

ELAEOCARPACEAE

杜英科 du ying ke

Tang Ya (唐亚)¹; Chamlong Phengkhai²

Trees or shrubs, evergreen or semi-evergreen. Leaves alternate or rarely opposite, stipulate or not, petiolate, simple, pinnately veined. Inflorescence axillary or terminal, racemose, corymbose, paniculate, or sometimes fascicled or solitary flowers. Flowers bisexual or polygamous, 4- or 5-merous, actinomorphic, with or without bracts. Sepals 4 or 5, basally connate or free, usually valvate. Petals 4 or 5, sometimes absent, valvate or imbricate, margin laciniate or rarely entire. Stamens 8 to numerous; filaments free and borne on disks; anthers 2-celled, dehiscent by apical or longitudinal slits, awned or tipped with hairs at apices. Disk circular or glandularly lobed. Ovary superior, 2- to several loculed; placentation axile; ovules 2 to several per locule; style connate or free. Fruit a drupe or capsule. Seeds with copious endosperm; embryo flat.

About 12 genera and ca. 550 species: primarily in tropical to subtropical regions of both hemispheres, excluding Africa; two genera and 53 species (21 endemic) in China.

The two genera in China are of economic value (i.e., medicine, food, and timber).

Chang Hung-ta. 1989. Elaeocarpaceae. In: Chang Hung-ta, ed., Fl. Reipubl. Popularis Sin. 49(1): 1–46.

- 1a. Inflorescence racemose; petal margin laciniate; fruit a drupe 1. *Elaeocarpus*
1b. Inflorescence a solitary flower or racemose; petal margin entire or dentate; fruit a capsule 2. *Sloanea*

1. ELAEOCARPUS Linnaeus, Sp. Pl. 1: 515. 1753.

杜英属 du ying shu

Ganitrus Gaertner; *Monocera* Jack.

Trees or rarely shrubs. Leaves alternate or spirally arranged; stipules linear or rarely leaflike, caducous, rarely persistent; petiole usually long and swollen at both ends; leaf blade margin serrate or entire, pinnately veined. Inflorescence axillary, racemose. Flowers bisexual, 4- or 5-merous. Sepals 4 or 5, valvate, abaxially usually pubescent. Petals 4 or 5, white, free, margin laciniate, rarely entire or lobed. Stamens 8 to numerous; filaments short; anthers 2-celled, dehiscing from apical slits, with awn or hairs at tip. Disk usually glandularly 5–10-lobed, rarely circular. Ovary superior, 2–5(–7)-loculed; ovules 2–12 per locule; style linear or subulate. Fruit a drupe, 1(or 5)-loculed; endocarp hard, bony, surface usually lacunose. Seeds usually 1 per locule, with fleshy endosperm; cotyledons thin; embryo straight or curved.

About 360 species: primarily in the Old World tropics; 39 species (14 endemic) in China.

- 1a. Ovary and fruit 4- or 5-loculed.
2a. Branchlets hairy; lateral veins of leaves 10–13 per side 1. *E. angustifolius*
2b. Branchlets glabrous; lateral veins of leaves 6–9 per side 2. *E. hayatae*
1b. Ovary 2- or 3-loculed; fruit usually 1-loculed.
3a. Anthers awned at apices; exocarp shiny.
4a. Leaf blade narrowly lanceolate; fruit spindle-shaped 3. *E. hainanensis*
4b. Leaf blade not narrowly lanceolate; fruit globose or ellipsoid.
5a. Fruit more than 2 cm in diam., pubescent 4. *E. rugosus*
5b. Fruit less than 2 cm in diam., glabrous.
6a. Leaf blade oblong or elliptic; branchlets glabrous.
7a. Lateral veins of leaves (10–)12–14 per side 5. *E. varunua*
7b. Lateral veins of leaves (5–)7–10 per side.
8a. Ovary and disk glabrous 6. *E. petiolatus*
8b. Ovary densely tomentose or slightly villous, disk villous.
9a. Pedicel glabrous or slightly pilose; both surfaces of petals villous, segments
8–10 8. *E. prunifolioides*
9b. Pedicel densely puberulent; petals adaxially villous at base, 3-dentate 12. *E. multiflorus*
6b. Leaf blade narrowly obovate or lanceolate; branchlets pubescent.
10a. Leaf blade glandular in axils of lateral and tertiary veins; petals adaxially glabrous 7. *E. subpetiolatus*
10b. Leaf blade not glandular; petals adaxially pubescent.

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- 11a. Petal segments 17–20; leaf blade oblanceolate 10. *E. laoticus*
 11b. Petal segments 6–12; leaf blade oblong or lanceolate.
 12a. Leaf blade 4–8 cm, veinlets adaxially prominently raised; ovary 3-loculed 11. *E. dubius*
 12b. Leaf blade 12–15 cm, veinlets adaxially slightly raised; ovary 2-loculed 9. *E. bachmaensis*
- 3b. Anthers not awned at apices; exocarp shiny or not, obscure.
- 13a. Flowers polygamous; petals incised or entire, not laciniate; exocarp shiny.
- 14a. Leaf blade lanceolate or narrowly oblong, rarely ovate-lanceolate or ovate-oblong.
 15a. Leaf blade abaxially pubescent 38. *E. brachystachyus*
 15b. Leaf blade abaxially glabrous.
 16a. Branchlets glabrous; leaf blade leathery, veinlets adaxially prominent 39. *E. decandrus*
 16b. Branchlets pubescent; leaf blade papery, veinlets adaxially inconspicuous.
 17a. Leaf blade 3–6 cm wide, lateral veins (6–)8 per side, petiole 2–6 cm 35. *E. japonicus*
 17b. Leaf blade 2–3 cm wide, lateral veins 4–6 per side, petiole 1.5–2 cm 37. *E. chinensis*
- 14b. Leaf blade elliptic, ovate, obovate, or oblanceolate.
 18a. Branchlets glabrous or minutely pubescent, old leaves glabrous 35. *E. japonicus*
 18b. Branchlets and leaves at least on midvein tomentose.
 19a. Leaf blade golden pubescent 36. *E. auricomus*
 19b. Leaf blade yellow-brown or silvery-gray pubescent.
 20a. Lateral veins of leaves 8–12 per side, petiole 3–5.5 cm; ovary glabrous 32. *E. gymnogynus*
 20b. Lateral veins of leaves 6–9 per side, petiole 1.5–4 cm; ovary at least on upper part pubescent.
 21a. Branchlets and leaf blades abaxially black punctate, lateral veins 8 or 9 per side 33. *E. atropunctatus*
 21b. Branchlets and young leaves abaxially not black punctate, lateral veins 6–8 per side 34. *E. nitentifolius*
- 13b. Flowers bisexual; petals laciniate; exocarp inconspicuous.
- 22a. Fruit less than 1.5 cm in diam.
 23a. Branchlets glabrous, brown when dried; petals glabrous or abaxially sericeous.
 24a. Petiole nearly absent or to 4(–10) mm; peduncle and petals glabrous 15. *E. glabripetalus*
 24b. Petiole 1.5–2 cm; peduncle densely pubescent; petals abaxially sericeous 16. *E. argenteus*
 23b. Branchlets sparsely pilose, pale; petals pubescent at least along margin.
 25a. Leaf blade obovate, lateral veins 4 or 5 per side, petiole not shorter than 1 cm; petal segments 10–12 14. *E. sylvestris*
 25b. Leaf blade lanceolate, lateral veins 6–10 per side, petiole ca. 0.5 cm; petal segments 7 13. *E. poilanei*
- 22b. Fruit more than 1.5 cm in diam.
 26a. Branchlets glabrous or pilose only.
 27a. Leaf blade attenuate to base from middle.
 28a. Endocarp inconspicuously verrucose; leaf blade not less than 5.5 cm wide, petiole 2–4.5 cm, prominently swollen at upper end 17. *E. sikkimensis*
 28b. Endocarp prominently verrucose; leaf blade to 4 cm wide, petiole to 2 cm, not swollen at upper end 28. *E. decipiens*
 27b. Leaf blade not attenuate, base cuneate to rounded.
 29a. Leaf blade abaxially glandular, oblong-lanceolate 20. *E. oblongilimbus*
 29b. Leaf blade abaxially eglandular, oblong, elliptic, oblanceolate, or lanceolate.
 30a. Endocarp inconspicuously verrucose.
 31a. Leaf blade 13–21 × 7–9 cm, petiole not shorter than 2 cm 19. *E. austroyunnanensis*
 31b. Leaf blade 6–12 × 2.5–4 cm, petiole not longer than 1 cm 15. *E. glabripetalus*
 30b. Endocarp conspicuously verrucose.
 32a. Branchlets pilose; lateral veins of leaves 8–10 per side, veinlets dense 31. *E. longlingensis*
 32b. Branchlets glabrous; lateral veins of leaves 7 or 8 per side, veinlets sparse 29. *E. lanceifolius*
- 26b. Branchlets densely tomentose.
 33a. Leaf blade basally cuneate or attenuate from middle.
 34a. Leaf blade narrowly lanceolate 27. *E. duclouxii*
 34b. Leaf blade oblong, ovate, or obovate-lanceolate.

- 35a. Leaf blade obovate-lanceolate, attenuate to base from middle, lateral veins 6 or 7 per side 22. *E. harmandii*
- 35b. Leaf blade oblong or ovate-oblong, base cuneate or acute, lateral veins 7–10 per side.
- 36a. Petals glabrous or marginally ciliate, segments 14–18; stamens 15 30. *E. limitaneoides*
- 36b. Petals adaxially villous at base, segments 10–12; stamens 26–30 27. *E. duclouxii*
- 33b. Leaf blade basally rounded, acute, or cordate.
- 37a. Leaf blade basally cordate; branchlets with persistent bracts 21. *E. balansae*
- 37b. Leaf blade basally rounded or acute; branchlets without persistent bracts.
- 38a. Flowers with persistent reniform bracteoles 26. *E. braceanus*
- 38b. Flowers without persistent reniform bracteoles.
- 39a. Leaf blade abaxially with extremely dense silvery-gray appressed hairs 25. *E. limitaneus*
- 39b. Leaf blade abaxially brown or yellow pilose.
- 40a. Endocarp smooth 18. *E. sphaerocarpus*
- 40b. Endocarp verrucose or lacunose.
- 41a. Leaf blade basally rounded, lateral veins 10–13 per side 24. *E. howii*
- 41b. Leaf blade basally cuneate or obtuse, lateral veins 7 or 8 per side 23. *E. lacunosus*

1. *Elaeocarpus angustifolius* Blume, Bijdr. 120. 1825.

圓果杜英 yuan guo du ying

Elaeocarpus ganitrus Roxburgh ex G. Don; *E. subglobosus* Merrill.

Trees to 30 m tall, to 1.7 m d.b.h. Branches brown-gray; branchlets yellowish brown villous. Petiole 1–1.5 cm, villous, glabrescent; leaf blade obovate-oblong to oblong-lanceolate, 9–14 × 3–4.5 cm, papery or membranous, both surfaces villous when young, glabrescent when mature, lateral veins 10–13 per side, slightly prominent abaxially, impressed adaxially, base broadly cuneate, margin serrate, apex acute or obtuse. Racemes in axils of current and fallen leaves, 2–4 cm; peduncles villous. Pedicel ca. 5 mm. Sepals 5, lanceolate, ca. 5 × 1.5 mm, both surfaces villous. Petals 5, ca. as long as sepals, lacinate to 1/2 their length, lower 1/2 villous. Stamens 25; anthers setose at apices. Ovary 5-loculed, densely tomentose; style ca. 5 mm. Drupe globose, 1.7–2 cm in diam., 5-loculed. Seed 1 per locule; endocarp hard, rugulose. Fl. Aug–Sep, fr. Sep–Nov.

Broad-leaved mountain and valley rain forests; 400–1300 m. Guangxi, Hainan, Yunnan [Cambodia, NE India, Indonesia, Malaysia, Myanmar, Nepal, Thailand; Australia, Pacific islands (Fiji)].

2. *Elaeocarpus hayatae* Kanehira & Sasaki, Trans. Nat. Hist. Soc. Formos. 24: 398. 1934.

球果杜英 qiu guo du ying

Elaeocarpus sphaericus (Gaertner) Schumann var. *hayatae* (Kanehira & Sasaki) C. E. Chang; *E. sylvestris* (Loureiro) Poiret var. *hayatae* (Kanehira & Sasaki) Y. C. Liu.

Trees evergreen. Branchlets glabrous. Leaves irregularly whorled; petiole 1.2–2 cm; leaf blade oblong or lanceolate to oblanceolate, 8–15 × 3–6 cm, papery, glabrous, lateral veins 6–9 per side, veinlets reticulate, base cuneate or obtuse, margin minutely serrate, apex shortly acuminate or obtuse. Racemes in axils of current and fallen leaves, 4–6 cm, laxly flowered; peduncles sparsely pubescent. Pedicel 3–6 mm, slender, puberulent. Sepals 5, lanceolate, 5–6 mm, abaxially depressed pubes-

cent, adaxially glabrous, apex acute. Petals 5, obovate, 6–7 mm, slightly pubescent at base, especially along margin, apex lacinate; lobes 12–15. Stamens ca. 30; anthers linear, puberulent, with a tuft of hairs at apices. Ovary ovoid, villous, 4- or 5-loculed. Drupe subglobose, ca. 2 × 1.5 cm; endocarp strongly tuberculate, very hard. Fl. unknown, fr. Sep.

• Evergreen forests. S Taiwan.

This species was originally described as having a 3-loculed ovary. In Kanehira (Formos. Trees, Rev. Ed. t. 388, G & I. 1936), the cross-section of the ovary is illustrated clearly as 3-loculed but the cross-section of the fruit is 5-loculed with 4 locules degenerating. Examination of type materials by C. E. Chang (Fl. Taiwan 3: pl. 776 (1, 4). 1977) revealed that the ovary and fruit are 4- or 5-loculed. In the infrageneric system of *Elaeocarpus* (Tang, Acta Phytotax. Sin. 30: 385–404. 1992), species with a 5-loculed ovary and fruit belong to *E. sect. Ganitrus* (Gaertner) Masters but species with a 2- or 3-loculed ovary and 1-loculed fruit belong to *E. sect. Elaeocarpus*. Because its ovary is 4- or 5-loculed, *E. hayatae* is certainly not a member of *E. sect. Elaeocarpus* but rather a member of *E. sect. Ganitrus*.

This species differs from *Elaeocarpus angustifolius* in a number of characters, including branchlets, petioles, and abaxial leaf blade surfaces glabrous (vs. villous), leaf blades slightly smaller (8–15 × 3–6 cm vs. 9–14 × 3–4.5 cm), lateral veins fewer (6–9 vs. 10–13), veins and veinlets distinctly (vs. poorly) anastomosing, sepals adaxially glabrous (vs. villous), petal lobes 12–15 (vs. 15–25), and ovary and fruit 4- or 5-loculed (vs. 5-loculed). In view of these differences, we prefer to treat it as a distinct species rather than as a variety. In addition, up-to-date records of geographical distribution indicate that they are allopatric.

Because its leaves look similar to *Elaeocarpus decipiens* and *E. sylvestris*, *E. hayatae* sometimes has been treated as a synonym of these; however, as noted above, *E. hayatae* is in a separate section. The discovery of both 4- and 5-loculed ovaries and fruit might be important in the study of evolution of this genus. *Elaeocarpus hayatae* is distributed in the periphery of the section and the reduction in locules of ovary and fruit might be derived.

3. *Elaeocarpus hainanensis* Oliver, Hooker's Icon. Pl. 25: sub t. 2462. 1896.

水石榕 shui shi rong

Shrubs or small trees, to 5 m tall. Branchlets glabrous or nearly so. Leaves clustered at twig apices; petiole 1–2 cm; leaf blade narrowly lanceolate, oblanceolate, or narrowly oblong, (4–)7–15(–18) × 1.5–3(–3.5) cm, papery, abaxially pubescent, adaxially glabrous or slightly pubescent on midvein only, lateral veins 14–30 per side, prominent on both surfaces, veinlets slightly prominent adaxially, base cuneate and tapered toward end, decurrent, margin denticulate, apex acuminate. Racemes in axils of current leaves, 5–8 cm, 2–6-flowered in upper part; peduncles puberulent, glabrescent. Pedicel 2–5 cm, puberulent; bracts sessile, persistent, leaflike, ovate or elliptic, 1–1.6 × 0.7–1 cm, veins and veinlets conspicuous, margin dentate, base rounded or auriculate. Flowers 3–4 cm in diam. Calyx lobes 5, lanceolate, 1.2–2 cm, abaxially puberulent, pubescent on midvein and upper 1/2 only. Petals 5, white, ca. as long as sepals, obovate, ciliate along margin, abaxially densely rust-colored yellow tomentose at base, adaxially tomentose, apex lacinate; lobes 30–46, 4–6 mm. Stamens 63–75, ca. as long as petals, puberulent; anthers with awn ca. 4 mm. Disk multi-lobed, tomentose. Ovary 2-loculed, glabrous or nearly so; ovules 2 per locule; style ca. 1 cm, pubescent in lower 1/2. Drupe spindle-shaped, 4–5 cm, ca. 1.2 cm in diam., both ends acuminate; endocarp hard, lacunose, 1-loculed. Seeds ca. 2 cm. Fl. Jun–Jul, fr. Jul–Sep.

Moist places, streamsides; 200–500 m. Guangdong, S Guangxi, Hainan, SE Yunnan [Myanmar, Thailand, Vietnam].

- 1a. Leaf blade narrowly lanceolate or oblanceolate, 7–15 cm, lateral veins 14–30 per side 3a. var. *hainanensis*
 1b. Leaf blade narrowly oblong, 4–7 cm, lateral veins 10 per side 3b. var. *brachyphyllus*

3a. *Elaeocarpus hainanensis* var. *hainanensis*

水石榕(原变种) shui shi rong (yuan bian zhong)

Leaf blade narrowly lanceolate or oblanceolate, 7–15 cm, lateral veins 14–30 per side.

Moist places, streamsides; 200–500 m. Guangdong, S Guangxi, Hainan, SE Yunnan [Myanmar, Thailand, Vietnam].

3b. *Elaeocarpus hainanensis* var. *brachyphyllus* Merrill, Lingnan Sci. J. 5: 123. 1927.

短叶水石榕 duan ye shui shi rong

Elaeocarpus brachyphyllus (Merrill) Kunth.

Leaf blade narrowly oblong, 4–7 cm, lateral veins 10 per side.

- Moist places, streamsides. N and W Hainan.

One of us (Chamlong Phengkhai) believes that this is not significantly different from the typical variety.

4. *Elaeocarpus rugosus* Roxburgh, Fl. Ind., ed. 1832, 2: 596. 1832.

毛果杜英 mao guo du ying

Trees to 30 m tall, to 2 m d.b.h. Bark gray; branchlets robust, 6–12 mm in diam., rust-brown puberulent, with conspicuous leaf and infructescence scars. Leaves fascicled or clustered

at twig apices; petiole 1–2.6 cm, rust-colored puberulent at first, glabrescent, swollen at base; leaf blade obovate-lanceolate, obovate, or obovate-elliptic, (14–)18–30(–45) × 6–11(–16) cm, leathery or thinly so, abaxially very sparsely pilose on midvein, adaxially puberulent on midvein only, lateral veins 16–18 per side, prominently raised abaxially, prominent adaxially, veinlets prominently raised abaxially, conspicuous adaxially, base cuneate, margin sparsely shallowly crenate, apex shortly acute, rounded, or emarginate. Racemes in axils of fallen and current leaves, dense, 4–12 cm, 8–10-flowered; peduncles rust-colored tomentose. Pedicel 0.9–1.8 cm, rust-colored tomentose. Flowers large; buds 1–1.4 cm. Sepals 5 or 6, 1.2–1.5 cm, abaxially pubescent, adaxially glabrous. Petals 5 or 6, 1.3–1.5 cm × ca. 8 mm, lacinate; lobes 15–20, abaxially densely rust-colored tomentose, adaxially tomentose, margin ciliate. Stamens 45–51; filaments 2–2.5 mm; anthers 3.5–4 mm, with awn 4–4.5 mm. Disk 5-lobed, pubescent. Ovary tomentose, 2-loculed; ovules numerous in each locule; style slightly longer than stamens, pubescent in lower part. Drupe ellipsoid, ca. 3.5 × 2–2.5 cm, tomentose; endocarp conspicuously verrucate, 1-loculed. Seed 1. Fl. Mar, fr. May–Aug.

Evergreen forests in valleys; 500–800 m. Hainan, S Yunnan [India, Malaysia, Myanmar, Thailand].

This species was misidentified in FRPS (49(1): 10. 1989) as *Elaeocarpus apiculatus* Masters.

5. *Elaeocarpus varunua* Buchanan-Hamilton ex Masters in J. D. Hooker, Fl. Brit. India 1: 407. 1874.

滇印杜英 dian yin du ying

Elaeocarpus decurvatus Diels.

Trees to 30 m tall. Terminal bud gummy resinous; branches black when dry; branchlets sparsely gray puberulent, glabrescent. Petiole 3–8 cm, puberulent at first, glabrescent, swollen at both ends; leaf blade abaxially green, adaxially dark green, shiny, elliptic to oblong, 10–20(–25) × 5–9(–12) cm, membranous, abaxially shortly puberulent, both surfaces white sericeous when young, glabrous when mature, lateral veins (10–)12–14 per side, prominently raised abaxially, impressed adaxially, parallel, tertiary veinlets dense, prominent on both surfaces, base rounded or obtuse, margin entire or slightly crenate, apex acute, with obtuse acumen. Racemes in axils of current and fallen leaves, 7–12 cm; peduncles gray-white puberulent. Pedicel ca. 1 cm, gray-white puberulent. Flowers ca. 1.5 cm. Sepals 5, narrowly lanceolate, ca. 1 cm, both surfaces gray puberulent. Petals 5, linear, ca. 11 × 3.5 mm, lower 1/2 woolly on both surfaces, upper 1/2 lacinate; segments 16–18. Stamens 30–40; filaments ca. 1 mm; anthers ca. 4.5 mm; awn 1–1.5 mm, erect or slightly curved. Disk 10-lobed, sparsely pubescent. Ovary 3-loculed, woolly; style ca. 8 mm, villous. Drupe ellipsoid, 1.4–1.7 cm, glabrous; endocarp hard, ca. 1 mm thick. Fl. Mar–Apr, fr. Aug–Sep. $2n = 30$.

Evergreen forests; 300–1400 m. Guangdong, Guangxi, Xizang, Yunnan [India, ?Malaysia, ?Nepal, Vietnam].

6. *Elaeocarpus petiolatus* (Jack) Wallich ex Steudel, Nomencl. Bot., ed. 2, 1: 545. 1840–1841.

长柄杜英 chang bing du ying

Monocera petiolata Jack, Malayan Misc. 1(5): 43. 1820.

Trees to 12 m tall. Terminal buds and branchlets gummy resinous, branchlets glabrous. Petiole 3–6 cm, robust, glabrous, swollen at both ends; leaf blade oblong or elliptic, 9–18 × 4–8 cm, leathery, glabrous, lateral veins 5–8 per side, prominent abaxially, conspicuous adaxially, veinlets conspicuous on both surfaces, base acute, rounded, or obtuse, margin slightly crenate to entire, apex acuminate to acute. Racemes in axils of fallen and current leaves, 6–12 cm; peduncles glabrous or nearly so. Pedicel nearly glabrous. Sepals 5, lanceolate, 6–7 mm, abaxially pilose. Petals ca. as long as sepals, oblong, abaxially brown pubescent, upper 1/2 laciniate; segments 9–14. Stamens 20–30, pubescent; anthers long awned, curved outward. Disk 10-lobed, glabrous. Ovary 2-loculed, glabrous; style glabrous. Drupe shiny, ellipsoid, 1.5–1.8 × 0.9–1 cm; endocarp bony, furrowed, 1-loculed. Seed ca. 1 cm. Fl. Aug–Sep, fr. Sep–Dec.

Tropical forests; sea level to 1300 m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

7. *Elaeocarpus subpetiolatus* Hung T. Chang, Acta Phytotax. Sin. 17(1): 57. 1979.

屏边杜英 ping bian du ying

Trees ca. 10 m tall. Branchlets shortly appressed sericeous, glabrescent. Petiole 1.5–2 cm, slender, swollen at both ends; leaf blade abaxially greenish, adaxially dark green, slightly shiny, elliptic, oblanceolate, or oblong, 8–13 × 3–5.5 cm, papery, abaxially sericeous at first, glabrescent, adaxially glabrous, lateral veins 10–12 per side, prominently raised abaxially, conspicuous adaxially, veinlets dense, prominent on both surfaces, glandular in vein axils, base cuneate, slightly decurrent, margin minutely crenate, apex acute, acumen obtuse. Raceme 2–4 cm, 4–7-flowered; bract caducous, minute. Pedicel ca. 5 mm. Flower buds ovoid-oblong, ca. 7 mm. Sepals 5, lanceolate, abaxially minutely pubescent. Petals 5, narrowly oblong, slightly shorter than sepals, glabrous, margin laciniate at apices; segments 12, ca. 2 mm, abaxially pubescent. Stamens 30, 4–5 mm, shortly awned. Disk 10-lobed, pubescent. Ovary 3-loculed, pubescent; style shorter than stamens. Fruit unknown. Fl. Apr, fr. unknown.

• Forests; ca. 1400 m. SE Yunnan.

8. *Elaeocarpus prunifolioides* Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 138. 1940.

假樱叶杜英 jia ying ye du ying

Elaeocarpus prunifolioides var. *rectinervis* Hung T. Chang.

Trees to 15 m tall. Terminal buds gummy resinous; branchlets and terminal buds black-brown when dry, glabrous. Petiole usually black when dry, 1–5 cm, glabrous, adaxially grooved, swollen at end; leaf blade abaxially greenish, adaxially dark green, black-brown, or gray-green, shiny, oblong, ovate-oblong, or elliptic, 8–15 × 3–6.5 cm, thinly leathery or papery, glabrous, lateral veins 8–10 per side, prominently raised abaxially, conspicuous adaxially, veinlets conspicuous on both sur-

faces, sometimes glandular in vein axils, base broadly cuneate or nearly rounded, ± unequal on each side, margin nearly entire or minutely serrulate, apex acuminate or acute, acumen obtuse. Racemes in axils of current and fallen leaves, 4–6 cm, 8–15-flowered; peduncles glabrous. Pedicel 7–10 mm, glabrous or sparsely pubescent. Flower buds narrowly ovoid, ca. 7 mm, apex acute. Sepals 5, lanceolate, ca. 7 mm, abaxially pubescent, pubescent on keel only, margin pubescent. Petals 5, oblong, ca. 7 × 2–2.5 mm, upper 1/5 laciniate; segments 8–10, abaxially gray-white pubescent, more so adaxially, margin ciliate. Stamens 20–30, 4–5 mm; filaments very short; anthers with awn ca. 1 mm. Disk 10-lobed, apparently separated, globose, pilose. Ovary 3-loculed, tomentose; ovules 6 per locule; style ca. 4.5 mm, pubescent in lower 1/2. Drupe shiny, ellipsoid, 1.5–1.9 × 0.7–1.1 cm, both ends rounded; endocarp bony, nearly smooth. Seed 1, ca. 1 cm. Fl. Jan–Feb, fr. Feb–May.

• Evergreen forests; 600–1700 m. S Yunnan.

9. *Elaeocarpus bachmaensis* Gagnepain, Notul. Syst. (Paris) 11: 1. 1943.

少花杜英 shao hua du ying

Elaeocarpus austrosinicus Hung T. Chang.

Trees to 15 m tall. Branchlets slender, minutely puberulent. Petiole 1–3 cm, slender, glabrous, swollen at end; leaf blade abaxially yellowish brown and adaxially greenish brown when dry, lanceolate, 12–15 × 3.5–4 cm, papery, glabrous, midvein prominently raised abaxially, slightly raised adaxially, lateral veins 9–11 per side, prominently raised abaxially, conspicuous adaxially, veinlets inconspicuous abaxially, conspicuous adaxially, not glandular, base cuneate, margin crenate, apex acuminate. Raceme 4–5 cm; peduncle ca. 7 mm, pilose. Flower buds ovoid, ca. 5 mm. Sepals 5, lanceolate, ca. 6 mm, abaxially pubescent, adaxially nearly glabrous, margin pubescent. Petals 5, laciniate; segments 6, abaxially densely sericeous, adaxially and marginally pilose. Stamens numerous; filaments glabrous; anthers awned. Disk 5-lobed, glabrous. Ovary densely tomentose, 2-loculed; style pubescent in lower 1/2. Drupe ellipsoid, ca. 8 × 2–3 mm; exocarp shiny. Fl. Dec–Feb, fr. May–Jun.

Forests; 300–500 m. S and SW Guangxi, SE Yunnan [Vietnam].

10. *Elaeocarpus laoticus* Gagnepain, Notul. Syst. (Paris) 11: 7. 1943.

老挝杜英 lao wo du ying

Trees 25–30 m tall. Branchlets silvery-gray puberulent, glabrescent. Petiole 0.8–2 cm, minutely puberulent, glabrescent; leaf blade oblanceolate, 6.5–11 × 2.5–3.5 cm, thinly leathery, abaxially pubescent on midvein only, adaxially glabrous, lateral veins ca. 10 per side, prominent abaxially, conspicuous adaxially, not glandular, base broadly cuneate or slightly obtuse, margin minutely serrate, apex slightly acute, acumen obtuse. Raceme 4–7 cm, 7–10-flowered; peduncle brown puberulent. Pedicel 4–7 mm, pubescent. Sepals 5, narrowly lanceolate, 8–10 × ca. 2 mm, abaxially gray-white puberulent, adaxially glabrous, margin tomentose. Petals 5, ca. 1 cm, abaxially appressed pubescent, adaxially velutinous, especially along keel, laciniate in upper 1/2; segments 17–20, adaxially white villous.

Stamens 24–28, ca. 5 mm; filaments ca. 1 mm; anthers ca. 3 mm, with awn ca. 1 mm. Disk 10-lobed, apparently separated, glands globose, pilose. Ovary 3-loculed, pubescent; style 5–6 mm, pubescent in lower 1/2. Drupe shiny, ellipsoid, 1.2–1.4 × ca. 0.6 cm. Fl. May, fr. Dec.

Evergreen forests; 1300–1500 m. SE Yunnan [Laos].

11. *Elaeocarpus dubius* A. Candolle, Bull. Herb. Boissier, sér. 2, 3: 366. 1903.

显脉杜英 xian mai du ying

Trees evergreen, to 25 m tall. Branchlets slender, silvery-gray pubescent at first, glabrescent. Leaves crowded at twig apices; petiole 1–2 cm, rarely to 3 cm, slender, glabrous, swollen at both ends; leaf blade oblong or lanceolate, 4–8 × 2–2.5 cm, rarely to 10 × 4 cm, thinly leathery, glabrous, lateral veins 8–10 per side, conspicuously raised on both surfaces, veinlets dense, prominently raised abaxially, not glandular, base broadly cuneate or obtuse, margin crenate, apex acute or acuminate, acumen obtuse. Racemes in axils of fallen and current leaves, 3–5 cm, 4–7-flowered; peduncles silvery gray-white pubescent. Pedicel ca. 5 mm, silvery-white pubescent. Flower buds ovoid-oblong. Sepals 5, conspicuously keeled, narrowly lanceolate, 7–8 × ca. 2 mm, abaxially minutely puberulent, apex acute. Petals 5, oblong, ca. as long as sepals, 7–8 × ca. 2.5 mm, both surfaces gray-white pubescent, upper 1/3 lacinate; segments 9–11. Stamens 20–23; filaments ca. 1 mm; anthers ca. 3.5 mm, with awn ca. 1.5 mm. Disk 10-lobed, pubescent. Ovary 3-loculed, pubescent; style ca. 5 mm. Drupe ellipsoid, 1–1.3 cm × 6–8 mm, glabrous; endocarp bony, ca. 1 mm thick. Fl. Mar–Apr, fr. Apr–Jun.

Low-elevation forests; 600–700 m. Guangdong, Guangxi, Guizhou, Hainan, Yunnan [Vietnam].

12. *Elaeocarpus multiflorus* (Turczaninow) Fernández-Villar in Blanco, Fl. Filip., ed. 3, Nov. App. 31. 1880.

繁花杜英 fan hua du ying

Monocera multiflora Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 19: 495. 1846; *Elaeocarpus arthropus* Ohwi.

Trees evergreen. Branchlets gray when dry, stout, glabrous. Petiole 2–4 cm, glabrous, swollen at both ends; leaf blade ovate-oblong or narrowly obovate-oblong, 7–12 × 3–4.5 cm, papery, both surfaces glabrous, abaxially not black glandular punctate, lateral veins 7–9 per side, arcuate-ascending, abaxially prominently raised, veinlets prominently reticulate, slightly raised on both surfaces, base obtuse, rounded, or slightly emarginate, margin sparsely crenate, apex acute or shortly acuminate. Racemes in axils of current and fallen leaves, 3–6 cm; peduncles sparsely puberulent. Pedicel 6–10 mm, densely puberulent. Flower buds ovoid, 5–6 mm. Sepals 5, lanceolate, 5–6 × ca. 1.8 mm, abaxially minutely gray puberulent, adaxially nearly glabrous, apex acute. Petals 5, oblong, ca. 6 mm, abaxially pubescent, adaxially with a cushion of long woolly hairs at base, usually 2- or 3-dentate at apices. Stamens ca. 20; filaments ca. 1.2 mm, villous; anthers linear, 2–3 mm, outer valve produced into an awn, very minutely pubescent throughout. Disk 10-lobed, villous. Ovary slightly villous; style

ca. 1.2 mm, glabrous. Drupe ellipsoid, ca. 1.5 × 0.8 cm. Fl. Jun–Jul, fr. unknown.

Taiwan [Indonesia, Japan, Philippines].

13. *Elaeocarpus poilanei* Gagnepain, Notul. Syst. (Paris) 11: 10. 1943.

滇越杜英 dian yue du ying

Elaeocarpus sylvestris (Loureiro) Poiret var. *viridescens* Chun & F. C. How.

Trees to 25 m tall, to 50 cm d.b.h. Branchlets slender, sparsely pale pilose, buds pubescent. Petiole ca. 5 mm, pubescent at first, glabrescent, swollen at end; leaf blade lanceolate, 6.5–10 × 2–3 cm, abaxially sparsely pilose on midvein, glabrescent, adaxially glabrous, lateral veins 6–10 per side, slender, prominent abaxially, inconspicuous adaxially, veinlets prominent on both surfaces, base cuneate, decurrent, margin entire or nearly so, apex acuminate. Raceme 2–4 cm, 14–20-flowered; peduncle nearly glabrous. Pedicel 3–4 mm, nearly glabrous. Flowers bisexual; buds ovoid, ca. 3 mm. Sepals 5, broadly lanceolate, 3–3.2 × 1.1–1.3 mm, glabrous, ciliate along margin. Petals lacinate; segments 7. Stamens 16; anthers 1.6–1.8 mm, pubescent, not awned, not pubescent at apices. Disk 5-lobed, tomentose. Ovary densely gray-white tomentose, 3-loculed; style pubescent in lower 1/2. Drupe ellipsoid, 1.5–1.8 × 0.8–0.9 cm, 1-loculed; endocarp smooth. Fl. Apr–May, fr. Oct–Dec.

Evergreen forests on hills or in valleys; 500–1300 m. Guangdong, Guangxi, Hainan, S Yunnan [Vietnam].

14. *Elaeocarpus sylvestris* (Loureiro) Poiret in Lamarck, Encycl., Suppl. 2: 704. 1811.

山杜英 shan du ying

Adenodus sylvestris Loureiro, Fl. Cochinch. 1: 294. 1790; *Elaeocarpus henryi* Hance; *E. kwangtungensis* Hu; *E. omeiensis* Rehder & E. H. Wilson.

Trees to 15 m tall. Branchlets slender, sparsely pale pilose. Petiole 1–1.5 cm, sparsely pubescent at first, glabrescent; leaf blade black-brown when dry, obovate or oblanceolate, 4–12 × 2–7 cm, papery, both surfaces glabrous, lateral veins usually 4 or 5 per side, prominent abaxially, inconspicuous adaxially, veinlets sparse, conspicuous adaxially, base narrowly cuneate, decurrent, margin crenate or sinuately crenate, apex obtuse or shortly acuminate. Racemes in axils of fallen and current leaves, 4–6 cm; peduncles slender, glabrous, rarely gray-white pubescent. Pedicel 3–5 mm, slender, usually glabrous. Flowers bisexual. Sepals 5, lanceolate, ca. 4 mm, both surfaces sparsely pubescent. Petals 5, obovate, lacinate in upper 1/2; segments 10–12, abaxially pubescent at base. Stamens 15, ca. 3 mm; anthers not awned at apices, puberulent. Disk 5-lobed, globose, completely separate, white pubescent. Ovary pubescent, 2- or 3-loculed; style ca. 2 mm, pubescent in lower 1/2. Drupe ellipsoid, 1–1.2 × ca. 0.7 cm; endocarp thinly bony, with 3 ventral sutures. Fl. Apr–May, fr. May–Aug.

Evergreen forests; 300–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang [Vietnam].

15. *Elaeocarpus glabripetalus* Merrill, Philipp. J. Sci. 21: 501. 1922.

秃瓣杜英 tu ban du ying

Trees to 15 m tall. Branchlets red-brown when dry, ± angular, glabrous; buds pubescent. Petiole nearly absent or to 4(–10) mm, black when dry, glabrous; leaf blade abaxially greenish, ± shiny, adaxially greenish yellow when dry, shiny, oblanceolate, (6–)8–12(–20) × (2.5–)3–4 cm, papery or membranous, glabrous, abaxially not glandular, lateral veins 7–9 per side, prominently raised abaxially, veinlets sparse, slightly prominent abaxially, inconspicuous adaxially, base narrow and decurrent, margin minutely crenate, apex acute, acumen obtuse. Racemes in leaf axils of second-year branches, 5–10 cm, slender; peduncles puberulent. Pedicel 5–6 mm. Flowers bisexual. Sepals 5, lanceolate, ca. 5 × 1.5 mm, abaxially puberulent. Petals 5, white, 5–6 mm, broader in upper part, narrow at base, abaxially glabrous, 14–18-laciniate. Stamens 20–30, ca. 3.5 mm; filaments very short; anthers fascicled, not awned but pubescent at apices. Disk 5-lobed, pubescent. Ovary 2- or 3-loculed, pubescent; style 3–5 mm, puberulent. Drupe ellipsoid, 3.4–4.2 × 1–1.5 cm; endocarp thinly bony, shallowly lacunose (furrowed). Fl. Jul, fr. Aug–Oct.

• Evergreen forests; 300–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Yunnan, Zhejiang.

1a. Fruit not less than 1.5 cm in diam.

..... 15c. var. *grandifructus*

1b. Fruit to 1.5 cm in diam.

2a. Petiole ca. 5 mm; stamens

20–30 15a. var. *glabripetalus*

2b. Leaves nearly sessile; stamens 15 15b. var. *alatus*

15a. *Elaeocarpus glabripetalus* var. *glabripetalus*

秃瓣杜英(原变种) tu ban du ying (yuan bian zhong)

Elaeocarpus glabripetalus var. *teres* Hung T. Chang; *E. subsessilis* Handel-Mazzetti.

Petiole ca. 5 mm; leaf blade 6–15 cm. Stamens 20–30. Fruit less than 1.5 cm in diam.

• Evergreen forests; 400–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Yunnan, Zhejiang.

15b. *Elaeocarpus glabripetalus* var. *alatus* (Kunth) Hung T. Chang, Acta Phytotax. Sin. 17(1): 55. 1979.

棱枝杜英 leng zhi du ying

Elaeocarpus alatus Kunth, Repert. Spec. Nov. Regni Veg. 50: 81. 1941; *E. kwangsiensis* Hung T. Chang.

Leaves nearly sessile; leaf blade 10–20 cm. Stamens 15. Fruit 1–1.5 cm in diam.

• Evergreen forests; 300–500 m. Guangxi, Guizhou, Hubei, Yunnan.

15c. *Elaeocarpus glabripetalus* var. *grandifructus* Y. Tang, Acta Phytotax. Sin. 30: 397. 1992.

大果秃瓣杜英 da guo tu ban du ying

Fruit 3.4–4.2 × 2–2.5 cm.

• Evergreen forests; 400–800 m. Guangxi.

16. *Elaeocarpus argenteus* Merrill, Publ. Bur. Sci. Gov. Lab. 29: 26. 1905.

腺叶杜英 xian ye du ying

Trees evergreen. Branchlets brown, terete, glabrous. Petiole 1.5–2 cm, glabrous, slightly swollen at each end; leaf blade elliptic-oblong, usually tapered to base, 6.5–8 × 2–2.5 cm, leathery, glabrous, lateral veins 5 or 6 per side, midvein raised on both surfaces, axils mostly prominently glandular abaxially, base obtuse or acute, margin shallowly sparsely crenate, apex acuminate. Raceme 5–7 cm; peduncle densely pubescent. Pedicel 5–6(–8) mm, densely appressed-pubescent. Flowers bisexual; buds ellipsoid, ca. 4 mm, apex acute. Sepals 5, lanceolate, abaxially densely minutely gray pubescent, adaxially keeled. Petals 5, oblong-obovate, ca. 4 mm, abaxially silvery sericeous, adaxially white villous in lower part and along margin, upper 1/3 laciniate; segments 12. Stamens ca. 28; filaments ca. 1 mm, villous; anthers linear, ca. 2 mm, minutely puberulent, not awned but pubescent at apices. Disk 5-lobed, villous. Ovary villous, 2-loculed; style tomentose on lower 1/2. Drupe ovoid, ca. 8 × 6 cm; exocarp obscure, glabrous; endocarp inconspicuously verrucose. Fl. and fr. unknown.

Forests. Taiwan [Philippines].

17. *Elaeocarpus sikkimensis* Masters in J. D. Hooker, Fl. Brit. India 1: 402. 1874.

大果杜英 da guo du ying

Trees to 25 m tall. Branchlets striate, pilose. Petiole 2–4.5 cm, pubescent at first, glabrescent, prominently swollen at upper end; leaf blade broadly oblanceolate-oblong, usually tapered to base, 14–23 × 5.5–8 cm, thinly leathery, glabrous, lateral veins 7 or 8 per side, prominently raised abaxially, prominent adaxially, base attenuate and decurrent, margin shallowly crenate, apex acuminate, acumen obtuse. Raceme short, ca. 4 cm; peduncle yellow-brown puberulent. Pedicel to 8 mm, yellow-brown puberulent; bracteoles caducous. Flowers bisexual; buds oblong, 5–7 mm, yellow-brown puberulent. Sepals 5, lanceolate, abaxially puberulent, adaxially pubescent only on keel at base, margin tomentose. Petals 5, abaxially tomentose at base, adaxially velutinous at base and along margin, margin laciniate; segments 25–35. Stamens 30–32; anthers minutely puberulent, not awned but pubescent at apices. Disk 5-lobed, tomentose. Ovary densely tomentose, 3-loculed; style tomentose on lower 1/2. Drupe subglobose, 4.5–5 × 2.5–3 cm; exocarp and endocarp inconspicuously verrucose. Fl. Apr–May, fr. Nov–Dec.

Dense forests on slopes; 1500–2100 m. S Yunnan [Bhutan, India].

This species was misidentified in FRPS (49(1): 26. 1989) as *Elaeocarpus fleuryi* A. Chevalier ex Gagnepain.

18. *Elaeocarpus sphaerocarpus* Hung T. Chang, Acta Phytotax. Sin. 17(1): 56. 1979.

阔叶圆果杜英 kuo ye yuan guo du ying

Trees to 25 m tall. Branchlets terete, thin, minutely striate, yellowish brown tomentose. Petiole 1.5–3.5 cm, yellowish brown tomentose; leaf blade broadly lanceolate-ovate, ovate, oblong, or elliptic, 8.5–15 × 5–6 cm, abaxially yellowish pubescent, densely so on veins, adaxially glabrous, lateral veins 9 or 10 per side, ± parallel, prominently raised abaxially, slightly impressed adaxially, veinlets prominent abaxially, conspicuous adaxially, base acute, sometimes rounded, slightly oblique, margin minutely crenate, apex acuminate. Racemes usually in axils of fallen leaves, 10–12 cm, multi-flowered; peduncles yellow-brown tomentose. Pedicel 3–4 mm, pubescent, without persistent bracteoles. Flowers bisexual; buds ovoid or nearly globose. Sepals 5, lanceolate, 4.5–5 × ca. 2 mm, both surfaces puberulent, more densely so along keel, margin ciliate, apex acuminate. Petals 5, 4–5 × 3.2–3.6 mm, abaxially glabrous, adaxially pubescent at base, margin pubescent, lacinate; segments 25–30. Stamens 30; filaments ca. 1 mm, puberulent; anthers 2–2.5 mm, not awned but with hairs at apices. Disk 5-lobed, densely tomentose. Ovary densely tomentose, 3-loculed; style pubescent on lower 1/2. Drupe ellipsoid, 2–3 × ca. 1.8 cm, yellowish tomentose; exocarp inconspicuous; endocarp smooth, 1- or 2-loculed. Fl. Apr–May, fr. Aug–Sep.

- Rain forests; 600–1700 m. S Yunnan.

19. *Elaeocarpus austroyunnanensis* Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 135. 1940.

滇南杜英 *dian nan du ying*

Elaeocarpus floribundoides Hung T. Chang.

Trees to 30 m tall. Branchlets and young leaves puberulent at first, glabrescent. Petiole 2–5(–6) cm, pubescent at first, glabrescent, swollen at upper end; leaf blade abaxially greenish, adaxially gray-green, elliptic, 13–21 × 7–9 cm, papery, glabrous, abaxially not glandular, adaxially usually creased, lateral veins 8–10 per side, prominently raised abaxially, inconspicuous adaxially, veinlets sparse, inconspicuous on both surfaces, base broadly cuneate, unequal, margin densely serrulate, apex acute, rarely obtuse or emarginate. Racemes in axils on current and second-year branches, 10–21 cm; peduncles gray-brown puberulent. Pedicel 8–10 mm; bract caducous. Flowers bisexual. Sepals 5, lanceolate, 5–6 mm, both surfaces puberulent. Petals 5, obovate, ca. 6 mm, lacinate in upper 1/2; segments 25–30, abaxially glabrous, margin ciliate. Stamens 34–40, ca. 4 mm; anthers without appendages at apices. Disk 5-divided, each part 2-lobed, pubescent. Ovary 3-loculed, pubescent; ovules 2 per locule; style 3–4 mm, puberulent. Drupe ellipsoid, 3–3.5 × 1.5–1.8 cm, both ends acute; exocarp inconspicuous; endocarp bony, smooth. Fl. Apr–May, fr. May–Jul.

- Evergreen forests in ravines; 400–1400 m. S and SE Yunnan.

20. *Elaeocarpus oblongilimbus* Hung T. Chang, Acta Phytotax. Sin. 17(1): 58. 1979.

长圆叶杜英 *chang yuan ye du ying*

Trees ca. 15 m tall. Branchlets glabrous. Petiole 4–6 cm, swollen at both ends; leaf blade adaxially dark, oblong or oblong-lanceolate, 13–19 × 4.5–6 cm, leathery, densely sericeous when young, glabrous when mature, glandular abaxially and in

vein axils, lateral veins 8 or 9 per side, base nearly rounded or broadly cuneate, margin sparsely crenate, teeth 5–8 mm apart, apex acute, acumen obtuse. Flowers unknown. Inflorescence 5–6 cm. Drupe ellipsoid, 2.5–3 × 1.5–2 cm, stalk ca. 5 mm; exocarp not shiny; endocarp 3–5 mm thick, lacunose, 1-loculed. Seed 1. Fl. unknown, fr. Sep.

- Forests; 700–800 m. SE Yunnan.

21. *Elaeocarpus balansae* A. Candolle, Bull. Herb. Boissier, sér. 2, 3: 366. 1903.

大叶杜英 *da ye du ying*

Trees to 15 m tall. Branchlets robust, rust-brown tomentose. Stipule leaflike, sessile, ovate or orbicular, 1–2.5 cm, brown pubescent; petiole 6–12 cm, terete, rust-brown tomentose, sometimes glabrescent; leaf blade elliptic, 18–32 × 8–19 cm, thinly leathery or papery, abaxially rust-colored tomentose, adaxially pubescent and glabrescent or pubescent only on veins, lateral veins 11–14 per side, prominently raised abaxially, impressed adaxially, veinlets sparse, prominent abaxially, inconspicuous adaxially, base cordate, usually unequal, margin repand-dentate, apex acute. Racemes in axils on current year branches, 8–12 cm. Pedicel ca. 1 cm, rust-colored tomentose. Flowers bisexual. Sepals lanceolate, ca. 6 mm, abaxially rust-colored pubescent, adaxially glabrous, apex acute. Petals 5, obovate, 6–7 mm, abaxially glabrous or nearly so, adaxially sparsely pubescent, margin lacinate in upper 1/2; segments 16–20. Stamens 28–35, ca. 4 mm; anthers fascicled, not awned but pubescent at apices. Disk 5-lobed, globose, pubescent. Ovary 3-loculed, tomentose; style 6–7 mm, pubescent. Drupe spindle-shaped, pointed at both ends, ca. 4 × 2 cm, gray-brown pubescent; exocarp inconspicuous; endocarp bony, shallowly furrowed. Fl. Apr, fr. May–Jun.

Forests; 100–1100 m. SE Yunnan [Cambodia, India, Malaysia, Myanmar, N Vietnam].

22. *Elaeocarpus harmandii* Pierre, Fl. Forest. Cochinch. t. 145. 1888.

肿柄杜英 *zhong bing du ying*

Trees to 15 m tall. Branchlets yellow-brown puberulent, glabrescent and yellow-brown tomentose. Petiole 1.5–3 cm, swollen at both ends, nearly glabrous; leaf blade obovate-lanceolate, broadly lanceolate, or oblong, tapered toward base from middle, 11–19 × 4–6 cm, nearly membranous, both surfaces glabrous or puberulent on midvein, lateral veins 6 or 7 per side, prominent abaxially, slightly impressed adaxially, veinlets inconspicuous on both surfaces, base cuneate or obtuse, margin shallowly crenate, apex acuminate, acumen obtuse. Racemes in axils on two-year-old branches, ca. 8 cm; peduncles puberulent. Pedicel ca. 5 mm. Flowers bisexual. Sepals 5, ca. 5 mm, gray-white pubescent abaxially, glabrous adaxially. Petals 5, obovate, glabrous, lacinate in upper 1/2; segments ca. 30. Stamens 34 or 35, fascicled; anthers not awned but pubescent at apices. Disk 5-lobed. Ovary pubescent, 3-loculed; ovules 2 per locule. Drupe ellipsoid, ca. 3.5 × 2.2 cm; exocarp black when dry, glabrous; endocarp bony, ca. 3 mm thick, shallowly lacunose. Fl. Mar–Apr, fr. Apr–May.

Evergreen forests; 1500–1800 m. NW Yunnan [N Vietnam].

23. *Elaeocarpus lacunosus* Wallich ex Kurz, Forest Fl. Burma 1: 168. 1877.

多沟杜英 duo gou du ying

Elaeocarpus borealiyunnanensis Hung T. Chang.

Trees to 20 m tall. Two-year-old branches with dense whitish or yellowish white lenticels, glabrous. Branchlets puberulent. Petiole yellow-brown, 0.7–1.5 cm, not swollen at ends, puberulent; leaf blade brown, oblong-ob lanceolate or oblong to elliptic, 8–17 × 4–7 cm, thinly leathery, abaxially glabrous or puberulent only on midvein, adaxially glabrous, lateral veins 7 or 8 per side, conspicuous on both surfaces, veinlets conspicuous abaxially, inconspicuous adaxially, base cuneate or obtuse, margin minutely crenate or serrate, apex acuminate or slightly acute. Raceme 5–12 cm, multi-flowered; peduncle puberulent. Pedicel 4–6 mm, slender, brown puberulent, without persistent bracteoles. Flowers bisexual; buds 4–5 mm, narrowly ovoid. Sepals 5, lanceolate, 4–5 mm, both surfaces puberulent. Petals 5, obovate, slightly longer than sepals, abaxially glabrous, adaxially pubescent at base, margin ciliate, laciniate in upper 1/2; segments 20–25. Stamens 30–40; filaments fascicled, glabrous; anthers not awned but pubescent at apices. Disk 5-lobed, completely separated, densely tomentose. Ovary 3-loculed, densely tomentose; style glabrous in upper 1/2; ovules 2 per locule. Drupe ovoid, ca. 3.5 × 2–3 cm; exocarp obscure, glabrous; endocarp bony, ca. 4 mm thick, lacunose. Fl. Apr–May, fr. May–Jun.

Forests; 1400–2600 m. W Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

One of us (Chamlong Phengklai) prefers to treat this as a synonym of *Elaeocarpus lanceifolius*.

24. *Elaeocarpus howii* Merrill & Chun, Sunyatsenia 5: 124. 1940.

锈毛杜英 xiu mao du ying

Trees evergreen, to 15 m tall. Bark gray-brown; branchlets robust, brown tomentose. Petiole robust, 2–5 cm, terete, brown tomentose, swollen at both ends; leaf blade adaxially shiny when dry, elliptic or oblong, 10–20 × 4–10 cm, leathery, abaxially brown tomentose, adaxially sparsely pubescent especially on veins, lateral veins 10–13 per side, prominently raised abaxially, slightly impressed adaxially, veinlets prominent abaxially, base rounded, margin nearly entire or inconspicuously denticulate, apex acute, caudate, acumen 5–10 mm. Racemes in axils in upper part of twigs, 5–10 cm; peduncles robust, brown tomentose. Pedicel 3–5 mm; bracts reniform, ca. 1 × 1.5 mm, pubescent, without persistent bracteoles. Flowers bisexual. Sepals 5, lanceolate, 5–6 mm, abaxially brown pubescent, adaxially puberulent. Petals 5, obovate, ca. as long as sepals, glabrous, laciniate in upper 1/2; segments ca. 20. Stamens 25–30, ca. 3 mm; anthers without appendages at apices. Disk 5-lobed, densely pubescent. Ovary 3-loculed, pubescent; style ca. 3 mm, glabrous at base. Drupe elliptic-ovoid, 3–4.5 × ca. 2 cm, brown tomentose; exocarp and mesocarp usually shrunk when dry; exocarp inconspicuous; endocarp bony, lacunose. Seed usually 1, black, 1–1.5 cm. Fl. May–Jun, fr. Oct–Feb.

• Evergreen forests; 1100–2200 m. Guangdong, Hainan, SE Yunnan.

25. *Elaeocarpus limitaneus* Handel-Mazzetti, Sinensia 3: 193. 1933.

灰毛杜英 hui mao du ying

Elaeocarpus maclurei Merrill.

Trees evergreen, to 20 m tall. Branchlets robust, gray-brown appressed tomentose, without persistent bracts. Petiole robust, 2–4 cm, densely brown tomentose at first, glabrescent; leaf blade adaxially shiny when dry, elliptic or obovate, 7–19 × 5–8 cm, leathery, abaxially silvery-gray appressed tomentose, adaxially pubescent on midvein only, lateral veins 8–14 per side, prominently raised abaxially, conspicuous adaxially, veinlets slightly raised abaxially, inconspicuous adaxially, base broadly cuneate or acute, decurrent, margin sparsely serrulate, apex acuminate or acute. Racemes in axils of current and fallen leaves, 5–8 cm; peduncles brown tomentose. Pedicel 3–6 mm, brown tomentose; bract 1, at base of pedicel, caducous, minute. Flowers bisexual. Sepals 5, gray, narrowly lanceolate, ca. 5 mm, abaxially pubescent, adaxially sparsely pubescent. Petals 5, white, 6–7 mm, abaxially glabrous, adaxially pubescent at base, laciniate in upper 1/2; segments 11–16. Stamens 30, ca. 4 mm, puberulent; anthers not awned. Disk 5-lobed, pubescent. Ovary 3-loculed, pubescent; style ca. 3 mm, glabrous in upper 1/2. Drupe elliptic-ovoid, 2.5–3 × ca. 2 cm; exocarp glabrous, apex rounded; endocarp bony, lacunose. Fl. Jul, fr. Aug–?Sep.

Forests; 1000–1700 m. Fujian, Guangdong, Guangxi, Hainan, SE Yunnan [Vietnam].

26. *Elaeocarpus braceanus* Watt ex C. B. Clarke, J. Linn. Soc., Bot. 25: 8. 1890.

滇藏杜英 dian zang du ying

Elaeocarpus shunningensis Hu.

Trees 5–15 m tall. Bark brown; branchlets rust-brown puberulent, glabrescent on older branches, with gray-white lenticels and persistent bracts. Petiole 1–3 cm, rust-brown puberulent; leaf blade adaxially dark greenish, not shiny, oblong or elliptic, 10–18 × 4–7.5 cm, thinly leathery, abaxially rust-brown puberulent, adaxially with rudimentary hairs on midvein, lateral veins 10–12 per side, prominently raised abaxially, conspicuous adaxially, veinlets prominently raised abaxially, conspicuous adaxially, base obtuse or nearly rounded, margin irregularly minutely crenate, apex acuminate or acute. Racemes in axils of fallen leaves, 10–15 cm; peduncles rust-brown pubescent. Pedicel 3–5 cm, rust-brown pubescent; bract 1, at base of pedicel; bracteoles 2 or 3, in upper 1/2 of pedicels, nearly reniform, abaxially tomentose, apex incised. Flowers bisexual. Sepals 5, oblong-lanceolate, ca. 6.5 × 2.5–3 mm, both surfaces brown pubescent. Petals 5, obtriangular-ovate, 4–6 mm, laciniate to middle, both surfaces puberulent; segments 30–40. Stamens 40–50; filaments ca. 1 mm; anthers 3.5–4 mm, not awned at apices, puberulent. Disk 5-lobed, tomentose. Ovary 3-loculed; style 3–4 mm, pubescent in lower half. Drupe ellipsoid, ca. 4 × 2.5 cm, rudimentary tomentose; exocarp inconspicuous;

endocarp bony, 5–6 mm thick, lacunose, 1-loculed. Seed 1, ca. 2 cm. Fl. Oct–Nov, fr. Nov–?Jan.

Forests; 800–3000 m. SE Xizang, S Yunnan [India, Myanmar, Thailand].

The fruit is edible.

27. *Elaeocarpus duclouxii* Gagnepain, Notul. Syst. (Paris) 1: 133. 1910.

冬桃 dong tao

Trees evergreen, to 20 m tall, to 50 cm d.b.h. Branchlets yellow-brown tomentose, hairs becoming brown or not; branches dark brown when dry, with sparse lenticels. Leaves crowded at twig apices; petiole 1–1.5 cm, yellow-brown tomentose; leaf blade adaxially shiny, narrowly lanceolate or oblong to oblong-ob lanceolate, 6–15 × (2–)3–6 cm, papery or leathery, abaxially yellow-brown tomentose, adaxially puberulent on veins only, glabrescent, lateral veins 8–10 per side, prominently raised abaxially, conspicuous adaxially, veinlets slightly prominent abaxially, inconspicuous adaxially, base cuneate, decurrent, margin minutely crenate to serrate, apex acute. Racemes in axils of fallen and current leaves, 4–7 cm, slender; peduncles yellow-brown tomentose. Pedicel 3–6 mm, yellow-brown tomentose; bracteole 1, filiform-lanceolate, 3–4 × ca. 1 mm, pubescent, at base of pedicels. Flowers bisexual. Sepals 5, lanceolate, 4–5 mm, both surfaces puberulent. Petals 5, slightly longer than sepals, 5–6 mm, abaxially glabrous or sparsely pilose, adaxially pubescent at base, lacinate in upper 1/2; segments 10–12. Stamens 26–30, ca. 3 mm; filaments very short; anthers not awned, not pubescent at apices. Disk 5-lobed, pubescent. Ovary 3-loculed, tomentose; ovules 2 per locule; style ca. 4 mm, pubescent at base. Drupe ellipsoid, 2.5–3 × 1.7–2 cm; exocarp black when dry, glabrous; endocarp bony, ca. 3 mm thick, lacunose, 1-loculed. Seed 1.4–1.8 cm. Fl. Jun–Jul, fr. Aug–Oct.

• Forests; 700–1000 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan.

- 1a. Leaf blade oblong-ob lanceolate or oblong, 3–6 cm wide, papery 27a. var. *duclouxii*
 1b. Leaf blade narrowly lanceolate, 2–2.5 cm wide, leathery 27b. var. *funingensis*

27a. *Elaeocarpus duclouxii* var. *duclouxii*

冬桃(原变种) dong tao (yuan bian zhong)

Elaeocarpus fengjieensis P. C. Tuan.

Leaf blade oblong-ob lanceolate or oblong, 3–6 cm wide, papery.

• Evergreen forests; 700–1000 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan.

27b. *Elaeocarpus duclouxii* var. *funingensis* Y. C. Hsu & Y. Tang, Bull. Bot. Res., Harbin 8(3): 96. 1988.

富宁杜英 fu ning du ying

Leaf blade narrowly lanceolate, 2–2.5 cm wide, leathery.

• Forests; ca. 700 m. SE Yunnan.

28. *Elaeocarpus decipiens* Hemsley, J. Linn. Soc., Bot. 23: 94. 1886.

杜英 du ying

Trees evergreen, 5–15 m tall. Branchlets and terminal buds black-brown when dry, puberulent, glabrescent. Petiole 1–2 cm, not swollen at upper end, puberulent, glabrescent; leaf blade adaxially shiny, oblanceolate, tapered toward base, 7–13.5 × 2–4 cm, leathery or thickly papery, glabrous, lateral veins 7–9 per side, prominent abaxially, inconspicuous adaxially, veinlets inconspicuous abaxially, prominent adaxially, base attenuate, decurrent and becoming narrow wing on petiole, margin serrulate, apex acuminate, acumen obtuse. Racemes in axils of fallen leaves, 5–10 cm; peduncles slender, puberulent. Pedicel 4–5 mm, puberulent. Flowers bisexual; buds ovoid, 4–5 mm. Sepals 5, lanceolate, ca. 5.5 × 1.5 mm, both surfaces puberulent, apex acute. Petals 5, white, obovate, ca. as long as sepals, abaxially glabrous, adaxially pubescent near base, margin ciliate, lacinate in upper 1/2; segments 10–16. Stamens ca. 20 or 25–32, ca. 3 mm; filaments very short. Disk 5-lobed, pubescent. Ovary 3-loculed, tomentose or glabrescent; ovules 2 per locule; style ca. 3.5 mm, pubescent in lower 1/2. Drupe ellipsoid, 2–3.5 × 1.5–2 cm; exocarp inconspicuous, glabrous; endocarp bony, prominently verrucose, 1-loculed. Seed 1, ca. 1.5 cm. Fl. Jun–Jul, fr. Nov–Jan.

Evergreen forests; 400–2400 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Taiwan, Yunnan, Zhejiang [Japan, Vietnam].

- 1a. Leaf blade 7–13.5 × 2–4 cm, without glands in axils of lateral veins, petiole 1–2 cm; fruit ca. 2 cm in diam.; stamens 25–30; ovary densely tomentose 28a. var. *decipiens*
 1b. Leaf blade 4.5–7 × 1.5–2.5 cm, with glands in axils of lateral veins, petiole shorter than 1 cm; fruit 0.7–0.8 cm in diam.; stamens ca. 20; ovary glabrescent 28b. var. *changii*

28a. *Elaeocarpus decipiens* var. *decipiens*

杜英(原变种) du ying (yuan bian zhong)

Petiole 1–2 cm; leaf blade 7–13.5 × 2–4 cm, leathery, usually without glands in axils of lateral veins. Stamens 25–30. Ovary densely tomentose. Fruit 2–3.5 × 1.5–2 cm.

Evergreen forests; 400–2400 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Taiwan, Yunnan, Zhejiang [Japan, Vietnam].

28b. *Elaeocarpus decipiens* var. *changii* Y. Tang, Novon 16: 60. 2006.

兰屿杜英 lan yu du ying

Petiole shorter than 1 cm; leaf blade 4.5–7 × 1.5–2.5 cm, thickly papery, usually with glands in axils of lateral veins, lateral veins 6–8. Petal segments 14–16. Stamens ca. 20. Ovary glabrescent. Fruit ca. 1.5 × 0.7–0.8 cm.

• Evergreen forests. S Taiwan.

"*Elaeocarpus lanyuensis*" (C. E. Chang, Quart. J. Chin. Forest. 21: 113. 1988) belongs here but was not validly published because no

type was indicated. Likewise, the intended new combination "*E. sylvestris* var. *lanyuensis*" (C. E. Chang, Fl. Taiwan, ed. 2, 3: 720. 1993) was not validly published.

29. *Elaeocarpus lanceifolius* Roxburgh, Fl. Ind., ed. 1832, 2: 598. 1832 [*"lanceaeifolius"*].

披针叶杜英 pi zhen ye du ying

Elaeocarpus serrulatus Benth.

Trees to 20 m tall. Bark gray-black; branchlets glabrous; terminal buds gray puberulent. Petiole black when dry, 1–2.5 cm, glabrous, swollen at upper end; leaf blade oblong, broadly elliptic, or elliptic, 9–15 × 3–4.5 cm, thinly leathery, not glandular, glabrous, lateral veins 7 or 8 per side, prominently raised abaxially, conspicuous adaxially, veinlets conspicuous on both surfaces, base cuneate, ± decurrent, margin conspicuously crenate, apex acuminate or caudate-acuminate, acumen 1.5–2 mm. Raceme 7–10 cm; peduncle pubescent. Pedicel 6–7 mm. Flowers bisexual. Sepals 5, lanceolate. Petals 5, slightly shorter than sepals, margin ciliate, lacinate. Stamens 15; anthers not awned but ciliate at apices. Disk 5-lobed, each 2-lobed again, pubescent. Ovary pubescent, (2 or)3-loculed. Drupe ovoid, 3–4 × 2–2.5 cm; exocarp inconspicuous; endocarp bony, conspicuously verrucose, 1-loculed. Seeds ca. 2 cm. Fl. Jun–Jul, fr. Jul–Sep. $2n = 30$.

Forests; 2300–2600 m. NW Yunnan [Bhutan, Cambodia, India, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

One of us (Chamlong Phengkai) believes that *Elaeocarpus lacunosus* is synonymous with this species. However, the other of us (Tang Ya) differentiates these on account of *E. lacunosus* having puberulent branchlets and cuneate or obtuse leaf bases and *E. lanceifolius* having glabrous branchlets and cuneate, ± decurrent leaf bases.

30. *Elaeocarpus limitaneoides* Y. Tang, Acta Phytotax. Sin. 30: 400. 1992 [*"limitaneoides"*].

小花杜英 xiao hua du ying

Trees ca. 7 m tall. Branchlets terete, with numerous lenticels, densely pubescent. Petiole 1–2 cm, densely gray pubescent; leaf blade ovate-oblong or oblong, 8–13 × 3–4.5 cm, papery, abaxially densely gray puberulent, adaxially sparsely pilose, more densely so on veins, lateral veins 7–9 per side, base cuneate, margin sparsely serrate, apex acuminate. Raceme multi-flowered, ca. 7 cm; peduncle densely gray puberulent. Flowers bisexual. Sepals 5, lanceolate, ca. 3 mm, both surfaces pilose. Petals 4, 5–6 mm, glabrous, margin ciliate in lower 1/2, lacinate; segments 14–18. Stamens 15; anthers not awned at apices. Disk densely tomentose, 5-lobed. Ovary 3-loculed, densely tomentose; style glabrous. Fruit unknown. Fl. Jun–Jul, fr. unknown.

• Forests; ca. 600 m. Guangdong.

31. *Elaeocarpus longlingensis* Y. C. Hsu & Y. Tang, Bull. Bot. Res., Harbin 8(3): 95. 1988.

龙陵杜英 long ling du ying

Trees to 9 m tall. Two-year-old branches with whitish lenticels; branchlets brown when dry, striate, glabrous or only

pilose; buds pubescent. Petiole 1–2 cm, pubescent, glabrescent, abaxially rounded, adaxially grooved; leaf blade lanceolate, 7–12.5 × 2–4 cm, leathery, abaxially not glandular, lateral veins 8–10 per side, abaxially prominently raised, adaxially impressed, veinlets prominent, dense abaxially, sparse adaxially, base cuneate, decurrent, margin crenate-dentate, apex acuminate. Flowers unknown. Drupe ellipsoid, ca. 3 × 2 cm, apex obtuse-rounded; exocarp not shiny; endocarp grooved, verrucose. Fl. and fr. unknown.

• Forests; ca. 2400 m. SW Yunnan.

32. *Elaeocarpus gymnogynus* Hung T. Chang, Acta Phytotax. Sin. 17(1): 52. 1979.

秃蕊杜英 tu rui du ying

Trees ca. 10 m tall. Branchlets yellow-brown tomentose. Petiole 3–5.5 cm, slender, puberulent at first; leaf blade elliptic, 10–14 × 4–6.5 cm, thinly leathery, abaxially glabrous, pubescent only on veins, adaxially yellow-brown tomentose at first, glabrescent, lateral veins 8–12 per side, veinlets prominently raised abaxially, base obtuse or broadly cuneate, margin minutely serrate, apex acute, acumen 1–1.5 cm. Raceme 3–5.5 cm, 5–9-flowered; peduncle pubescent. Pedicel 4–5 mm. Flowers polygamous. Sepals 5, lanceolate, ca. 4.5 mm, both surfaces pubescent. Petals 5, slightly longer than sepals, abaxially glabrous, adaxially pubescent at base, 5-incised at apices. Stamens 10–12, ca. 3 mm; filaments very short, puberulent; anthers not awned at apices. Disk 5-lobed, pubescent. Ovary 2-loculed, glabrous; style ca. 2 mm, sparsely pilose. Drupe elliptic, ca. 1.7 × 1.1 cm. Fl. May–Jun, fr. Jun–Aug.

• Mid-elevation evergreen forests; 300–900 m. Guangdong, Guangxi.

33. *Elaeocarpus atropunctatus* Hung T. Chang, Acta Phytotax. Sin. 17(1): 52. 1979.

黑腺杜英 hei xian du ying

Trees ca. 10 m tall. Branchlets yellow-brown tomentose. Stipules caducous, lanceolate, ca. 3 mm; petiole 1.5–3 cm, slender, usually puberulent; leaf blade greenish yellow abaxially, greenish when mature, elliptic, 6–9 × 3–5 cm, papery or membranous, both surfaces yellow-brown puberulent when young, abaxially black punctate, pilose on midvein, adaxially inconspicuously pubescent when dry, lateral veins 8 or 9 per side, prominently raised abaxially, conspicuous adaxially, veinlets prominent on both surfaces, base rounded or broadly cuneate, margin minutely crenate, apex acute, acumen ca. 1 cm. Flowers unknown. Drupe shiny, broadly ellipsoid or nearly globose, 1.2–1.4 × 0.9–1.1 cm, both ends rounded, with 5 persistent glands at base; endocarp bony, ca. 1 mm thick. Fl. unknown, fr. Aug–Sep.

• Evergreen forests; ca. 1200 m. Guangdong (Luoding), Guangxi.

This species was described from Luoding, Guangdong, with two gatherings only. Since then, no other gatherings had been reported until, in the course of the present study, we saw two gatherings from Guangxi (Du'an, *Liang Shengye 2000003*; Daqing Shan, *Integrated Survey Team 0691*).

34. *Elaeocarpus nitentifolius* Merrill & Chun, Sunyatsenia 2: 279. 1935.

绢毛杜英 juan mao du ying

Trees to 20 m tall. Branchlets rust-colored sericeous; buds pubescent. Petiole 2–4 cm, slender, silvery-white sericeous; leaf blade oblong-lanceolate to oblanceolate or elliptic, 8–15 × 3.5–7.5 cm, leathery, abaxially silvery-white sericeous, or rarely glabrescent, not black punctate, adaxially sericeous on veins, glabrescent, lateral veins 6–8 per side, prominently raised abaxially, veinlets prominently raised abaxially, conspicuous adaxially, base acute or broadly cuneate, margin serrulate, apex long acuminate or nearly caudate, acumen 1–1.5 cm. Raceme 2–4.5 cm; peduncle appressed sericeous; bracts caducous, lanceolate. Pedicel 3–5 mm, pubescent. Flowers polygamous, usually pendulous. Sepals 4 or 5, lanceolate, 4–5 mm, abaxially gray puberulent, adaxially nearly glabrous. Petals 4 or 5, oblong, ca. 4 mm, glabrous, 5- or 6-incised at apices. Stamens 12–14, ca. 2.5 mm; anthers not awned at apices. Disk inconspicuously lobed, pubescent. Ovary 2-loculed, sparsely sericeous; style ca. 2.5 mm, pubescent, 2- or 3-lobed at tip. Drupe shiny, ellipsoid, small, 1.5–2 × 0.8–1.1 cm, 1-loculed; endocarp ca. 1 mm thick. Seed 1, ca. 1 cm. Fl. Apr–May.

Evergreen forests; ca. 1400 m. Fujian, Guangdong, Guangxi, Hainan, Yunnan [Vietnam].

35. *Elaeocarpus japonicus* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(2): 165. 1845.

薯豆 shu dou

Trees to 25 m tall. Branchlets robust, glabrous or minutely pubescent; buds sericeous. Petiole 2–6 cm, pubescent at first, glabrescent; leaf blade ovate, elliptic, obovate, or lanceolate to narrowly oblong, 6–11(–17) × 3–6 cm, papery or leathery, both surfaces densely silvery-gray sericeous at first, soon glabrescent, abaxially with minute black glandular spots, lateral veins 6–8 per side, prominently raised abaxially, veinlets prominent abaxially, inconspicuous adaxially, base rounded, obtuse, acute, or broadly cuneate, margin sparsely dentate, apex acuminate or acute, acumen obtuse. Raceme 3–6 cm; peduncle puberulent. Pedicel 3–4 mm, puberulent. Flowers polygamous. Bisexual flowers: sepals 5, oblong, ca. 4 mm, both surfaces pubescent. Petals oblong, ca. as long as sepals, both surfaces or only abaxially pubescent, margin entire or incised. Stamens 15; filaments very short; anthers ca. 2 mm, not awned at apices, puberulent. Disk 5- or 10-lobed, in circle. Ovary pubescent, 3-loculed; style ca. 3 mm, pubescent. Male flowers: sepals 5 or 6; petals 5 or 6; stamens 9–14; rudimentary ovary present or not. Drupe shiny, ellipsoid, 1–1.3 × ca. 0.8 cm, 1-loculed. Seed 1, ca. 8 mm. Fl. Apr–May, fr. May–Jul.

Evergreen forests; 400–2800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Vietnam].

- 1a. Glands present in vein axils of lateral and tertiary veins 35c. var. *yunnanensis*
 1b. Glands not present in vein axils.
 2a. Leaf blade ovate, elliptic, or obovate; disk 10-lobed 35a. var. *japonicus*

- 2b. Leaf blade lanceolate or narrowly oblong; disk 5-lobed 35b. var. *lantsangensis*

35a. *Elaeocarpus japonicus* var. *japonicus*

薯豆(原变种) shu dou (yuan bian zhong)

Elaeocarpus japonicus var. *euphlebius* Merrill; *E. yunnanensis* Hu; *E. yunnanensis* E. Brandis ex Tutcher.

Branchlets glabrous. Leaf blade ovate, elliptic, or obovate, glands absent from vein axils. Petals pubescent on both surfaces, margin entire or incised. Disk 10-lobed.

Evergreen forests; 400–2300 m. South of Yangtze River: Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Vietnam].

35b. *Elaeocarpus japonicus* var. *lantsangensis* (Hu) Hung T. Chang, Acta Phytotax. Sin. 17(1): 54. 1979.

澜沧杜英 lan cang du ying

Elaeocarpus lantsangensis Hu, Bull. Fan Mem. Inst. Biol., Bot. 10: 137. 1940.

Branchlets minutely pubescent. Leaf blade lanceolate or narrowly oblong, base obtuse or broadly cuneate, glands absent from vein axils. Petals abaxially white pubescent, margin 4- or 5-incised at apices. Disk 5-lobed.

• Evergreen forests on slopes; 1400–2800 m. Fujian, Guizhou, Hunan, Yunnan.

35c. *Elaeocarpus japonicus* var. *yunnanensis* C. Chen & Y. Tang, Bull. Bot. Res., Harbin 8(3): 96. 1988.

云南杜英 yun nan du ying

Branchlets glabrous. Leaf blade ovate, elliptic, or obovate, glands present in lateral and tertiary vein axils. Petals pubescent on both surfaces, margin entire or cleft. Disk 10-lobed.

• Evergreen forests; 1200–1700 m. S and SE Yunnan.

36. *Elaeocarpus auricomus* C. Y. Wu ex Hung T. Chang, Acta Phytotax. Sin. 17(1): 53. 1979.

金毛杜英 jin mao du ying

Trees, small to large, 7–20 m tall. Branchlets robust, terete, golden sericeous; buds slightly gummy. Petiole 2–6 cm, slender, swollen at end, golden sericeous at first, glabrescent; leaf blade abaxially dark brown when dry, adaxially slightly purple and shiny, oblong or elliptic, (6–)9–16 × (2.6–)4–6(–7) cm, papery, golden pubescent at first, glabrescent, abaxially sometimes pubescent only on veins, lateral veins 7–10 per side, prominently raised abaxially, veinlets prominent abaxially, inconspicuous adaxially, glandular in axils of lateral veins, base acute or obtuse, margin serrulate, teeth silklike, apex acuminate. Raceme 3–4 cm, densely golden sericeous. Bracteoles caducous, lanceolate, ca. 2 mm. Sepals 5, lanceolate, abaxially puberulent. Petals 5, glabrous, 5-incised at apices. Stamens 10–12. Disk 5-lobed, sparsely pubescent. Ovary 3-loculed, pubescent. Drupe shiny, ellipsoid, ca. 1.6 × 0.7 cm; endocarp with 3 ventral sutures. Fl. Apr, fr. May–Jun.

Evergreen forests; 1100–1500 m. Hainan, SE Yunnan [N Vietnam].

37. *Elaeocarpus chinensis* (Gardner & Champion) J. D. Hooker ex Benth, Fl. Hongk. 43. 1861.

华杜英 *hua du ying*

Friesia chinensis Gardner & Champion, Hooker's J. Bot. Kew Gard. Misc. 1: 243. 1849.

Trees evergreen, 3–7 m tall. Branchlets puberulent, glabrous when old. Petiole 1.5–2 cm, slender, minutely pubescent when young; leaf blade ovate-lanceolate or lanceolate, 5–8 × 2–3 cm, papery, pubescent when young, soon glabrescent, abaxially black glandular punctate, lateral veins 4–6 per side, slightly raised abaxially, veinlets inconspicuous on both surfaces, base rounded, rarely broadly cuneate, margin minutely crenate, apex acuminate. Racemes in axils of fallen leaves, 3–4 cm; peduncles puberulent. Pedicel ca. 3 mm. Flowers polygamous. Bisexual flowers: sepals 4, lanceolate, ca. 3 mm, both surfaces minutely pubescent. Petals 4, oblong, ca. 3 mm, margin nearly entire, adaxially sparsely minutely pubescent. Stamens 8 or 9, ca. 2 mm; filaments very short; anthers without hairs at apices. Ovary 2-loculed. Drupe ellipsoid, shorter than 1 cm. Fl. May–Jun, fr. Jun–Sep.

Evergreen forests; 300–900 m. Fujian, Guangdong, Guangxi, Guizhou, Jiangxi, Zhejiang [Vietnam].

38. *Elaeocarpus brachystachyus* Hung T. Chang, Acta Phytotax. Sin. 17(1): 54. 1979.

短穗杜英 *duan sui du ying*

Trees to 17 m tall. Branchlets slender, sometimes striate, gray-yellow or gray-white tomentose, glabrous when old; buds rust-colored or gray-white tomentose. Petiole 2–3.5 cm, pilose or glabrous, swollen at end; leaf blade greenish gray when dry, narrowly oblong, oblong-lanceolate, or lanceolate, 10–14 × 3–3.5 cm, thinly leathery, abaxially pilose or glabrous, black punctate, adaxially glabrous, lateral veins 7–9 per side, prominently raised abaxially, impressed adaxially, veinlets prominent abaxially, conspicuous or sometimes prominently raised adaxially, glands present in axils of lateral veins and veinlets or absent, base cuneate or rounded, margin serrulate, apex long acuminate. Flowers unknown. Drupe ellipsoid, ca. 2 × 1 cm; endocarp shallowly sculptured. Fl. unknown, fr. Sep–Nov.

• Forests, evergreen forests along riverbanks; 1300–2300 m. Yunnan (Gongshan).

1a. Glands present in axils of lateral veins and veinlets, veinlets not prominently raised adaxially; branchlets not conspicuously striate 38a. var. *brachystachyus*

1b. Glands absent from axils of veins and veinlets, veinlets prominently raised adaxially; branchlets conspicuously striate 38b. var. *fengii*

38a. *Elaeocarpus brachystachyus* var. *brachystachyus*

短穗杜英(原变种) *duan sui du ying* (*yuan bian zhong*)

Branchlets not conspicuously striate. Leaves with glands present in axils of lateral veins and veinlets, veinlets not prominently raised adaxially.

• Evergreen forests along riverbanks; 1300–2300 m. Yunnan (Gongshan).

38b. *Elaeocarpus brachystachyus* var. *fengii* C. Chen & Y. Tang, Bull. Bot. Res., Harbin 8(3): 96. 1988.

贡山杜英 *gong shan du ying*

Branchlets conspicuously striate. Leaves without glands in axils of veins and veinlets, veinlets prominently raised adaxially.

• Forests; 1400–2300 m. Yunnan (Gongshan).

39. *Elaeocarpus decandrus* Merrill, J. Arnold Arbor. 32: 193. 1951.

缘瓣杜英 *yuan ban du ying*

Trees to 20 m tall. Branchlets slender, glabrous; buds pubescent, slightly gummy. Petiole 1–3.5 cm, slender, glabrous, adaxially grooved, swollen at end; leaf blade abaxially brownish or reddish brown, adaxially shiny, lanceolate, slightly curved, (4–)6.5–10 × (1–)2–3.5 cm, leathery, glabrous, abaxially densely glandular, adaxially sparsely black glandular, mid-vein prominently raised abaxially, impressed adaxially, lateral veins 6 or 7 per side, prominently raised, especially abaxially, veinlets prominent on both surfaces, glandular in axils of veins, base acute or nearly rounded, slightly oblique, margin crenate-serrate, reflexed, apex long acuminate, acumen obtuse. Racemes in axils of fallen and current leaves, 2–4.5 cm; peduncles pubescent, glabrescent. Pedicel 3–5 mm, puberulent. Flowers polygamous. Sepals 5, lanceolate, ca. 4 mm, abaxially puberulent, adaxially nearly glabrous. Petals 5, linear, ca. 3 mm, abaxially puberulent, adaxially pubescent, especially densely so at base, margin ciliate, entire or very shallowly 1- or 2-toothed. Stamens 10; anthers very shortly pilose, ca. 2 mm, not pubescent at apices. Fruit unknown. Fl. and fr. unknown.

Evergreen forests on slopes; 1200–2100 m. SE Yunnan [Laos].

This species is similar to *Elaeocarpus chinensis* but differs in having 5-merous flowers with 10 stamens, lanceolate, leathery leaves with crenate-serrate margins, conspicuous adaxial veinlets, and glabrous branchlets.

2. SLOANEA Linnaeus, Sp. Pl. 1: 512. 1753.

猴欢喜属 *hou huan xi shu*

Echinocarpus Blume.

Trees or shrubs. Buds usually pubescent. Leaves alternate or clustered at twig apices, simple, petiolate, margin entire or serrate, pinnately veined; stipules caducous. Flowers solitary or in racemes, axillary, long stalked, usually bisexual. Sepals 4 or 5, valvate or

imbricate, ovate, slightly connate at base. Petals 4 or 5, rarely absent, obovate, imbricate, margin entire or dentate at apices. Stamens numerous, inserted on disk; filaments short; anthers opening by vertical slit, connective usually elongated as beak. Disk broad, thick. Ovary 3–7-loculed; ovules several per locule, furrowed, pubescent; style free or connate, subulate. Capsule globose or ovoid, prickly, septically dehiscent into 3–7 valves; exocarp woody, thick; endocarp thin, leathery, usually detached from exocarp when dry. Seeds 1 to several, pendulous, usually arillate in lower 1/2; endosperm fleshy, copious. Cotyledons flat.

About 120 species: primarily in the tropics and subtropics; 14 species (seven endemic) in China.

Echinocarpus cavaleriei H. Léveillé (Repert. Spec. Nov. Regni Veg. 10: 474. 1912), *E. erythrocarpus* H. Léveillé (loc. cit., “*erythrocarpa*”), *E. esquirolii* H. Léveillé (loc. cit.), and *E. hederirhizus* H. Léveillé (loc. cit., “*hederaerhiza*”) are synonyms of, respectively, *Euonymus acanthoxanthus* Pitard, *E. acanthocarpus* Franchet, *E. acanthoxanthus*, and *E. aculeatus* Hemsley, all in the Celastraceae (see Fl. China 11).

1a. Prickles of capsule shorter than 7 mm, very dense.

2a. Branchlets and leaf blade glabrous.

3a. Leaf blade elliptic or orbicular, thickly leathery, more than 12 cm wide 1. *S. cordifolia*

3b. Leaf blade oblong or obovate, membranous or papery, less than 8 cm wide 3. *S. dasycarpa*

2b. Branchlets tomentose; leaf blade abaxially pubescent at least when young.

4a. Leaf blade not less than 9 cm wide, lateral veins not less than 9 per side 2. *S. tomentosa*

4b. Leaf blade less than 8 cm wide, lateral veins to 8 per side.

5a. Leaf blade lanceolate or oblanceolate, to 3.5 cm wide 6. *S. leptocarpa*

5b. Leaf blade oblong, elliptic, or obovate, more than 4 cm wide.

6a. Branchlets and petiole glabrous or sparsely pilose 4. *S. chingiana*

6b. Branchlets and petiole densely yellow-brown tomentose.

7a. Leaf margin entire, base rounded or slightly cordate; prickles on capsule shorter than 2.5 mm 5. *S. integrifolia*

7b. Leaf margin sparsely and minutely dentate, base acute; prickles on capsule 5–7 mm 7. *S. xichouensis*

1b. Prickles of capsule longer than 7 mm, not dense.

8a. Leaf blade abaxially pubescent at least on veins.

9a. Leaf blade broadest above middle, usually attenuate to base, base narrow and rounded 8. *S. sterculiacea*

9b. Leaf blade broadest below middle, base broad and rounded 9. *S. mollis*

8b. Leaf blade glabrous or with tufts of hairs in vein axils only.

10a. Leaf blade ovate-lanceolate or ovate-oblong, lateral veins sparse 10. *S. changii*

10b. Leaf blade not ovate-lanceolate or ovate-oblong, lateral veins dense.

11a. Branchlets pilose at least when young 12. *S. hainanensis*

11b. Branchlets glabrous.

12a. Leaf blade narrowly obovate or oblanceolate, usually attenuate to base, lateral veins 7–9 per side 13. *S. hemsleyana*

12b. Leaf blade oblong, obovate, or elliptic, lateral veins 5–7 per side.

13a. Leaf blade with angle between midvein and lateral veins ca. 30°, lateral veins adaxially conspicuous; capsule ca. 6 cm 14. *S. sigun*

13b. Leaf blade with angle between midvein and lateral veins more than 50°, lateral veins adaxially inconspicuous; capsule 2–2.5 cm 11. *S. sinensis*

1. *Sloanea cordifolia* K. M. Feng ex Hung T. Chang, Acta Phytotax. Sin. 17(1): 58. 1979.

心叶猴欢喜 xin ye hou huan xi

Trees 15–26 m tall. Branches brown, glabrous; branchlets robust, 6–8 mm in diam., brown puberulent. Petiole 2.5–5 cm, robust, glabrous; leaf blade broadly elliptic or nearly orbicular, 6–25 × 12–18 cm, thickly leathery, glabrous, midvein prominently raised on both surfaces, 2–3 mm wide, lateral veins 8–10 per side, very prominently raised abaxially, prominent adaxially, veinlets prominently raised abaxially, base rounded or truncate, rarely cordate, margin entire, reflexed when dry, apex rounded, acumen short, 1–2 cm. Flowers unknown. Capsule dehiscent into 4 valves; valves 3.5–4 × ca. 2 cm, 4–5 mm thick, woody; prickles yellow, 3–4 mm; endocarp reddish, ca. 1 mm thick, usually separated from mesocarp when dry. Seeds black-brown, shiny, ellipsoid, ca. 1.5 × 0.8 cm; aril yellow-brown when dry, to 7 mm. Fl. Jun–Jul, fr. Nov.

• Forests; 1400–1600 m. SE Yunnan.

2. *Sloanea tomentosa* (Benth) Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 362. 1915.

绒毛猴欢喜 rong mao hou huan xi

Echinocarpus tomentosus Benth, J. Proc. Linn. Soc., Bot. 5(Suppl. 2): 73. 1861.

Trees evergreen, to 26 m tall, to 1.2 m d.b.h. Bark brown, exfoliating; branchlets rust-brown tomentose. Petiole robust, terete, 2–10 cm, rust-colored tomentose; leaf blade broadly elliptic or obovate-elliptic, 15–30 × 9–18 cm, leathery, abaxially densely brown tomentose, adaxially pubescent only on midvein, lateral veins 9–12 per side, prominently raised abaxially, conspicuous adaxially, base rounded, rarely obtuse or slightly cordate, margin entire or toothed near apex, apex rounded with acumen ca. 1 cm. Flowers axillary at twig apices. Pedicel 2–3 cm, slightly robust, brown pubescent, upper 1/2 usually curved

downward. Sepals 4 or 5, ovate, pubescent, apex obtuse. Petals slightly shorter than sepals, broader than long, incised at apices. Anthers ca. as long as filaments. Ovary ovoid, brown pubescent. Capsule 4- or 5-valved; valves 3–4 × 1–1.3 cm, 5–6 mm thick; exocarp ca. 1.5 mm thick, slightly woody, with many short prickles; prickles easily deciduous, brown, ca. 2 mm; mesocarp ca. 4 mm thick, woody; endocarp purple-red adaxially, thin. Seeds ca. 1.5 cm. Fl. May–Jun, fr. Oct.

Evergreen forests; 1000–1600 m. S Yunnan [Bhutan, E and NE India, Myanmar, Nepal, Thailand].

3. *Sloanea dasycarpa* (Benth) Hemsley, Hooker's Icon. Pl. 27: sub t. 2628. 1900.

毛果猴欢喜 mao guo hou huan xi

Echinocarpus dasycarpus Benth, J. Proc. Linn. Soc., Bot. 5(Suppl. 2): 73. 1861 [*dasycarpa*]; *Sloanea formosana* H. L. Li.

Trees evergreen, 8–12 m tall. Branchlets glabrous. Petiole 2–3 cm, slender, glabrous; leaf blade oblong or obovate-oblong, broadest at middle or above, 12–20 × 4–7 cm, membranous or papery, glabrous or sparsely pilose at first, glabrescent, or pubescent only in vein axils, lateral veins 4 or 5 per side, prominent abaxially, conspicuous adaxially, veinlets conspicuous, more so abaxially, tapered into narrow and obtuse or rounded base, margin entire or minutely denticulate, apex acuminate or acute. Flowers axillary in upper part of twigs. Pedicel 2–4 cm, puberulent. Sepals 4 or 5, broadly ovate, ca. 5 mm, puberulent, apex rounded. Petals unequal in length, 6–8 mm, abaxially puberulent, incised at apices. Stamens shorter than petals. Ovary roughly pubescent; style 6–8 mm, glabrous. Capsule globose, 2–2.5 cm in diam., 3- or 4-valved; valves ca. 2 mm thick; prickles brown, 6–8 mm. Seeds black, shiny, ca. 8 mm; aril thin. Fl. Apr–May, fr. Sep–Oct.

Forests; 1400–2100 m. Fujian, Hainan, Taiwan, Xizang, Yunnan [Bhutan, E India, Myanmar, Vietnam].

4. *Sloanea chingiana* Hu, J. Arnold Arbor. 11: 49. 1930.

白色猴欢喜 bai se hou huan xi

Trees evergreen, to 14 m tall, to 30 cm d.b.h. Bark gray, smooth; branches with numerous lenticels; branchlets robust, puberulent at first, glabrescent or with rudimentary minute hairs. Petiole 2.5–5 cm, relatively robust, glabrous or minutely puberulent; leaf blade oblong, 12–20 × 4–7.5 cm, leathery, abaxially pubescent only in vein axils, adaxially glabrous, lateral veins 6–8 per side, prominently raised abaxially, conspicuous or slightly impressed adaxially, veinlets conspicuous, base obtuse or slightly rounded, margin entire, shrunk when dry, apex acuminate. Capsules solitary or several fascicled, terminal, globose, 1.5–2 cm in diam., 3- or 4-valved; stipe of fruit 3–5 cm, brown pubescent; valves adaxially purple-red, ca. 1.5 mm thick; prickles brown, 1–2 mm. Seeds dark brown, shiny, ellipsoid, ca. 8 mm; aril yellowish, covering 1/2 of seed. Fl. May, fr. Sep–Oct.

• Forests on limestone; 600–1100 m. SW Guangxi.

5. *Sloanea integrifolia* Chun & F. C. How, Acta Phytotax. Sin. 7: 12. 1958.

全缘叶猴欢喜 quan yuan ye hou huan xi

Sloanea chingiana Hu var. *integrifolia* (Chun & F. C. How) Hung T. Chang.

Trees. Branchlets densely dark brown tomentose. Petiole 1–5 cm, densely tomentose; leaf blade ovate to elliptic-obovate or oblong, 6.5–15 × 2.5–7 cm, leathery, abaxially puberulent on veins, adaxially glabrous, lateral veins and veinlets prominently raised abaxially, inconspicuous or slightly impressed adaxially, base cuneate, nearly rounded, or slightly cordate, margin entire, apex acute or acuminate. Inflorescences and flowers unknown. Fruiting pedicel 1.5–2 cm; capsule axillary, solitary, ovoid-globose, 2.5–3 cm in diam.; valves adaxially purple, ca. 2 cm, with dense prickles to 2.5 mm. Seed usually 1 per locule, ellipsoid-ovoid, ca. 6 × 4–5 mm. Fl. and fr. unknown.

?Guangdong, Guangxi, Hainan [N Vietnam].

6. *Sloanea leptocarpa* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 11: 214. 1931.

薄果猴欢喜 bo guo hou huan xi

Sloanea austrosinica Hu ex Tang; *S. elegans* Chun; *S. emeiensis* W. P. Fang & P. C. Tuan; *S. tsiangiana* Hu; *S. tsinyunensis* S. S. Chien.

Trees evergreen, to 27 m tall, to 60 cm d.b.h. Branches glabrous; branchlets yellow-brown puberulent. Petiole 1–3 cm, ± slender, brown puberulent, glabrescent, swollen at end; leaf blade lanceolate or oblanceolate, rarely narrowly oblong, 7–14 × 2–3.5 cm, leathery, puberulent or at least on veins at first, abaxially pubescent on veins and in vein axils in mature leaves, adaxially glabrescent, base narrow, obtuse, margin entire, usually shrunken when dry, apex acuminate. Flowers axillary in upper twigs, solitary or fascicled. Pedicel 1–2 cm, slender, puberulent. Sepals 4 or 5, ovate-orbicular, unequal in size, 4–5 × 3–4 mm, puberulent. Petals 4 or 5, 6–7 mm, unequal in width, puberulent, incised at apices. Stamens numerous, 6–7 mm, sometimes shorter; filaments 3–4 mm; anthers pubescent. Ovary brown pubescent; style slender. Capsule globose, 1.5–2 cm, 3- or 4-valved; valves thin; prickles short, 1–2 mm, puberulent. Seed black, ca. 1 cm; aril yellowish, covering 1/2 of seed. Fl. Apr–May, fr. Sep.

• Evergreen forests; 700–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Yunnan.

7. *Sloanea xichouensis* Feng ex Y. Tang & Y. C. Hsu, Bull. Bot. Res., Harbin 8(3): 97. 1988.

西畴猴欢喜 xi chou hou huan xi

Trees to 15 m tall, to 40 cm d.b.h. Branchlets densely yellow-brown tomentose, two-year-old branches sometimes pubescent. Petiole 2–4.5 cm, densely yellow-brown tomentose, slender, swollen at ends; leaf blade obovate to elliptic, 12–14 × (4–)5–6 cm, papery, abaxially pubescent, adaxially glabrous or pubescent only on midvein, midvein prominently raised abaxially, impressed adaxially, lateral veins 6 per side, ascending, prominently raised abaxially, impressed adaxially, veinlets conspicuous abaxially, base acute, margin sparsely dentate, apex acuminate. Flowers unknown. Capsule dark red adaxially,

subglobose, ca. 2 cm in diam., 3- or 4-valvate, abaxially densely prickly; prickles filiform, 5–7 mm, sparsely setose; stipe of capsule 2.5–3 cm, densely pubescent. Fl. unknown, fr. Aug–Sep.

- Evergreen forests; ca. 1300 m. S Yunnan.

8. *Sloanea sterculiacea* (Benth) Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 362. 1915.

贡山猴欢喜 gong shan hou huan xi

Trees to 20 m tall. Branches black-brown when dry; branchlets brown pubescent. Petiole 1.5–4 cm, brown pubescent; leaf blade obovate-oblong, broadest from middle upward, 13–25(–35) × (5–)7–9(–15) cm, thinly leathery, abaxially brown puberulent, becoming sparsely so on older leaves, or rarely glabrescent and pubescent in vein axils only, adaxially glabrous, lateral veins 7–9(–12) per side, prominently raised abaxially, slightly impressed adaxially, veinlets conspicuous on both surfaces, base very narrow, rounded, margin minutely serrulate, apex acute. Flowers solitary. Pedicel 2–3 cm, pubescent. Sepals 4, broadly ovate, 7–8 mm, both surfaces tomentose. Petals 4, broadly ovate, both surfaces sparsely pilose, margin slightly 3–5-dentate at apices. Stamens ca. 80; filaments ca. 4 mm, puberulent; anthers puberulent, awned at apices. Disk cushion-shaped, thick. Ovary tomentose, 4-loculed; style subulate, 8–10 mm, pubescent in lower 1/2. Capsule 2–3 × ca. 2 cm; prickles 1.5–2 mm; valves 2–3 cm, 2–3 mm thick. Seeds black, shiny, ca. 1 cm; aril yellow when dry, covering 1/2 of seed. Fl. Apr, fr. Sep–Nov.

Forests; 1400–2500 m. SE Xizang, NW Yunnan [Bhutan, India, Myanmar, Nepal].

- 1a. Leaf blade abaxially pubescent at least on veins 8a. var. *sterculiacea*
 1b. Leaf blade abaxially glabrous except for tufts of hairs in vein axils 8b. var. *assamica*

8a. *Sloanea sterculiacea* var. *sterculiacea*

贡山猴欢喜(原变种) gong shan hou huan xi (yuan bian zhong)

Echinocarpus sterculiaceus Benth, J. Proc. Linn. Soc., Bot. 5(Suppl. 2): 72. 1861; *Sloanea forrestii* W. W. Smith; *S. rotundifolia* Hung T. Chang.

Leaf blade abaxially pubescent at least on veins.

Forests; 1400–2500 m. SE Xizang, NW Yunnan [Bhutan, India, Myanmar, Nepal].

8b. *Sloanea sterculiacea* var. *assamica* (Benth) Coode, Kew Bull. 38: 387. 1983.

长叶猴欢喜 chang ye hou huan xi

Echinocarpus assamicus Benth, J. Proc. Linn. Soc., Bot. 5(Suppl. 2): 72. 1861; *Sloanea assamica* (Benth) Rehder & E. H. Wilson.

Leaf blade abaxially glabrous except for tufts of hairs in vein axils.

Forests; 1400–2500 m. SE Xizang, NW Yunnan [Bhutan, NE India (Assam)].

9. *Sloanea mollis* Gagnepain, Notul. Syst. (Paris) 1: 195. 1910.

滇越猴欢喜 dian yue hou huan xi

Sloanea mollis var. *chinghsiensis* Chun & F. C. How.

Trees to 25 m tall, to 1 m d.b.h. Bark brown; branchlets brown-yellow tomentose. Petiole terete, 3–6 cm or longer, robust, tomentose; leaf blade ovate or narrowly elliptic, 11–15 × 6–12 cm, thinly leathery, abaxially yellow-brown tomentose, adaxially glabrous, lateral veins 8–10 per side, prominently raised abaxially, ascending and intermixed 3–4 mm from margin, conspicuous adaxially, veinlets conspicuous abaxially, base broad and rounded, or slightly cordate, margin minutely denticulate or minutely crenulate, apex acuminate, rarely acute, acumen ca. 2.5 cm. Pedicel 2–3 cm, tomentose. Sepals 4 or 5, narrowly ovate, 7–9 × 6–7 mm, both surfaces tomentose. Petals ca. as long as sepals, both surfaces puberulent, large toothed at apices. Stamens numerous; filaments ca. 4 mm, puberulent; anthers ca. 3 mm, puberulent. Ovary tomentose; style 8–10 mm, pointed at tip, pubescent in lower half. Capsule 4-valved; valve 2–2.5 cm, ca. 3 mm thick; prickles usually yellow, 1–1.5 mm; endocarp purple-red. Seeds black, shiny, 1–1.2 cm, enclosed by yellowish aril in lower 1/2. Fl. Apr–May, fr. Oct–Dec.

Evergreen forests; 1200–1400 m. S Guangxi, SE Yunnan [N Vietnam].

One of us (Chamlong Phengklai) considers *Sloanea sterculiacea* as possibly synonymous with this species.

10. *Sloanea changii* Coode, Kew Bull. 38: 402. 1983.

樟叶猴欢喜 zhang ye hou huan xi

Sloanea laurifolia Hung T. Chang, Acta Phytotax. Sin. 17(1): 59. 1979, not Benth (1861).

Trees evergreen, to 28 m tall, to 50 cm d.b.h. Branches with lenticels; branchlets glabrous, 4–5 mm in diam. Petiole 2–6 cm, glabrous; leaf blade ovate-lanceolate or ovate-oblong, 10–17 × 4–7 cm, leathery, glabrous, lateral veins 6 or 7 per side, lowermost pair very strong, prominently raised abaxially, conspicuous adaxially, veinlets prominent abaxially, inconspicuous adaxially, base rounded, margin entire, apex acuminate. Flowers axillary in upper twigs. Pedicel 2–4 cm, puberulent. Sepals, petals, and stamens unknown. Ovary conical, brown pubescent; style 5–7 mm, pubescent. Capsule globose, 3–4 cm in diam., 3- or 4-valved; valves 3–3.5 cm, 4–5 mm thick; prickles 6–8 mm. Seeds 1.5–2 cm. Fl. Mar–Apr, fr. Sep–Dec.

- Forests on limestone; 1000–1600 m. W Guangxi, SE Yunnan.

11. *Sloanea sinensis* (Hance) Hemsley, Hooker's Icon. Pl. 27: sub t. 2628. 1900.

猴欢喜 hou huan xi

Echinocarpus sinensis Hance, J. Bot. 22: 108. 1884; *Castanopsis cavaleriei* H. Léveillé; *Sloanea chinensis* Hu (1925), not *Sloanea sinensis* (Hance) Hemsley (1900); *S. hongkongensis* Hemsley; *S. kweichowensis* Hu; *S. oligophlebia* Chun & K. C. Ting; *S. parvifolia* Chun & F. C. How.

Trees to 20 m tall. Branchlets glabrous. Petiole 1–4 cm, glabrous; leaf blade variable, usually oblong or narrowly obovate, rarely orbicular or lanceolate, 6–9(–12) × 3–5 cm, thinly leathery, glabrous, lateral veins 5–7 per side, base cuneate, or narrowed and obtuse-rounded, margin usually entire, rarely sparsely dentate along upper margin, apex acute. Flowers fascicled. Pedicel 3–6 cm, gray pubescent. Sepals 4, broadly ovate, 6–8 × 5–6 mm, both surfaces puberulent. Petals 4, white, 7–9 mm, both surfaces puberulent, 6- or 7-incised at apices. Stamens ca. 82, ca. as long as petals; anthers ca. 3 × as long as filaments, awned at apices. Ovary ovoid, 6-loculed, 4–5 mm, pubescent; style simple, 4–6 mm, puberulent in lower 1/2. Capsule variable in size, 2–5 cm in diam., 3–7-valved; valves variable in size, 2–3.5 cm, 3–5 mm thick; prickles 1–1.5 cm; endocarp purple-red. Seeds black, shiny, 1–1.3 cm; aril yellow, ca. 5 mm. Fl. Jun–Oct, fr. May–Nov, most frequently in Aug–Oct.

Evergreen forests, often in valleys or near streams; 700–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Zhejiang [Cambodia, Laos, Myanmar, Thailand, Vietnam].

12. *Sloanea hainanensis* Merrill & Chun, Sunyatsenia 5: 123. 1940.

海南猴欢喜 hai nan hou huan xi

Trees to 15 m tall. Branchlets puberulent, glabrescent. Petiole 5–12 mm, puberulent, glabrescent; leaf blade spatulate or obovate, 7–12 × 3–6 cm, becoming narrow from middle downward, thinly leathery, glabrous or abaxially pubescent only in vein axils, lateral veins 6–8 per side, 60° from midvein, prominently raised abaxially, inconspicuous adaxially, veinlets conspicuous abaxially, base narrow and rounded, margin sinuately crenulate in upper 1/2, apex acute. Flowers usually solitary, ca. 1.5 cm in diam. Pedicel 2–3 cm, gray pubescent. Sepals 4, broadly ovate, variable in size, 4–7 mm, puberulent, apex obtuse. Petals 4, broadly ovate, 4–7 mm, both surfaces puberulent, incised at apices. Stamens ca. 5 mm; anthers longer than filaments, pubescent. Ovary ovoid, tomentose; style simple, ca. as long as ovary, nearly glabrous. Capsule nearly globose, ca. 3.5 cm in diam., 3- or 4-valved; valves ca. 3 mm thick; prickles 1–1.5 cm. Seeds 1.5–2 cm, enclosed by aril in lower 1/2. Fl. May, fr. Jul–Aug.

• Evergreen forests; 300–500 m. C and S Hainan.

13. *Sloanea hemsleyana* (T. Itô) Rehder & E. H. Wilson in Sargent, Pl. Wilson. 2: 361. 1915.

仿栗 fang li

Echinocarpus hemsleyanus T. Itô, J. Coll. Sci. Imp. Univ. Tokyo 12: 349. 1899; *Sloanea chengfengensis* Hu; *S. hanceana* Hemsley; *S. hemsleyana* var. *yunnanica* Coode.

Trees to 25 m tall; terminal buds yellow-brown puberulent. Branches dark brown when dry, lenticels present; branchlets glabrous. Leaves fascicled at twig apices; petiole 1–2.5(–3.5) cm, glabrous; leaf blade variable, usually narrowly obovate or oblanceolate, rarely ovate, 10–15(–20) × 3–5(–7) cm, thinly leathery, glabrous, abaxially rarely pubescent in vein axils only, lateral veins 7–9 per side, base narrow and obtuse, rarely slightly cordate, margin irregularly crenulate, apex acute or acuminate. Flowers terminal in raceme; peduncle and pedicels puberulent. Sepals 4, ovate, 6–7 mm, both surfaces puberulent. Petals white, both surfaces puberulent, ca. as long as sepals or slightly longer, 6- or 7-incised at apices. Stamens ca. 92, ca. as long as petals; filaments 1–2.5 mm, puberulent; anthers ca. 5 mm, puberulent, awn 1–2 mm. Ovary brown tomentose; style extending beyond stamens, 5–6 mm. Disk cushion-shaped. Capsule variable in size, (3 or)4- or 5(or 6)-valved; valves 2.5–5 cm, 3–5 mm thick; endocarp purple-red or yellow-brown; prickles 1–2 cm; stipe of capsule 2.5–6 cm, usually robust. Seeds black-brown, shiny, 1.2–1.5 cm, lower 1/2 enclosed by yellow aril. Fl. Jul, fr. unknown.

• Evergreen forests; 1100–1400 m. Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan.

14. *Sloanea sigun* (Blume) K. Schumann in Engler & Prantl, Nat. Pflanzenfam. III(6): 5. 1890.

斜脉猴欢喜 xie mai hou huan xi

Echinocarpus sigun Blume, Bijdr. 56. 1825.

Trees to 30 m tall, to 40 cm d.b.h. Branchlets glabrous. Petiole 2–2.5 cm, slender, glabrous, swollen at ends; leaf blade elliptic or obovate, 12–14 × 5–6 cm, papery, abaxially pubescent in vein axils only, adaxially glabrous, lateral veins 5 or 6 per side, 30° from midvein, both prominently raised abaxially, veinlets conspicuous abaxially, base acute or broadly cuneate, margin minutely serrate, apex acuminate. Flowers solitary. Pedicel 1–6 cm, glabrous. Sepals 4, ovate, both surfaces pubescent. Petals 4, yellowish, ovate or obovate, both surfaces sparsely pubescent. Stamens 5–7 mm. Ovary ovoid, sparsely pubescent; style glabrous. Capsule subglobose, ca. 6 cm in diam., 4-valvate; valves woody, with rigid prickles abaxially; prickles subulate, ca. 1.5 cm, sparsely setose, persistent. Fl. and fr. unknown.

Forests; ca. 800 m. S Yunnan [Cambodia, India, Indonesia, Malaysia, Myanmar, Thailand].