

2. ENGELHARDIA Leschenault ex Blume, Bijdr. 10: 528. 1825.

黄杞属 huang qi shu

Pterilema Reinwardt.

Trees deciduous, semievergreen or evergreen, monoecious or rarely dioecious. Branchlets with solid pith. Terminal buds oblong, naked. Leaves even-pinnate, rarely odd-pinnate; leaflets 2–14, margin entire or serrate. Inflorescences lateral or terminal on old or new growth: male and female spikes in androgynous panicles or separate; male spikes solitary or clustered, pendulous; female spike many flowered, erect or recurved in fruit. Flowers anemophilous. Male flowers with a 3-lobed bract; bracteoles 2, rarely absent; sepals 1–4, rarely absent; stamens 3–15, anthers glabrous or pubescent. Female flowers subtended by an enlarged, 3-lobed bract; bracteoles 2, united, reduced to a low rim or forming a conspicuous, anterior prophyll, adnate to base of ovary; sepals 4, adnate to ovary, free at apex; style absent or elongate; stigmas carinal or commissural, 2-lobed, with 2 or 4 plumose branches, or short and 4-lobed. Fruiting spike elongate, pendulous. Fruit a 3-winged nutlet, (2–)4-chambered at base. Germination epigeal.

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

The number of species of *Engelhardia* is open to question: more than ten have been recognized in SE Asia. The taxonomy of the genus suffers from a lack of good specimens from throughout its range.

- 1a. Plants monoecious, semievergreen or evergreen; leaflet margin entire; inflorescences terminal on new growth; male flowers shortly stalked, receptacle orbicular, stamens (10–)12, enclosed in 4-hooded floral parts, anthers glabrous; female flowers stalked, style absent, stigmas carinal, short, 4-lobed; nutlets glabrous 1. *E. roxburghiana*
- 1b. Plants monoecious or dioecious, evergreen or deciduous; leaflet margin serrate or entire; inflorescences lateral on old growth; male flowers sessile, receptacle elongate, stamens 4–13, not enclosed, anthers pubescent; female flowers ± sessile, style present, stigmas commissural, elongate, with 2 or 4 plumose branches; nutlets pubescent.
 - 2a. Leaflets with glandular scales inconspicuous abaxially, margin entire; petiole 2.5–11.5 cm 4. *E. spicata*
 - 2b. Leaflets with glandular scales conspicuous abaxially, margin serrate or entire; petiole 1–7 cm.
 - 3a. Petiole 1–2 cm, pubescent; leaflets pubescent abaxially, margin serrate or entire; nutlets globose, ca. 3 mm in diam., central wing 2–2.5 cm 2. *E. serrata*
 - 3b. Petiole 4.5–7 cm, glabrous or pubescent; leaflets glabrous to slightly pubescent along midvein abaxially, margin serrate; nutlets obovoid, 5–7 mm in diam., central wing 5–6 cm 3. *E. hainanensis*

1. *Engelhardia roxburghiana* Wallich, Pl. Asiat. Rar. 2: 85. 1831.

黄杞 huang qi

Alfaropsis roxburghiana (Wallich) Iljinskaja; *Engelhardia chrysolepis* Hance; *E. fenzelii* Merrill; *E. formosana* Hayata; *E. roxburghiana* f. *brevialata* W. E. Manning; *E. spicata* Leschenault var. *formosana* Hayata; *E. unijuga* Chun ex P. Y. Chen.

Trees to 30 m tall. Leaves even-pinnate, 1–25 cm; petiole 1–8 cm, glabrous; rachis glabrous; leaflets 2–10, entire, petiolule 2–15 mm, blade elliptic-lanceolate to long elliptic, 4.5–14 × 1.5–5 cm, abaxially glabrous or puberulent, base oblique, apex acuminate or shortly acuminate. Nutlets globose, 3–5 mm, glabrous; wings glabrous, middle wing 1.5–5 cm, lateral wings 0.7–2.7 cm. Fl. Feb–Aug, fr. Jan–Dec. *2n* = 32.

Mixed broad-leaved or evergreen forests on loam, or on steep, dry slopes with sandy soil; 200–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, Indonesia, Laos, Myanmar, E Pakistan, Thailand, Vietnam].

This species is widely distributed and highly variable, but the leaves, flowers, and nutlets are quite distinctive. Vegetative material can

usually be distinguished by its entire, leathery, evergreen leaflets that are glabrous but coated with yellowish, peltate scales abaxially.

2. *Engelhardia serrata* Blume var. *cambodica* W. E. Manning, Bull. Torrey Bot. Club 93: 47. 1966.

齿叶黄杞 chi ye huang qi

Trees to 12 m tall. Leaves even-pinnate, rarely odd-pinnate, 15–25 cm; petiole 1–2 cm, tomentose; rachis tomentose; leaflets 6–14, sessile to shortly petiolulate, blade elliptic or elliptic-lanceolate, (2–)6–13 × (1.5–)2.5–4.5 cm, abaxially tomentose, base broadly cuneate to obtuse, margin irregularly serrate or entire, apex acute or shortly acuminate. Nutlets globose, ca. 3 mm, hispid; wings hispid at base, middle wing 2–2.5 cm, lateral wings ca. 1.3 cm. Fl. Feb, fr. Apr.

Forests on mountain slopes; 700–1000 m. SW Yunnan [Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

According to W. E. Manning (Bull. Torrey Bot. Club 93: 34–52. 1966), this taxon displays a degree of intermediacy between *Engelhardia serrata* var. *serrata*, from Indonesia and the Philippines, and *E. spicata* var. *colebrookeana*, a taxon that also has golden yellow scales intermixed with hairs abaxially on the leaflets.

3. *Engelhardia hainanensis* Chen, Acta Phytotax. Sin. 19(2): 251. 1981.

海南黄杞 hai nan huang qi

Trees to 30 m tall. Leaves even-pinnate, 15–23 cm; petiole 4.8–7 cm, pubescent or glabrescent; rachis pubescent; leaflets 6–10, petiolule 2–3 mm, blade oblong-ovate or oblong-elliptic, 5–10.5 × 2.5–4 cm, abaxially pubescent along midvein and with scattered hairs in vein axils, base oblique, subobtusate or subcordate, margin serrate, apex acuminate. Nutlets obovoid, 8–10 × 5–7 mm, hispid; wings hispid at base, middle wing 5–6 cm, lateral wings 2.5–2.8 cm. Fr. Dec–Jan.

• Forests in valleys. SW Hainan (Dongfang: Jianfeng Ling).

4. Engelhardia spicata Leschenault ex Blume, Bijdr. 10: 528. 1825.

云南黄杞 yun nan huang qi

Trees to 20 m tall. Leaves even-pinnate, rarely odd-pinnate, 15–35 cm; petiole 2.5–11.5 cm, glabrous or pubescent; rachis glabrous or pubescent; leaflets 4–14, entire, sessile or petiolulate, blade elliptic, elliptic-lanceolate, or elliptic-ovate, 7–15 × 2–7 cm, abaxially glabrous or pubescent, base broadly cuneate, apex shortly acuminate. Nutlets globose or ovoid, 3–6 mm, hispid; wings hispid at base, middle wing 2.5–3.5 cm, lateral wings ca. 1.5–2 cm. Fl. Nov–Apr, fr. Jan–Aug(–Nov). $2n = 32$.

Forests on mountain slopes or in valleys; near sea level to 2100 m. Guangdong, Guangxi, Guizhou, Hainan, Xizang, Yunnan [Bhutan, India, Indonesia, Laos, W Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sikkim, Thailand, Vietnam].

- 1a. Leaflets strongly petiolulate, abaxially glabrous; fruiting spike long, (22–)30–45(–60) cm 4a. var. *spicata*
- 1b. Leaflets sessile or petiolulate, abaxially pubescent; fruiting spike short, 13–30(–40) cm.
 - 2a. Leaflets sessile or shortly petiolulate, abaxially slightly pubescent, apex acuminate 4b. var. *aceriflora*
 - 2b. Leaflets petiolulate or rarely sessile, abaxially tomentose, apex obtuse or acute 4c. var. *colebrookeana*

4a. Engelhardia spicata var. *spicata*

云南黄杞(原变种) yun nan huang qi (yuan bian zhong)

Trees to 20 m tall. Leaves 25–35 cm; petiole 3.5–11.5 cm, glabrous to tomentose; rachis glabrous to tomentose; leaflets (4–)8–14, petiolule 2–10 mm, blade elliptic to elliptic-lanceolate, 7–15 × 2–5 cm, abaxially glabrous except for slight pubescence along midvein and in secondary vein axils, base broadly cuneate, apex obtuse or sometimes acute. Fruiting spike (22–) 30–45(–60) cm, glabrous. Nutlets globose, ca. 3.5 mm, hispid; wings hispid at base, middle wing 2.5–3.5 cm, lateral wings ca. 1.5 cm. Fl. Nov, fr. Jan–Feb. $2n = 32$.

Mixed forests on mountain slopes; 500–2100 m. Guangxi, Xizang, Yunnan [Bhutan, India, Indonesia, Laos, W Malaysia, Nepal, Pakistan, Philippines, Sikkim, Thailand, Vietnam].

4b. Engelhardia spicata var. *aceriflora* (Reinwardt) Koorders & Valeton, Bijdr. Boomsoort. Java 5: 167. 1900.

爪哇黄杞 zhao wa huang qi

Pterilema aceriflorum Reinwardt, Sylloge Plant. Nov. Soc. Rotisb. 2: 13. 1826; *Engelhardia aceriflora* (Reinwardt) Blume.

Trees to 10 m tall. Leaves 8–15 cm; petiole 4.5–9 cm, glabrous to puberulent; rachis usually slightly pubescent; leaflets 4–10, petiolule sessile to 5 mm, blade narrowly elliptic to ovate-elliptic, 8–15 × 3–6 cm, abaxially puberulent or glabrous, base oblique, obtuse, apex acuminate. Fruiting spike 15–30(–40) cm, tomentose. Nutlets ovoid, ca. 6 mm, hispid; wings hispid at base, middle wing 3–3.8 cm, lateral wings 1.5–1.8 cm. Fl. Mar, fr. Apr–May, Nov. $2n = 32$.

Forests on mountain slopes; 1500–1700 m. Yunnan [India, Indonesia, Myanmar, Nepal, Philippines, Thailand, Vietnam].

4c. Engelhardia spicata var. *colebrookeana* (Lindley) Koorders & Valeton, Bijdr. Boomsoort. Java 5: 169. 1900.

毛叶黄杞 mao ye huang qi

Engelhardia colebrookeana Lindley in Wallich, Pl. Asiat. Rar. 3: 4. 1832; *E. esquirolii* H. Léveillé; *E. pterococca* Roxburgh ex Kuntze var. *colebrookeana* (Lindley) Kuntze; *E. spicata* var. *integra* (Kurz) Grierson & Long; *E. villosa* Kurz var. *integra* Kurz.

Trees to 7(–20) m tall. Leaves 15–25 cm; petiole 2–6 cm; petiole and rachis tomentose, rarely glabrescent; leaflets 4–10, petiolule to 1 cm or leaflets rarely sessile, blade broadly elliptic-ovate or broadly elliptic-obovate to long elliptic, 7–15 × 3–7 cm, abaxially tomentose or rarely glabrescent, base oblique, broadly cuneate or rounded, apex obtuse or sometimes acute. Fruiting spike 13–18 cm, densely pubescent. Nutlets globose, 4–6 mm, hispid; wings hispid at base, middle wing 1.9–3 cm, lateral wings 1–1.5 cm. Fl. Jan–Apr, fr. Mar–Aug(–Oct). $2n = 32$.

Open forests on mountain slopes or in valleys; near sea level to 1400(–2000) m. Guangdong, Guangxi, Guizhou, Hainan, Xizang, Yunnan [India, Myanmar, Nepal, Philippines, Sikkim, Thailand, Vietnam].

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