube. Stamens as many as or more than petals; staminal tube usually subglobose, obovoid, or cup-shaped with apex incurved, apical margin entire, crenate, or shallowly lobed; anthers 5 or 6(–12), included, slightly exerted, or rarely semiexserted. Disk absent. Ovary 1–3(or 4)-locular, with 1 or 2 ovules per locule; style short or absent; stigma ovoid or shortly cylindrical. Fruit with fibrous pericarp, indehiscent with 1 or 2 locules or loculicidally dehiscent with 3 locules; locules without seeds or each containing 1 seed; pericarp often containing latex. Seeds usually surrounded by a colloidal and fleshy aril; endosperm absent.

About 120 species: tropical and subtropical Asia, tropical Australia, Pacific islands; eight species in China.

Aglaiia is the only source of the group of about 50 known representatives of compounds that bear a unique cyclopenta[b]tetrahydrobenzofuran skeleton. These compounds are more commonly called rocaglate or rocaglamide derivatives, or flavaglines, and have been found to have anticancer and pesticidal properties. Since the first representative in this group was only discovered in 1982, this is one of the few recent examples of a completely new class of plant secondary metabolites of biological promise (see B. G. Wang et al., *Biochem. Syst. Ecol.* 32: 1223–1226. 2004; L. W. Chaidir et al., *J. Nat. Prod.* 64: 1216–1220. 2001).

- 1a. Fruit dehiscent; petals 3 or 4 (*A. sect. Amooria* (Roxburgh) Pannell and *A. sect. Neoaglaiia* Harms).
- 2a. Leaflets 11 1. *A. spectabilis*
- 2b. Leaflets 3–9.
- 3a. Indumentum lepidote 2. *A. lawii*
- 3b. Indumentum stellate 3. *A. teysmanniana*
- 1b. Fruit indehiscent; petals 5 (*A. sect. Aglaiia*).
- 4a. Leaflet blades densely lepidote on both surfaces or only abaxially densely lepidote.
- 5a. Leaflets (1 or)3–7; leaflet blades obovate to elliptic, 4–8 cm, abaxially densely yellow squamate, adaxially densely silvery squamate; anthers 5 4. *A. elaeagnoidea*
- 5b. Leaflets 7; leaflet blades elliptic to oblong, 8–13 cm, abaxially densely brown squamate, adaxially glabrous; anthers 6 5. *A. rimosa*
- 4b. Leaflet blades glabrous on both surfaces or only abaxially sparsely lepidote along midvein.
- 6a. Leaflet blades abaxially sparsely lepidote along midvein.
- 7a. Leaflets (1 or)3–7, opposite to subopposite; leaflet blade midveins adaxially prominent; petiole and rachis brown squamate 4. *A. elaeagnoidea*
- 7b. Leaflets 7–9(–11), alternate to subopposite; leaflet blade midveins adaxially conspicuously depressed; petiole and rachis brown squamate when young but glabrescent 7. *A. edulis*
- 6b. Leaflet blades glabrous on both surfaces.
- 8a. Petiole and rachis narrowly winged; leaflets opposite; panicles glabrous 8. *A. odorata*
- 8b. Petiole and rachis not winged; leaflets alternate to subopposite; panicles lepidote.
- 9a. Leaflets (1 or)3–7, opposite to subopposite; leaflet blades 8–12 cm, secondary veins 5–10 on each side of midvein; panicles covered with scalelike stellate rust-colored trichomes 4. *A. elaeagnoidea*
- 9b. Leaflets 9–13, alternate to subopposite; leaflet blades 5–15 cm, secondary veins 12–16 on each side of midvein; panicles grayish lepidote 6. *A. perviridis*

1. ***Aglaiia spectabilis*** (Miquel) S. S. Jain & Bennet, *Indian J. Forest.* 9: 271. 1987.

曲梗崖摩 qu geng ya mo

Amooria spectabilis Miquel, *Ann. Mus. Bot. Lugduno-Batavi* 4: 37. 1868; *Aglaiia dasyclada* F. C. How & T. C. Chen; *Amooria dasyclada* (F. C. How & T. C. Chen) C. Y. Wu.

Trees to 18 m tall. Leaves alternate; petiole and rachis ca. 35 cm; petiole glabrous, abaxially rounded, adaxially with a shallow groove; leaflets 11, opposite; petiolules 1–1.5 cm, thick, adaxially sulcate and stellately lepidote; leaflet blades oblong-

elliptic, both surfaces ± glabrous, secondary veins 14–16 on each side of midvein, abaxially conspicuously prominent, and adaxially depressed, reticulate veins abaxially subprominent, base truncate to rounded, margin reflexed, apex acuminate. Thyrses axillary, 20–25 cm, stellately lepidote, branches thick and often pendulous. Flower buds ovoid, ca. 6 mm. Pedicel 2–4 mm, apex nodiferous. Calyx 3-lobed; lobes broadly triangular, outside stellately lepidote. Petals 3, ovate, 5–6 mm, outside densely stellately lepidote, inside concave and glabrous. Staminal tube urceolate, ca. 3 mm, glabrous, apical margin 10-lobed; anthers 10, linear to oblong, included. Ovary ovoid, 3-locular, densely covered with yellowish pubescence; stigma triquetrous to conical, base sulcate, apex 3-dentate.

Fruit dehiscent, obovoid to pyriform, 3-locular, with 1 seed per locule, pubescent and sparsely stellately lepidote; stipe to 4 mm in diam. Fl. Sep–Nov, fr. Oct.

Dense forests; 900–1800 m. S and SE Yunnan (Xichou, Xishuangbanna) [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Vietnam; NE Australia, Pacific islands].

“*Amoora stellatosquamosa*” (C. Y. Wu & H. Li in C. Y. Wu, Fl. Yunnan. 1: 233. 1977) belongs here but was not validly published because two gatherings were indicated as types (*Vienna Code*, Art. 37.2).

Aglaia dasyclada is based on a mixture of *A. spectabilis* and *Dysoxylum hongkongense*. It is treated here as a synonym of *A. spectabilis* because the holotype (in IBSC) belongs to *A. spectabilis*.

2. *Aglaia lawii* (Wight) C. J. Saldanha ex Ramamoorthy in C. J. Saldanha & Nicolson, Fl. Hassan Dist. 392. 1976.

望谟崖摩 wang mo ya mo

Nimmonia lawii Wight, Calcutta J. Nat. Hist. 7: 13. 1847; *Aglaia attenuata* H. L. Li; *A. lawii* subsp. *oligocarpa* (Miquel) Pannell; *A. oligocarpa* Miquel; *A. stipitata* T. P. Li & X. M. Chen; *A. tenuifolia* H. L. Li; *A. tetrapetala* Pierre; *A. tsangii* Merrill; *A. wangii* H. L. Li; *A. wangii* var. *macrophylla* H. L. Li; *A. yunnanensis* H. L. Li; *Amoora calcicola* C. Y. Wu & H. Li; *A. duodecimantha* H. Zhu & H. Wang; *A. ouangliensis* (H. Léveillé) C. Y. Wu; *A. tetrapetala* (Pierre) Pellegrin; *A. tetrapetala* var. *macrophylla* (H. L. Li) C. Y. Wu; *A. tsangii* (Merrill) X. M. Chen; *A. yunnanensis* (H. L. Li) C. Y. Wu; *A. yunnanensis* var. *macrophylla* (H. L. Li) C. Y. Wu; *Ficus ouangliensis* H. Léveillé; *F. vaniotii* H. Léveillé.

Trees or shrubs, 2–20 m tall. Branches grayish, pale to yellowish lepidote, sometimes glabrescent. Leaves alternate, to 50 cm; petiole and rachis lepidote or glabrous; petiolules 1–15 mm, sometimes slightly inflated, sparsely to densely lepidote, sometimes glabrescent; leaflets 3–9, alternate to subopposite; leaflet blades elliptic, oblong, ovate-lanceolate, or lanceolate, 5–20(–30) × 2–7.5(–11.5) cm, papery to leathery, both surfaces glabrous or adaxially lepidote only on midvein and abaxially lepidote on veins only or on entire surface, midvein abaxially prominent and adaxially depressed, secondary veins (8–)12–15(–16) on each side of midvein, abaxially prominent or depressed, and adaxially flat, prominent, or depressed, base rounded or ± oblique by being cuneate and conspicuously decurrent on one side and rounded on other, apex acuminate to obtuse. Thyrses axillary, botryose, usually shorter than leaves, 2–15 cm in male plants but shorter and with fewer flowers in female plants, densely lepidote or stellately lepidote, few flowered or sometimes with just 1 flower. Flowers unisexual, 3–5 mm in diam. Pedicel 2–3 mm, as long or slightly longer than flower buds, nodiferous, lepidote. Calyx cup-shaped, 1–2 mm, densely lepidote, 3–5-lobed, lobes rounded or sometimes nearly truncate. Petals 3 or 4, suborbicular, ovate, obovate, or oblong, 2–6 mm, concave, outside sometimes sparsely lepidote near base, otherwise glabrous, free from staminal tube. Staminal tube turbinate to campanulate, 2–5 mm, both surfaces glabrous or outside sparsely lepidote, apical margin entire or crenate/serrulate; anthers (5 or)6(–12), linear, oblong, or

ovoid, ca. 0.5 mm, inserted just above inside middle of tube, included or very slightly exerted, both ends acute. Ovary shortly conical, stellately lepidote, 2- or 3-locular, with 2 ovules per locule; style absent; stigma conical, glabrous, 3-lobed. Inflorescences 6–10 cm, lepidote. Fruit dehiscent, ellipsoid, globose, or pyriform with base gradually constricted into a 3–16 mm stipe, 1–3 cm in diam., 3-locular, rugose, lepidote, apex rounded, concave, or acute; pericarp woody, hard when dry; calyx persistent, spreading and ± reflexed, lepidote, margin 3(or 4)-dentate. Seeds 1–3 per fruit, completely surrounded by a fleshy usually red aril. Fl. May–Dec, fr. almost year-round.

Forests in hilly regions, dense or sparse forests in limestone regions, ravine rain forests in mountainous regions, evergreen broad-leaved forests, thickets; near sea level to 1600 m. Guangdong, Guangxi, Guizhou, Hainan, Taiwan (Lan Yu), SE Xizang, Yunnan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Vietnam; Indian Ocean islands, Pacific islands].

Aglaia lawii is the most widespread and variable species in the genus. Although treated here as a single species, in China it could be treated as two subspecies, *Aglaia lawii* subsp. *lawii* and *A. lawii* subsp. *oligocarpa*. *Aglaia lawii* subsp. *lawii* is lepidote on the abaxial surface of the leaflets and has a pear-shaped fruit. It occurs in Guangdong, Guangxi, Guizhou, Hainan, Taiwan (Lan Yu), and SE Xizang (as well as Bhutan, India, Indonesia, Laos, Myanmar, Papua New Guinea, Philippines, Thailand, Vietnam, and Indian Ocean and Pacific islands). *Aglaia lawii* subsp. *oligocarpa* has subglobose fruit without a stipe and leaflets almost completely without hairs or scales. It occurs in Yunnan (as well as Indonesia, Laos, Malaysia, Thailand, and Vietnam).

3. *Aglaia teysmanniana* (Miquel) Miquel, Ann. Mus. Bot. Lugduno-Batavi 4: 48. 1868.

星毛崖摩 xing mao ya mo

Amoora teysmanniana Miquel, Fl. Ned. Ind., Eerste Bijv. 3: 503. 1861.

Trees 7–10 m tall, to 10 cm d.b.h. Bark glaucous. Young branches with dense stellate trichomes, glabrescent. Petiole and rachis 13–20 cm, with dense stellate trichomes, abaxially rounded, adaxially with a groove; leaflets 5–9; petiolules 5–7 mm, with stellate trichomes; leaflet blades elliptic, 10–22 × 4–6 cm, papery, abaxially with dense stellate trichomes especially along midvein and secondary veins, adaxially with stellate trichomes to nearly glabrous, base cuneate and ± oblique, apex acuminate and caudate. Thyrses axillary, 9–15 cm, with sparse flowers. Flowers subglobose, ca. 2 mm in diam. Pedicel ca. 1 mm, straight or flexed, with yellow stellate trichomes. Calyx cup-shaped, 5-lobed; lobes obtuse-triangular, outside with dense yellow stellate trichomes, inside glabrous. Petals 3, rotund to ovate, both surfaces glabrous. Staminal tube cup-shaped with apical margin incurved, glabrous; anthers (6 or)7(–9), ellipsoid, just protruding beyond aperture. Fruit dehiscent, obovoid-globose, lepidote, base with persistent calyx, apex concave; pericarp leathery. Seeds (2 or)3 per fruit, enveloped by a red aril. Fl. Apr, fr. in following year.

Dense or sparse forests; 300–500 m. SE Yunnan (Hekou, Jinping) [Indonesia, Malaysia, Papua New Guinea, Philippines, Thailand].

“*Amoora stellata*” (C. Y. Wu, Fl. Yunnan. 1: 234. 1977) belongs here but was not validly published because two gatherings were indi-

cated as types (*Vienna Code*, Art. 37.2).

4. *Aglaia elaeagnoidea* (A. Jussieu) Benth, Fl. Austral. 1: 383. 1863.

山楞 shan luo

Nemeda elaeagnoidea A. Jussieu, Bull. Sci. Nat. Géol. 23: 239. 1832; *Aglaia abbreviata* C. Y. Wu; *A. elaeagnoidea* var. *formosana* Hayata; *A. elaeagnoidea* var. *pallens* Merrill; *A. formosana* (Hayata) Hayata; *A. roxburghiana* (Wight & Arnott) Miquel; *Milnea roxburghiana* Wight & Arnott.

Trees 1.5–15 m tall, to 30 cm d.b.h., evergreen. Bark greenish white or russet, thin, exfoliating. Young branches, petioles, rachises, and inflorescences covered with scalelike stellate rust-colored trichomes, densely brown squamate and glabrescent, or densely silvery to yellowish stellate squamate. Leaves alternate to subopposite, 10–20 cm; petiole and rachis 3–10 cm, brown squamate, covered with scalelike stellate rust-colored trichomes when young but glabrescent; leaflets (1 or) 3–7, opposite to subopposite; petiolules 2–13 mm, brown squamate; leaflet blades obovate, elliptic, or oblong-elliptic, (3–)6–12(–16) × (1.5–)2.5–5.5 cm, thinly papery to leathery, both surfaces glabrous or abaxially densely yellowish squamate and adaxially densely silvery squamate but abaxially sparsely lepidote along midvein, abaxially greenish yellow when dry, adaxially lustrous, midvein abaxially prominent and adaxially slightly prominent, secondary veins 5–10 on each side of midvein, slender, and abaxially ± prominent, base cuneate to broadly cuneate and ± oblique, margin entire, apex acuminate, obtuse, or rounded. Thyrses axillary, as long as or slightly shorter than leaves, lax, covered with rust-colored or yellowish scalelike stellate trichomes or densely russet squamate. Flowers ca. 2.5 mm in diam. Pedicel ± as long as flower, covered with scalelike stellate rust-colored trichomes. Calyx ca. 0.6 mm, 5-lobed; lobes rounded, outside rust-colored or yellowish lepidote. Petals 5, oblong, 1–1.5 mm, glabrous or outside yellowish lepidote, apex rounded. Staminal tube subglobose, slightly shorter than petals, apical margin entire, undulate, or 5-lobed; anthers 5, included. Ovary ovoid, densely covered with scalelike stellate trichomes; stigma sessile. Infructescences axillary, 1–3 cm, usually with 1(–3) fruit, brown squamate; bractlets conical. Fruit indehiscent, yellowish brown when mature, subglobose, ellipsoid, or obovoid, 1–1.4 cm in diam.; persistent calyx 5-crenate, crenations triangular, brown squamate. Seeds 1(or 2) per fruit. Fl. Jun–Oct, fr. Jul–Dec.

Dense and moist forests in valleys and mountainous regions, ravine rain forests, evergreen broad-leaved forests; near sea level to 1500 m. Guangdong, Guangxi, Guizhou, Hainan, S Taiwan (Hengchun peninsula), Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia, Pacific islands].

5. *Aglaia rimosa* (Blanco) Merrill, Sp. Blancoan. 212. 1918.

椭圆叶米仔兰 tuo yuan ye mi zi lan

Portesia rimosa Blanco, Fl. Filip. 297. 1837; *Aglaia elliptifolia* Merrill.

Shrubs or small trees. Branchlets densely ferruginous lepidote. Leaves odd-pinnate, 15–25 cm; petiole and rachis lepidote; leaflets 7, opposite to subopposite; petiolules 5–7 mm; leaflet blades obovate-elliptic to oblong, 8–14(–20) × 4–6.5(–8) cm, thinly leathery, abaxially brown lepidote especially along veins, adaxially glabrous, midvein prominent on both surfaces, secondary veins 6–10 on each side of midvein, veinlets rather loose, base obtuse, apex shortly cuspidate. Thyrses axillary, ca. 15 cm, densely lepidote. Flowers ca. 2.5 mm in diam. Pedicel 1–3 mm. Calyx short, 5-lobed; lobes ca. 1 mm, lepidote. Petals 5, yellow, ovate, ca. 2.5 mm, quincuncial, free from staminal tube, glabrous. Staminal tube ca. 1.8 mm, rather thick, apical margin inconspicuously toothed; anthers 6, sessile, ca. 0.8 mm, slightly exerted. Ovary 2-locular. Fruit indehiscent, ellipsoid, ca. 2 × 1.8 cm, densely ferruginous lepidote. Seed 1 per fruit, with a fleshy yellow aril.

Forests; low elevations. S and SE Taiwan and nearby islands [Indonesia, Papua New Guinea, Philippines; Pacific islands].

6. *Aglaia perviridis* Hiern in J. D. Hooker, Fl. Brit. India 1: 556. 1875.

碧绿米仔兰 bi lu mi zi lan

Trees to 15 m tall. Branchlets dark gray, with scattered small yellowish lenticels. Leaves ca. 30 cm; leaflets 9–13, alternate to subopposite; petiolules 5–10 mm; leaflet blades oblong-elliptic or ovate, 5–15(–18) × (2–)3–4.5 cm, thickly papery to subleathery, both surfaces glabrous, secondary veins 12–16 on each side of midvein and slender, base ± oblique and cuneate to subrotund, apex acuminate. Thyrses axillary, 20–24 cm, slightly shorter than leaves, dark gray squamate. Flowers ca. 2 mm in diam., glabrous. Pedicel short. Calyx 5-parted; lobes rounded, margin ciliate. Petals 5, white, orbicular to ovate, ca. 1.5 mm. Staminal tube subglobose, glabrous; anthers 5, ovoid. Ovary with 2 ovules per locule. Fruit indehiscent, oblong and curved, 3–3.8 × ca. 2 cm, rust-colored squamate. Seed 1 per fruit, with a yellowish fleshy aril. Fl. Mar–May, fr. Sep–Dec.

Seasonal rain forests, ravine rain forests, evergreen broad-leaved forests; 100–1400 m. S and SE Yunnan [Bangladesh, Bhutan, India, Laos, Malaysia, Thailand; Indian Ocean islands].

7. *Aglaia edulis* (Roxburgh) Wallich, Calc. Garden Rep. 26. 1840.

马肾果 ma shen guo

Milnea edulis Roxburgh, Fl. Ind. 2: 430. 1824; *Aglaia testicularis* C. Y. Wu.

Trees 5–9 m tall, to 30 cm d.b.h. Bark rufous. Young branches pale brown, glabrous, with inconspicuous lenticels. Leaves 25–30 cm; petiole and rachis 10–15 cm, glabrous but sparsely brown squamate when young; leaflets 7(–11), alternate to subopposite; petiolules 3–11 mm, slightly inflated; leaflet blades ovate-oblong to elliptic, 5–10(–22) × 1.5–4(–11) cm,

Fl. China 11: 121–124. 2008.

papery, both surfaces glabrous but abaxially sparsely lepidote along midvein, midvein abaxially prominent and adaxially conspicuously depressed, secondary veins 9–12 on each side of midvein and abaxially prominent, base rounded to cuneate, apex acute to acuminate. Thyrses axillary, 5–15 cm, sparsely branching, brown squamate. Flowers subsessile, globose, ca. 2 mm in diam. Calyx 5-lobed; lobes rounded, sparsely brown squamate, margin ciliate. Petals 5, broadly ovate, glabrous. Staminal tube globose, free from petals, glabrous, apical margin entire or undulate; anthers 5, ovoid, inserted on or near throat of tube, included or \pm exserted. Style very short; stigma conical, truncate, glabrous. Fruit indehiscent, brown, elliptic, ca. 5.5 \times 3–3.5 cm, yellowish lenticellate, densely brown squamate, basally contracted into a 1–1.5 cm stipe, apex plump and turbinate; persistent calyx inconspicuous. Seeds 1–3 per fruit, ellipsoid, ca. 4 cm; hilum to 3 cm. Fl. Nov–Jan, fr. Nov–Jan.

Evergreen broad-leaved forests on limestone hills; 1200–1800 m. SE Yunnan (Malipo) [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

The timber of this species is red, hard, and usually used for making carts, boats, furniture, etc.

8. *Aglaia odorata* Loureiro, Fl. Cochinch. 1: 173. 1790.

米仔兰 mi zi lan

Aglaia odorata var. *microphyllina* C. Candolle.

Shrubs or small trees, much branching. Young branches apically with stellate or lepidote trichomes. Leaves 5–12(–16) cm; petiole and rachis narrowly winged; leaflets 3–7(or 9), opposite; leaflet blades usually obovate, sometimes elliptic, 1–7(–11) \times 0.5–3.5(–5) cm with apical one biggest, both surfaces glabrous, secondary veins 8 on each side of midvein, very slender, and \pm prominent on both surfaces, base cuneate, apex obtuse. Thyrses axillary, 5–10 cm, lax, glabrous. Flowers fragrant, ca. 2 mm in diam. Pedicel of male flowers 1.5–3 mm, slender. Pedicel of female flowers short and thick. Calyx 5-lobed, lobes round. Petals 5, yellow, oblong to suborbicular, 1.5–2 mm, apex rounded to truncate. Staminal tube slightly shorter than petals, obovoid to subcampanulate, outside glabrous, apical margin entire or lobed; anthers 5, ovoid, included. Ovary ovoid, densely covered with yellow trichomes. Fruit indehiscent, ovoid to subglobose, 1–1.2 cm, scattered stellate lepidote but glabrescent. Seeds with a fleshy aril. Fl. May–Dec, fr. Jul–Mar.

Sparse forests or thickets in mountainous regions; low elevations. Guangdong, Guangxi, Hainan [Cambodia, Laos, Thailand, Vietnam].

This species is also cultivated in Anhui, Fujian, Guizhou, Henan, Sichuan, Taiwan, Yunnan, and Zhejiang.

Fl. China 11: 121–124. 2008.