

10. CINNAMOMUM Schaeffer, Bot. Exped. 74. 1760, nom. cons.

樟属 zhang shu

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Camphora Fabricius; *Cecidodaphne* Nees; *Parthenoxylon* Blume.

Evergreen trees or shrubs. Bark, branchlets, and leaves very scented. Buds naked or perulate; if perulate, scales distinct or indistinct, imbricate. Leaves alternate, subopposite, or opposite, sometimes clustered at apex of branchlet, leathery, trinerved or triplinerved, also pinninerved. Panicle axillary, subterminal, or terminal, composed of (1–)3- to many-flowered cymes. Flowers yellow or white, small- to medium-sized, bisexual, rarely polygamous. Perianth tube short, cupuliform or campanulate; perianth lobes 6, subequal, entirely deciduous or upper halves deciduous but rarely entirely persistent after anthesis. Fertile stamens 9, rarely less or more, in 3 whorls; filaments of 1st and 2nd whorls eglandular, those of 3rd whorl each with 2 stalked or stalkless glands near base; anthers 4-celled, rarely those of 3rd whorl 2-celled, cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, of innermost whorl, cordate or sagittate, stipitate. Ovary always as long as style; style slender; stigma capitate or discoid, sometimes 3-lobed. Fruit fleshy, subtended by a perianth cup; perianth cup cupuliform, campanulate, or conical, truncate or undulate, irregularly denticulate or sometimes with 6 truncate lobe bases at apex.

About 250 species: tropical and subtropical Asia, Australia, and Pacific islands; 49 species (30 endemic, one introduced) in China.

Cinnamomum sericans Hance (J. Bot. 15: 336. 1877) was described from China but could not be treated here because no material was seen by the present authors.

In addition, numerous names in *Cinnamomum* and *Camphora* based on Chinese material were published by Lukmanoff (Nomencl. Icon. Cannel. 1889). They are listed below. Type material needs to be located and identified in order to determine the correct application of these names.

Camphora: *C. brongniartii* Lukmanoff (loc. cit.: 23; China and Japan); *C. decandollei* Lukmanoff (loc. cit.: 23; China: Hong Kong); *C. oldhamii* Lukmanoff (loc. cit.: 23; China: Taiwan); and *C. wrightii* Lukmanoff (loc. cit.: 24; China: Hong Kong).

Cinnamomum: *C. asa-grayi* Lukmanoff (loc. cit.: 9; China: Hong Kong); *C. baillonii* Lukmanoff (loc. cit.: 10; China); *C. barlowii* Lukmanoff (loc. cit.: 16; China); *C. calleryi* Lukmanoff (loc. cit.: 16; China); *C. goeringii* Lukmanoff (loc. cit.: 16; China and Indonesia: Java); *C. linnei* Lukmanoff (loc. cit.: 15; China); *C. lowii* Lukmanoff (loc. cit.: 15; China); *C. lucienii* Lukmanoff (loc. cit.: 18; China and Japan); *C. lunatum* Lukmanoff (loc. cit.: 11; China); *C. maximoviczii* Lukmanoff (loc. cit.: 19; China); *C. reinwardtii* Lukmanoff (loc. cit.: 19; China); *C. rougieri* Lukmanoff (loc. cit.: 7; China and ?Myanmar); *C. suaveolens* Lukmanoff (loc. cit.: 9; China); and *C. walteri* Lukmanoff (loc. cit.: 18; China).

Cinnamomum esquirolii H. Léveillé (Fl. Kouy-Tchéou, 218. 1914–1915) is a synonym of *Cocculus laurifolius* Candolle in the Menispermaceae (see p. 13).

- 1a. Perianth lobes entirely deciduous when in fruit; bud scales distinct, imbricate; leaves alternate, pinninerved or subtriplinerved, rarely trinerved, axils of lateral veins usually dome-shaped abaxially, ± conspicuously bullate adaxially.
- 2a. Leaf blade conspicuously hairy on both surfaces or only abaxially when mature (except *C. philippinense* glabrate abaxially).
- 3a. Leaf apex caudate-acuminate or abruptly acuminate.
 - 4a. Leaf blade ovate or ovate-oblong, densely villous along midrib adaxially and on whole surface abaxially when young, glabrous adaxially and grayish brown villous abaxially when mature, lateral veins 6–8 pairs; perianth lobes glabrous outside and inside; fruit ovoid, ca. 1 cm in diam. 1. *C. foveolatum*
 - 4b. Leaf blade ovate-elliptic or lanceolate, glabrous adaxially, pubescent initially but soon glabrate abaxially, lateral veins 5 or 6(or 7) pairs; perianth lobes appressed pubescent outside, hirsute inside; fruit globose, ca. 7 mm in diam. 2. *C. philippinense*
- 3b. Leaf apex not caudate-acuminate or abruptly acuminate.
 - 5a. Panicle glabrous or subglabrous.
 - 6a. Leaf blade sparsely villous initially but very soon glabrate adaxially, very densely yellow villous initially but soon sparsely so abaxially, midrib and lateral veins impressed adaxially, elevated abaxially, axils of lateral veins inconspicuously dome-shaped abaxially; panicle 7–11 cm, 12–16-flowered, peduncle, rachis, and pedicels sparsely villous initially but soon glabrate; perianth densely puberulent outside and inside 7. *C. mollifolium*
 - 6b. Leaf blade finely puberulent initially but soon glabrate adaxially, very densely sericeous-puberulent abaxially, midrib and lateral veins slightly conspicuous on both surfaces, axils of lateral veins conspicuously dome-shaped abaxially; panicle (5–)10–15 cm, many flowered, peduncle and rachis glabrous, pedicels sericeous-puberulent; perianth subglabrous outside, white sericeous inside 8. *C. bodinieri*
 - 5b. Panicle densely hairy.

- 7a. Buds densely red-brown or gray tomentose.
 - 8a. Buds, young branchlets, leaf blade abaxially, and inflorescences densely gray tomentose; axils of lateral veins in leaves inconspicuously bullate adaxially 3. *C. tenuipile*
 - 8b. Buds, young branchlets, leaf blade abaxially, and inflorescences densely reddish brown tomentose; axils of lateral veins in leaves conspicuously bullate adaxially 4. *C. rufotomentosum*
- 7b. Panicle densely grayish brown to yellowish brown pubescent or white sericeous.
 - 9a. Branchlets, leaf blade abaxially, and inflorescences densely gray-brown to yellowish brown pubescent; veinlets of leaf blade nearly invisible abaxially, axils of lateral veins inconspicuously dome-shaped abaxially; fruit covered with gray-brown or yellowish brown villous hairs 5. *C. platyphyllum*
 - 9b. Branchlets, leaf blade abaxially, and inflorescences densely white sericeous; veins of leaf blade \pm conspicuously visible and somewhat foveolate abaxially, axils of lateral veins shallowly dome-shaped abaxially; fruit glabrous 6. *C. septentrionale*
- 2b. Leaf blade glabrous or subglabrous on both surfaces when mature.
 - 10a. Panicle \pm hairy.
 - 11a. Perianth cup crateriform, dilated into a disk; fruit globose 9. *C. migao*
 - 11b. Perianth cup shallowly cupuliform or campanulate; fruit obovoid or ovoid but not globose.
 - 12a. Leaf blade lateral veins 3–5 pairs, axils always conspicuously dome-shaped abaxially; fruit obovoid, ca. 2 cm; perianth cup campanulate, 1.2–1.8 cm 10. *C. illicioides*
 - 12b. Leaf blade lateral veins 5–7 pairs, axils always inconspicuously dome-shaped abaxially; fruit ovoid, 1.5–2 cm; perianth cup shallowly cupuliform, 0.5–1.5 cm.
 - 13a. Leaf blade oblong, sometimes ovate-oblong, 5–13 \times 2–5 cm, petiole 0.5–1.5 cm; fruit ca. 1.5 \times 0.9 cm, perianth cup ca. 0.5 cm and ca. 0.65 cm wide at apex 11. *C. saxatile*
 - 13b. Leaf blade ovate, 7–12.5 \times 2.8–7.8 cm, petiole 2–4 cm; fruit ca. 2 \times 1.7 cm, perianth cup ca. 1.5 cm long and broad 12. *C. longipetiolatum*
 - 10b. Panicle glabrous or subglabrous.
 - 14a. Panicles terminal, subterminal, or sometimes axillary, very short, (2–)3–5 cm, few flowered.
 - 15a. Leaf blade oblong-elliptic or ovate-elliptic, large, 7.5–9.5(–10) \times 4–5(–6) cm, glabrous abaxially, axils of lateral veins dome-shaped and puberulent abaxially; perianth cup in fruit urceolate, 9–10 mm wide at apex, fruit ellipsoid, 1.5–2 cm in diam. 13. *C. micranthum*
 - 15b. Leaf blade elliptic, smaller, 5–9 \times 2–4 cm, white sericeous abaxially, axils of lateral veins not dome-shaped and glabrous; perianth cup in fruit dilated, crateriform, up to 1.3 cm wide at apex, fruit globose, 1–1.5 cm in diam. 14. *C. brachythyrsum*
 - 14b. Panicles axillary or axillary and terminal, \pm elongate, ca. 5 cm or more, many flowered.
 - 16a. Leaf blade ovate-elliptic, always glaucous abaxially when dry, triplinerved, axils of lateral veins and veins conspicuously dome-shaped abaxially 15. *C. camphora*
 - 16b. Leaf blade variable in shape, not or inconspicuously glaucous abaxially when dry, generally pinninerved, axils of lateral veins conspicuously or inconspicuously dome-shaped abaxially, veins not dome-shaped abaxially.
 - 17a. Panicle generally many flowered, 9–20 cm; leaf blade mostly ovate, apex always falcate 16. *C. longepaniculatum*
 - 17b. Panicle rather few flowered and rather short, 4–10 cm; leaf blade variable in shape, generally elliptic-ovate or oblong-ovate.
 - 18a. Leaf blade lateral vein axils inconspicuously dome-shaped abaxially and also inconspicuously bullate adaxially 17. *C. parthenoxylon*
 - 18b. Leaf blade lateral vein axils conspicuously dome-shaped abaxially and also conspicuously bullate adaxially.
 - 19a. Leaf blade leathery, dark green and shiny adaxially, axils of lateral veins only with 1 dome abaxially 18. *C. glanduliferum*
 - 19b. Leaf blade papery, green and reddish brownish adaxially, axils of lateral veins with 1 or 2 domes abaxially 19. *C. chartophyllum*
 - 1b. Perianth lobes entirely persistent or lower parts persistent when in fruit; buds naked or bud scales indistinct; leaves opposite or subopposite, trinerved or triplinerved, axils of lateral veins not dome-shaped abaxially and not bullate adaxially.
 - 20a. Leaf blade conspicuously hairy on both surfaces but especially so abaxially when young, not sparsely hairy or very rarely glabrate on adaxial surface and when mature abaxially.
 - 21a. Two lower anther cells lateral; ovary hirsute; fruit ovoid, up to 2.5 cm, apiculate at apex, glabrous except apex slightly villous, exocarp scabrid; inflorescence inserted in leaf axils near apex of young branchlet, always many, clustered and approximate to each other, nearly sessile or shortly pedunculate 37. *C. pittosporoides*

- 21b. Two lower anther cells not lateral; ovary glabrous, if hairy not hirsute; fruit smaller, usually below 1 cm, not distinctly apiculate at apex, glabrous; panicles terminal or axillary, usually remote from each other, distinctly long pedunculate.
- 22a. Basal lateral veins with 4–6 additional veins outside, additional veins slightly impressed adaxially and very elevated abaxially 35. *C. pingbienense*
- 22b. Basal lateral veins usually without additional veins outside, if present veins not conspicuous.
- 23a. Young branchlets, inflorescence, leaf blade abaxially, and petioles covered with fine villous black-chestnut or red-brown hairs 38. *C. kwangtungense*
- 23b. Young branchlets, inflorescence, leaf blade abaxially, and petioles covered with dirty yellow, yellow-brown, rusty, or gray to silver hairs.
- 24a. Plant indumentum dirty yellow, yellow-brown, or rusty pubescent, or tomentose or villous.
- 25a. Leaf blade leathery, elliptic, ovate-elliptic to lanceolate, smaller, old leaves usually below 10 × 5 cm 49. *C. subavenium*
- 25b. Leaf blade leathery to thickly leathery, elliptic-ovate or oblong, larger, old leaves above 10 × 5 cm.
- 26a. Leaf blade transverse veins inconspicuous abaxially 47. *C. cassia*
- 26b. Leaf blade transverse veins parallel and conspicuously elevated abaxially.
- 27a. Leaf blade elliptic or elliptic-ovate, 11–22 × 5–6.5 cm, subtriplinerved, apex caudate, base subrounded; panicle 10–15 cm; panicles, leaf blade abaxially, and petioles densely yellow-brown tomentose 45. *C. javanicum*
- 27b. Leaf blade elliptic, 4.5–11 × 1.5–4 cm, triplinerved, apex abruptly shortly acuminate, base cuneate to subrounded; panicle 4–6.5 cm; panicles, leaf blade abaxially, and petioles dirty yellow hirsute-villous 46. *C. appelianum*
- 24b. Plant indumentum gray to silver villous, puberulent, or sericeous.
- 28a. Pedicels filiform, 6–20 mm 39. *C. wilsonii*
- 28b. Pedicels shorter, all below 6 mm.
- 29a. Perianth lobes in fruit persistent; leaf blade large, 12–35 × 5.5–8.5 cm 41. *C. iners*
- 29b. Perianth lobes in fruit ± deciduous; leaf blade smaller.
- 30a. Leaf blade ovate to broadly ovate, glabrous adaxially, distinctly white sericeous when young but eventually glabrate when mature abaxially 40. *C. contractum*
- 30b. Leaf blade not ovate or broadly ovate, pubescence mostly not deciduous when mature abaxially.
- 31a. Panicles axillary and terminal, several branched from base, branches elongate, inflorescence rachis ± depressed tetragonous; leaf blade oblong to lanceolate-oblong 42. *C. austroyunnanense*
- 31b. Panicle axillary only, pedunculate, peduncle long or slender, inflorescence rachis not depressed tetragonous; leaf blade lanceolate, oblong-lanceolate, or elliptic, generally broader and shorter.
- 32a. Leaf blade elliptic, old ones 14–16 × 6–7.5 cm, twice as long as young ones; panicle elongate, 9–13 cm, branched three times, very patent; panicle and leaf blade abaxially appressed short gray villous 48. *C. austrosinense*
- 32b. Leaf blade lanceolate or oblong-lanceolate, below 11 × 4 cm; panicle shorter, below 9 cm, branched twice, not very patent; panicle and leaf blade abaxially brownish or silver sericeous or sericeous-tomentulose.
- 33a. Leaf blade lanceolate or oblong-lanceolate, 5–10 × 1.5–2.5 cm, silver sericeous on both surfaces when young, glabrous adaxially and brownish sericeous abaxially or glabrate on both surfaces when mature, apex distinctly falcate-acuminate, petiole 0.5–1.2 cm, densely silver sericeous when young; inflorescences cymose, ca. 3 cm, solitary or in cluster, 3–5-flowered, silver sericeous; flowers green-white, 3–4 mm, pedicels ca. 5 mm 43. *C. tsangii*
- 33b. Leaf blade lanceolate, 6–11 × 2.5–4 cm, green and glabrous adaxially, glaucous and densely silver appressed tomentulose when young but glabrate when mature abaxially, apex acuminate, petiole 1–1.5 cm, glabrous; inflorescences paniculate, 4–7(–9) cm, solitary, 5–12-flowered, finely pubescent; flowers white, ca. 5 mm, pedicels 4–8 mm 44. *C. mairei*
- 20b. Leaf blade glabrous or sparsely hairy on both surfaces but especially so abaxially when young, glabrous or glabrate on both surfaces when old.
- 34a. Inflorescence few flowered, always subumbellate or corymbose, (1–)3–5-flowered, generally all short.
- 35a. Leaf blade small, obovate, apex obtuse or rounded, reticulate veins and veinlets conspicuously

- elevated on both surfaces 20. *C. reticulatum*
- 35b. Leaf blade generally large, ovate, ovate-lanceolate, or lanceolate to oblong-lanceolate, apex shortly acuminate or acute, occasionally obtuse, reticulate veins and veinlets inconspicuous and not elevated on both surfaces, especially so adaxially.
- 36a. Perianth entirely glabrous outside, papillate-ciliolate on margin, sericeous inside 22. *C. jensenianum*
- 36b. Perianth densely gray sericeous on both sides, not papillate-ciliolate on margin.
- 37a. Mature fruit ovoid, larger, up to 20 × 14 mm; perianth cup in fruit ca. 1 cm, up to 1.5 cm wide, truncate at apex, not dentate on margin; fruit stalk ca. 5 mm 25. *C. rigidissimum*
- 37b. Mature fruit ellipsoid, smaller, ca. 11 × 5–5.5 mm; perianth cup in fruit ca. 3 mm, up to 4 mm wide, regularly truncate-dentate on margin; fruit stalk up to 9 mm 21. *C. pauciflorum*
- 34b. Inflorescence subracemose or paniculate, many flowered, with floral branchlets, terminal one being 1–5-flowered cyme.
- 38a. Perianth cup in fruit truncate, undulate or irregularly dentate on margin.
- 39a. Inflorescence glabrous.
- 40a. Leaf blade ovate-oblong or oblong-lanceolate, 7–10 × 3–3.5 cm, acute to acuminate at apex, base broadly cuneate or obtuse, glabrous on both surfaces 23. *C. japonicum*
- 40b. Leaf blade ovate, ovate-oblong, or ovate-lanceolate, 8–12 × (2.5–)3.5–5(–5.5) cm, shortly acuminate at apex, base obtuse to subrounded, glabrous adaxially, sparsely pubescent abaxially 24. *C. osmophloeum*
- 39b. Inflorescence ± hairy.
- 41a. Inflorescence paniculate, trichotomous, many flowered, as long as leaf blade, branchlets divaricate, terminal one being 3-flowered cyme; leaf blade elliptic, reddish and glaucous abaxially, lateral veins and midrib somewhat impressed adaxially, very elevated abaxially 26. *C. validinerve*
- 41b. Inflorescence subracemose or paniculate, but all much shorter than leaf blade, branchlets not divaricate; leaf blade ovate-lanceolate to oblong or elliptic-lanceolate, greenish or whitish green abaxially, lateral veins and midrib somewhat elevated adaxially, conspicuously elevated abaxially.
- 42a. Leaf blade papery; inflorescence sparsely puberulent 27. *C. liangii*
- 42b. Leaf blade leathery; inflorescence sericeous-pubescent or appressed tomentose.
- 43a. Leaf blade ovate-lanceolate to oblong, (6–)8–12(–17) × (2.5–)3–5(–5.5) cm, brown adaxially, white-green or sparsely finely puberulent abaxially when dry; short panicle axillary or subterminal, generally inserted in leaf axils remote from apex of branchlet, gray sericeous-pubescent; perianth cup in fruit leathery 28. *C. tonkinense*
- 43b. Leaf blade elliptic-lanceolate, 7–11 × 1.5–3.5 cm, brown-green adaxially, greenish and sparsely wrinkled pubescent but soon glabrate abaxially when dry; short panicle axillary or subterminal but not inserted in leaf axils remote from apex of branchlet, appressed tomentose; perianth cup in fruit woody 29. *C. tsoi*
- 38b. Perianth cup in fruit regularly dentate on margin, teeth truncate, rounded, or acute at apex.
- 44a. Terminal branchlet of panicle bearing a 3–5-flowered cyme; basal lateral veins evanescent below leaf apex 36. *C. tamala*
- 44b. Terminal branchlet of panicle bearing a 1–3-flowered cyme; basal lateral veins extending to leaf apex or up to 3/4 of leaf blade or evanescent near apex.
- 45a. Panicle short, much shorter than leaf blade; fruit ovoid, ca. 8 mm.
- 46a. Leaf blade linear to lanceolate, (3.8–)4.5–12(–15) × (0.7–)1–2(–4) cm, appressed sericeous-pubescent abaxially especially when young; peduncle slender; pedicels up to 10(–12) cm 30. *C. heyneanum*
- 46b. Leaf blade ovate or oblong to lanceolate, 5.5–10.5 × 2–5 cm, glabrous or subglabrous abaxially when young; peduncle robust; pedicels 4–6 mm 31. *C. burmannii*
- 45b. Panicle large, always as long as leaf blade; fruit ellipsoid or ovoid, 10–15 mm.
- 47a. Leaf blade elliptic-oblong, 12–30 × 4–9 cm, thickly leathery, trinerved or triplinerved, apex obtuse, acute, or acuminate, base subrounded or attenuate, basal lateral veins oblique, basal lateral veins and midrib reaching leaf apex; petiole 1–1.5 cm 32. *C. bejolghota*
- 47b. Leaf blade ovate to oblong-ovate or ovate-lanceolate, smaller, leathery or subleathery to papery, triplinerved, apex acute or rounded but not obtuse, base acute or rounded, basal lateral veins extending up to 3/4 of leaf blade or evanescent near apex; petiole 1.5–2 cm.
- 48a. Leaf blade leathery, ovate or oblong-ovate, 8–11(–14) × 4–5.5(–9) cm, apex acute, base rounded, basal lateral veins extending up to 3/4 of leaf blade, veins and veinlets conspicuously and densely shallowly foveolate abaxially; panicles terminal; teeth of perianth cup in fruit short and rounded; branches, leaves, and bark not scented when dry; wild ... 33. *C. kotoense*
- 48b. Leaf blade leathery or subleathery to papery, ovate or ovate-lanceolate, 11–16 × 4.5–5.5 cm,

apex acuminate, base acute, basal lateral veins evanescent near leaf apex, veins and veinlets slightly conspicuous but not shallowly foveolate abaxially; panicles axillary and terminal; teeth of perianth cup in fruit truncate or acute; branches, leaves, and bark strongly scented when dry; cultivated 34. *C. verum*

1. *Cinnamomum foveolatum* (Merrill) H. W. Li & J. Li, comb. nov.

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Basionym: *Beilschmiedia foveolata* Merrill, J. Arnold Arbor. 19: 30. 1938; *Alseodaphne camphorata* (H. Léveillé) C. K. Allen; *A. caudata* Lecomte, nom. illeg. superfl.; *Cinnamomum caudiferum* Kostermans; *Litsea foveolata* (Merrill) Kostermans (1970), not Yen C. Yang & P. H. Huang (1978); *Machilus camphorata* H. Léveillé.

Small trees, up to 5 m tall, to 5 cm d.b.h. Branchlets purplish brown, terete or ± angled, densely villous initially but soon glabrate. Buds small, obconical; bud scales villous, ciliate on margin. Leaves alternate; petiole 1–1.3 cm, concave-convex, densely villous; leaf blade ovate or ovate-oblong, 9–15 × 3–5.5 cm, subleathery, densely villous abaxially and along midrib adaxially when young, villous and gray-brown abaxially and glabrous and somewhat shiny adaxially when mature, midrib and lateral veins elevated abaxially and impressed adaxially, lateral veins 6–8 pairs, arcuate, anastomosing near leaf margin, transverse veins and veinlets ± conspicuous abaxially and inconspicuous adaxially, base broadly cuneate to rounded, apex caudate-acuminate, acumen attenuate, up to 2.5 cm. Panicle axillary on young branchlets, (2.5–)5–8 cm, composed of few flowered cymes; peduncle delicate, 3–5 cm, sparsely villous. Pedicels 1–3 mm, glabrous. Flowers small. Perianth subglabrous outside and inside; perianth tube very short; perianth lobes 6, subequal, outer ones ovate, ca. 2 × 1.1 mm, inner ones broadly ovate, ca. 1.7 × 1.2 mm, all acute. Fertile stamens 9, ca. 1.2 mm (of 1st and 2nd whorls) or ca. 1.4 mm (of 3rd whorl); filaments almost as long as anthers, those of 3rd whorl each with 2 sessile orbicular glands at middle, others glandless; anthers 4-celled; cells introrse (of 1st and 2nd whorl) or extrorse (of 3rd whorl). Staminodes 3, triangular, ca. 0.7 mm, shortly stalked; stalks villous. Ovary subglobose, ca. 0.8 mm, glabrous; style robust, ca. 0.8 mm; stigma discoid, inconspicuously 3-lobed. Fruit green when fresh, ovoid, ca. 1.3 × 1 cm, glabrous; exocarp cartilaginous, ca. 0.5 mm thick; perianth cup in fruit up to 2 cm, sulcate, corky-spotted, dilated and up to 6 mm wide at apex, undulate on margin. Fl. Apr, fr. Aug.

Valley forests, sunny places on roadsides; 800–1000(–1500) m. S Guizhou, SE Yunnan [N Vietnam].

In FRPS (31: 166. 1982) this species was treated as *Cinnamomum caudiferum* Kostermans (Reinwardtia 8: 35. 1970, “*caudifer*”), which was a nomen novum for *Alseodaphne caudata* Lecomte (Nouv. Arch. Mus. Hist. Nat., sér. 5, 5: 97. 1913), not *C. caudatum* Nees (in Wallich, Pl. Asiat. Rar. 2: 76. 1831). However, Lecomte’s name was nomenclaturally superfluous when published, and therefore illegitimate, because it included the type of *Machilus camphorata* H. Léveillé (Repert. Spec. Nov. Regni Veg. 9: 460. 1911), *Cavalerie 1002*. Kostermans was nevertheless correct to publish a nomen novum, rather than a new combination based on *M. camphorata*, because the combination *C. cam-*

phoratum Blume (Bijdr. 571. 1826) already existed. Subsequent to FRPS, one of the present authors (Li Xiwen) has examined the holotype of *Beilschmiedia foveolata* Merrill, *Petelot 5380* (A), which is definitely referable to *C. caudiferum*. Therefore, the earliest name at specific rank, the epithet of which can be legitimately combined with *Cinnamomum*, is *B. foveolata* (1938), not *C. caudiferum* (1970).

2. *Cinnamomum philippinense* (Merrill) C. E. Chang in H. L. Li et al., Fl. Taiwan 2: 417. 1976.

菲律宾樟树 fei lü bin zhang shu

Machilus philippinensis Merrill, Philipp. J. Sci. 1(Suppl. 1): 56. 1906; *Cinnamomum acuminatissimum* Hayata; *C. caudatifolium* Hayata; *M. acuminatissima* (Hayata) Kanehira; *M. acuminatissima* var. *tasulinensis* J. C. Liao; *Persea acuminatissima* (Hayata) Kostermans; *P. philippinensis* (Merrill) Elmer.

Medium-sized trees, 8–15 m tall. Branchlets slender, brown or black-brown when dry; old branchlets glabrous and striate; young branchlets densely pubescent. Leaves alternate, remote; petiole 1–1.5 cm, concave-convex, pubescent initially but soon glabrate; leaf blade ± glaucous abaxially, slightly shiny adaxially, ovate-oblong or lanceolate, 6–8.5(–9) × 2–3 cm, pubescent initially but soon glabrate abaxially, glabrous adaxially, midrib elevated abaxially, slightly impressed adaxially, lateral veins slender, 5 or 6(or 7) pairs, conspicuous abaxially, obscure adaxially, or sometimes inconspicuous on both surfaces, base cuneate, margin ± undulate, apex abruptly acuminate or caudate-acuminate, acumen always curved. Cymose panicle subterminal, 6–10 cm, few flowered, branched; branches 3–5 cm, terminal one bearing a 3-flowered cyme; rachis and pedicels up to 4 mm, pubescent. Perianth tube campanulate, ca. 1.5 × 1 mm, appressed pubescent outside, sparsely hirsute inside; perianth lobes oblong or oblong-ovate, 2–2.5 × ca. 0.8 mm, acute, pubescent like tube. Fertile stamens inserted on base of perianth lobes, those of 1st and 2nd whorls almost as long as perianth lobes; filaments complanate, hirsute at base, those of 3rd whorl each with 2 stalked oblong glands, others stalkless; anthers ovate-oblong, obtuse, 4-celled; cells introrse (of 1st and 2nd whorl) or extrorse (of 3rd whorl). Staminodes sagittate, ca. 0.5 mm, stalked; stalks ca. 0.5 mm, densely hirsute. Ovary ovoid, ca. 1.7 × 0.7 mm, glabrous; style ca. 2 mm, glabrous, slightly dilated or curved at apex. Fruit globose, ca. 7 mm in diam., subtended by a cupuliform perianth cup. Fl. Mar, fr. after Apr.

Secondary forests; below 1000 m. Taiwan (Gaoxiang, Jiayi, Taidong) [Philippines].

3. *Cinnamomum tenuipile* Kostermans, Reinwardtia 8: 74. 1970 [“*tenuipilis*”].

细毛樟 xi mao zhang

Alseodaphne mollis W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 13: 153. 1921.

Small to large trees, 4–16(–25) m tall, 10–50 cm d.b.h. Bark gray. Branchlets slender; old branchlets glabrate, some-

what angled, striate; young branchlets very densely gray tomentose. Leaves alternate, somewhat clustered at apex of branchlet; petiole 1–1.5 cm, concave-convex, densely gray tomentose; leaf blade obovate or subelliptic, 7.5–13.5 × 4.5–7 cm, papery, densely tomentose initially but soon glabrate abaxially, densely villous except tomentose along midrib and lateral veins initially but soon entirely glabrate adaxially, midrib and lateral veins elevated abaxially, impressed adaxially, lateral veins 6 or 7 pairs, arcuate-ascendant, evanescent near leaf margin, transverse veins elevated abaxially, slightly impressed adaxially, veinlets inconspicuous on both surfaces, base broadly cuneate or subrounded, apex rounded or obtuse or shortly acuminate. Panicle axillary or subterminal, 4.5–8.5(–12) cm, slender, 12–20-flowered, branched; branches short, 1–1.5 cm, terminal ones 3-flowered cymes; peduncle slender, ca. as long as 1/3 of inflorescence, peduncle and rachis very densely gray tomentose. Pedicels 3–5 mm, densely gray tomentose. Flowers yellowish, small, ca. 3 mm. Perianth densely sericeous-puberulent on both sides; perianth tube obconical, ca. 1 mm; perianth lobes 6, ovate or oblong, subequal, ca. 2 mm, inner ones broader. Fertile stamens 9, ca. 1.6 mm (of 1st and 2nd whorls) or ca. 2 mm (of 3rd whorl); filaments longer than anthers, as abaxial side of anther villous, those of 3rd whorl each with 2 stalked orbicular glands, others glandless; anthers of 1st and 2nd whorls oblong-orbicular but those of 3rd whorl oblong, all 4-celled; cells introrse (of 1st and 2nd whorl) or lateral-extrorse (of 3rd whorl). Staminodes 3, ca. 1.5 mm, triangular-lanceolate, long stalked, villous. Ovary ovoid, ca. 1.2 mm, glabrous; style slender, ca. 1.5 mm; stigma discoid. Fruit subglobose, up to 1.5 cm in diam., red-purple when mature; perianth cup in fruit elongate, up to 1.5 cm, dilated into a shallow cup and up to 8 mm wide at apex, truncate or somewhat dentate on margin. Fl. Feb–Apr, fr. Jun–Oct.

• Thickets, sparse or dense forests in valleys; 500–2100 m. S and W Yunnan.

4. *Cinnamomum rufotomentosum* K. M. Lan, Fl. Guizhou. 2: 674. 1986.

绒毛樟 rong mao zhang

Trees. Branchlets densely reddish brown tomentose when young but glabrate when mature. Buds densely reddish brown tomentose. Leaves alternate; petiole 2–2.9 cm, reddish brown tomentose when young but glabrate when mature; leaf blade elliptic or obovate-elliptic, 15–16.5 × 4–5 cm, leathery, densely reddish brown tomentose especially on veins abaxially, reddish brown tomentose along midrib when young but glabrate when mature adaxially, pinninerved, lateral veins 4–6 pairs, axils of lateral veins bullate adaxially, base cuneate to broadly cuneate, margin entire, apex acute to acuminate. Panicle terminal or axillary, 5.5–8.5 × 1.5–3.5 cm; peduncle 2.5–4.5 cm, peduncle and rachis reddish brown tomentose. Pedicels 2–2.5 mm, hairy. Flowers small, ca. 4 mm. Perianth densely hairy outside and inside; perianth tube obconical, ca. 1 mm. Fertile stamens 9; filaments villous at base, those of 3rd whorl each with 2 stalked broadly ovate glands, others glandless; anthers all 4-celled; cells introrse (of 1st and 2nd whorls) or lateral-extrorse (of 3rd whorl). Staminodes sagittate, ca. 1 mm, densely yellowish brown sericeous-villous. Ovary narrowly ovoid, ca. 1 mm, gla-

brous; style ca. 1 mm; stigma discoid. Fl. unknown, fr. May–Jun.

• Forest margins on roadsides. SW Guizhou (Xinyi).

5. *Cinnamomum platyphyllum* (Diels) C. K. Allen, J. Arnold Arbor. 20: 46. 1939.

阔叶樟 kuo ye zhang

Machilus platyphylla Diels, Bot. Jahrb. Syst. 29: 348. 1900; *Cinnamomum chengkouense* N. Chao.

Trees, ca. 5.5 m tall. Branchlets angled, densely grayish brown or yellowish brown tomentose when young, but glabrate when mature. Buds ovoid or ellipsoid, ca. 4 mm; bud scales broadly ovate, densely gray brown or yellowish brown tomentose, apex acute. Leaves alternate; petiole 1–2.5 cm, concave-convex, grayish brown or yellowish brown tomentose; leaf blade broadly ovate, 5.5–13 × 2.5–5.5(–7) cm, papery or subleathery, densely grayish brown or yellowish brown tomentose abaxially, shiny and sparsely pubescent or glabrate adaxially, pinninerved, midrib conspicuously elevated abaxially, plane on lower part but slightly elevated on upper part adaxially, lateral veins 4–7 pairs, conspicuously elevated abaxially, slightly elevated adaxially, axils of lateral veins inconspicuously dome-shaped abaxially, slightly bullate adaxially, transverse veins and veinlets slightly conspicuous adaxially but almost invisible abaxially, base cuneate to rounded or sometimes shallowly cordate, apex acuminate or shortly acuminate. Flowers unknown. Inflorescence paniculate, axillary, up to 9 cm; rachis densely grayish brown or yellowish brown tomentose. Fruit broadly obovoid or subglobose, ca. 1 cm in diam., gray-brown or yellowish brown villous; perianth cup in fruit shallowly discoid, entire, ca. 3.5 mm in diam.; stalk ca. 3 mm, gradually dilated, ca. 2 mm in diam.

• Mountain slopes; ca. 200 m. Chongqing (Chengkou, Nanchuan), NE Sichuan (Bazhong).

6. *Cinnamomum septentrionale* Handel-Mazzetti, Oesterr. Bot. Z. 85: 213. 1936.

银木 yin mu

Cinnamomum inunctum (Nees) Meisner var. *albosericeum* Gamble.

Medium- to large-sized trees, 16–25 m tall, 0.6–1.5 m d.b.h. Bark gray, smooth. Branchlets slightly robust, angled, white sericeous. Buds ovoid; bud scales white sericeous, apex emarginate and apiculate. Leaves alternate; petiole 2–3 cm, plano-convex, white sericeous initially but soon glabrate; leaf blade elliptic or elliptic-oblongate, 10–15 × 5–7 cm, subleathery, white sericeous on whole surface but especially on veins abaxially, pubescent adaxially, pinninerved, lateral veins ca. 4 pairs, arcuate-ascendant, evanescent within leaf margin, lateral veins and midrib elevated on both surfaces, axils of lateral veins shallowly dome-shaped abaxially, slightly bullate adaxially, veins ± conspicuous on both surfaces, veinlets reticulate, shallowly foveolate under lens, base cuneate, apex shortly acuminate. Panicle axillary, up to 15 cm, many flowered, branched; branches slender, up to 6 cm, branches and rachis sericeous. Perianth tube obconical, densely white sericeous out-

side, ca. 1 mm; perianth lobes 6, subequal, broadly ovate, ca. 1.5 × 1.2 mm, acute, sparsely white sericeous outside but densely so inside, glandular. Fertile stamens 9, ca. 1.2 mm (of 1st and 2nd whorls) or ca. 1.5 mm (of 3rd whorl); filaments almost as long as anthers, those of 3rd whorl each with 2 orbicular-reniform glands, others glandless; anthers broadly ovate (of 1st and 2nd whorls) or ovoid-oblong (of 3rd whorl), all 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, narrowly triangular-subulate, shortly stalked, villous. Ovary ovoid, ca. 0.5 mm; style elongate, ca. 1.1 cm; stigma discoid, inconspicuous. Fruit globose, less than 1 cm in diam., glabrous; perianth cup in fruit ca. 5 mm, dilated into a disk, up to 4 mm wide at apex. Fl. May–Jun, fr. Jul–Sep.

• Valleys, mountain slopes; 600–1000 m. S Gansu, S Shaanxi, Sichuan.

The root wood, called “silver wood,” is used for making sculpture; it contains a large amount of camphor. The timber of the trunk is yellow-brown, finely grained, and used for making cabinets and furniture.

7. *Cinnamomum mollifolium* H. W. Li, Acta Phytotax. Sin. 13(4): 45. 1975.

毛叶樟 mao ye zhang

Trees, 5–15 m tall. Bark gray-brown, finely and longitudinally striate. Branchlets slender, finely and longitudinally striate; old branchlets conspicuously compressed, very glabrous; young branchlets subterete, sparsely gray villous. Buds large, ovoid, up to 1 cm; bud scales clustered, broadly ovate to oblong, densely yellowish brown pubescent, margin ciliolate, apex emarginate and apiculate. Leaves alternate; petiole 1–2 cm, concave-convex, densely villous when young but very glabrous when mature; leaf blade ovate or oblong-ovate, sometimes obovate, (4.5–)7.5–12(–16) × 3.5–5(–8) cm, leathery, densely gray villous initially soon sparsely so abaxially, sparsely villous initially soon entirely glabrous adaxially, lateral veins 4–6 pairs, ascendant, evanescent within leaf margin, lateral veins and midrib elevated abaxially, impressed adaxially, transverse veins ± conspicuous abaxially, inconspicuous or slightly impressed adaxially, veinlets inconspicuous on both surfaces, base broadly cuneate to subrounded, sometimes unequal on sides, apex acute or shortly acuminate. Panicles axillary from base of young shoot upward, basal one always leafless, all slender, 7–11 cm, 12–16-flowered, branched on upper part; branches short, 0.6–1(–1.5) cm, terminal one bearing a 3-flowered cyme; peduncle slender, 4.5–6.5 cm, sparsely villous but soon glabrate. Pedicels slender, 2.5–5 mm, sparsely villous but soon glabrate. Flowers yellowish, small, ca. 2.5 mm. Perianth densely gray puberulent outside and inside; perianth tube obconical, ca. 1 mm; perianth lobes oblong or oblong-ovate, ca. 1.5 mm, subequal, obtuse or acute at apex, outer ones ca. 1.2 mm wide, inner ones ca. 1.3 mm wide. Fertile stamens 9, ca. 1.4 mm (of 1st and 2nd whorls) or ca. 1.6 mm (of 3rd whorl); filaments complanate, villous, those of 3rd whorl longer than anthers, each with 2 shortly stalked orbicular glands at base, others almost as long as anthers, glandless; anthers broadly ovate (of 1st and 2nd whorls) or oblong (of 3rd whorl), all 4-celled, villous abaxially;

cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, ca. 1 mm, villous, subulate-triangular at apex, stalked. Ovary subglobose, ca. 1 mm in diam.; style ca. 2.3 mm; stigma discoid, lobed. Fruit subglobose, slightly depressed and oblique, ca. 9 mm in diam. when dry; perianth cup in fruit up to 1 cm, sulcate outside, abruptly dilated into a disk, up to 9 mm in diam. at apex, truncate on margin. Fl. Mar–Apr, fr. Sep.

• Roadsides, sparse or mixed forests; 1100–1300 m. S Yunnan.

The leafy branchlets contain essential oil, which is used for medicine and light industry. The fruit kernel contains oil and fat, which have various uses.

8. *Cinnamomum bodinieri* H. Lévillé, Repert. Spec. Nov. Regni Veg. 10: 369. 1912.

猴樟 hou zhang

Cinnamomum bodinieri var. *hupehanum* (Gamble) G. F. Tao; *C. glanduliferum* (Wallich) Meisner var. *longipaniculatum* Lecomte; *C. hupehanum* Gamble; *C. inunctum* (Nees) Meisner var. *fulvipilosum* Yen C. Yang.

Trees, up to 16 m tall, 30–80 cm d.b.h. Bark gray-brown. Branchlets purple-brown, terete, glabrous, ± angled when young. Buds small; bud scales sparsely sericeous. Leaves alternate; petiole 2–3 cm, concave-convex, slightly puberulent; leaf blade ovate or elliptic-ovate, 8–17 × 3–10 cm, papery, glaucous and densely sericeous-puberulent abaxially, shiny and finely puberulent when young but glabrate when mature adaxially, midrib elevated abaxially, plane adaxially, lateral veins 4–6 pairs, basal ones subopposite, others alternate, all ascendant, slightly conspicuous on both surfaces, axils of lateral veins conspicuously dome-shaped abaxially, conspicuously bullate adaxially, transverse veins and veinlets reticulate, inconspicuous on both surfaces, base acute, or broadly cuneate to rounded, apex shortly acuminate. Panicles axillary or lateral, also sublateral on young branchlets, sometimes subtended by floral leaves at base, (5–)10–15 cm, several branched; branches dichotomous, angled; peduncle terete, 4–6 cm, peduncle and rachis glabrous. Pedicels filiform, 2–4 mm, sericeous-puberulent. Flowers green-white, ca. 2.5 mm. Perianth tube obconical, subglabrous outside; perianth lobes 6, ovate, ca. 1.2 mm, subglabrous outside, white sericeous inside, reflexed, soon deciduous. Fertile stamens 9, ca. 1 mm (of 1st and 2nd whorls) or a little longer (of 3rd whorl); filaments of 3rd whorl each with 2 large reniform glands near base, others glandless; anthers subglobose, all 4-celled. Staminodes 3, cordate, subsessile, ca. 0.5 mm. Ovary ovoid, ca. 1.2 mm, glabrous; style ca. 1 mm; stigma capitate. Fruit green, globose, 7–8 mm in diam., glabrous; perianth cup in fruit shallowly cupuliform, ca. 6 mm wide at apex. Fl. May–Jun, fr. Jul–Aug.

• Roadsides, streamsides, sparse forests, thickets; 700–1500 m. Guizhou, Hubei, W Hunan, E Sichuan, NE and SE Yunnan.

The leafy branchlets contain essential oil. The fruit kernel contains oil and fat.

9. *Cinnamomum migao* H. W. Li, Acta Phytotax. Sin. 16(2): 90. 1978.

米槁 mi gao

Evergreen trees, up to 20 m tall. Bark gray-black, fissured, scented. Old branchlets subterete, slender, red-brown when dry, longitudinally striate, glabrous; young branchlets brownish, somewhat compressed, angled, gray puberulent. Buds small, ovoid; bud scales broadly ovate, gray puberulent outside. Leaves alternate; petiole slender, 1.3–3 cm, concave-convex, finely gray puberulent near base; leaf blade gray-green and opaque abaxially, yellow-green and somewhat shiny adaxially, ± reddish along midrib and lateral veins on both surfaces, ovate to ovate-oblong, 4.5–16 × 2.5–7 cm, papery, finely gray puberulent or glabrate when mature abaxially, glabrous adaxially, pinninerved, midrib extending to leaf apex, elevated on both surfaces, lateral veins 4 or 5 pairs, arcuate, evanescent near leaf margin, ± conspicuous on both surfaces, axils of lateral veins inconspicuously dome-shaped abaxially and inconspicuously bullate adaxially, transverse veins and veinlets reticulate, ± visible under lens, base broadly cuneate, subequal on sides, margin slightly involute, apex acute to shortly acuminate. Flowers unknown. Inflorescence paniculate, axillary, inserted on middle part of young branchlet, 3.5–7.5 cm, pedunculate; peduncle 1–4 cm, peduncle and rachis finely gray puberulent. Fruit green when fresh, yellow-brown when dry, globose, 1.2–1.3 cm in diam.; perianth cup in fruit crateriform, ca. 1.2 cm, finely gray puberulent and longitudinally sulcate outside, dilated into a disk, up to 1 cm wide and crenate at apex, base abruptly contracted into a column ca. 1.5 mm wide. Fr. Nov.

- Forests; ca. 500 m. W Guangxi, SE Yunnan.

10. *Cinnamomum illicioides* A. Chevalier, Bull. Écon. Indochine, n.s., 21: 855. 1918 [*“illicioides”*].

八角樟 ba jiao zhang

Trees, 5–18 m tall, up to 90 cm d.b.h.; corona globose. Bark brown, longitudinally deeply fissured. Young branchlets greenish; old branchlets terete, black-gray. Leaves alternate; petiole 1.3–2 cm; leaf blade brownish and opaque abaxially, greenish and shiny adaxially, ovate or narrowly ovate-elliptic, 6–11 × (2.5–)3–6 cm, subleathery, pinninerved, lateral veins 3–5 pairs, ascendant but curved near leaf margin, lateral veins and midrib elevated on both surfaces, axils of lateral veins always conspicuously dome-shaped abaxially, transverse veins and veinlets reticulate, inconspicuously foveolate on both surfaces, base broadly cuneate to subrounded, apex acute or shortly acuminate. Flowers unknown. Inflorescence paniculate, axillary or subterminal, 6.5–7 cm; peduncle robust, ca. 2.5 cm, peduncle and rachis yellowish brown villous. Fruit purple-black, obovoid, ca. 2 cm; perianth cup in fruit green, campanulate, 1.2–1.8 cm long and broad. Fr. Jun–Jul.

Dense forests, valley forests; ca. 800 m. Guangxi, Hainan [N Thailand, N Vietnam].

11. *Cinnamomum saxatile* H. W. Li, Acta Phytotax. Sin. 13(4): 44. 1975.

岩樟 yan zhang

Trees, up to 15 m tall. Branchlets terete, slightly angled,

longitudinally finely striate, black-brown when dry, glabrous, few lenticellate, lenticels brownish, orbicular to oblong; young branchlets conspicuously compressed, angled, brownish puberulent. Buds ovoid to narrowly ovoid, 2–5 mm; bud scales very densely yellowish brown tomentose. Leaves alternate or sometimes those on upper part of branchlet subopposite; petiole 0.5–1.5 cm, sulcate adaxially, yellow-brown villous when young but glabrate when mature; leaf blade greenish opaque abaxially, green shiny adaxially, oblong or sometimes ovate-oblong, 5–13 × 2–5 cm, subleathery, sparsely puberulent when young but very glabrous when mature abaxially, glabrous adaxially, pinninerved, midrib extending to leaf apex, slightly elevated adaxially but strongly so abaxially, lateral veins 5–7 pairs, arcuate, anastomosing within leaf margin, ± conspicuous on both surfaces, axils of lateral veins inconspicuously dome-shaped abaxially, transverse veins and veinlets reticulate, foveolate on both surfaces, base truncate to subrounded, always asymmetrical on sides, apex shortly acuminate, acumen obtuse, sometimes acute or irregularly lanceolate. Panicle subterminal, 3–6 cm, 6–15-flowered, branched; branches ca. 1.5 cm, terminal one bearing a 3-flowered cyme; peduncle 1–3 cm, peduncle and rachis brownish puberulent. Pedicels 3–5 mm, densely brownish puberulent. Flowers green, up to 5 mm. Perianth sparsely brownish puberulent outside but densely so inside; perianth tube obconical, ca. 2 mm; perianth lobes 6, subequal, ovate, ca. 3 mm, acute. Fertile stamens 9, ca. 4 mm (1st and 2nd whorls) or ca. 4.5 mm (of 3rd whorl); filaments villous, those of 3rd whorl each with 2 sessile reniform glands slightly above middle; anthers of 1st and 2nd whorls ovate-oblong, ca. 2 mm, those of 3rd whorl oblong, ca. 1.6 cm, all 4-celled. Staminodes 3, ca. 2 mm, ovate-sagittate, shortly stalked; stalk villous. Ovary ovoid, ca. 1.5 × 9 mm. Fruit ca. 1.5 × 0.9 cm; perianth cup in fruit shallowly cupuliform, ca. 5 mm wide, apex ca. 6.5 mm wide, entire. Fl. Apr–May, fr. Oct.

- Thickets, forests, along water on limestone mountains; 600–1500 m. Guangxi, Guizhou, SE Yunnan.

12. *Cinnamomum longipetiolatum* H. W. Li, Acta Phytotax. Sin. 13(4): 47. 1975.

长柄樟 chang bing zhang

Trees, up to 35 m tall, to 60 cm d.b.h. Bark gray-black. Branchlets red-brown, subterete, ± angled, glabrous. Buds large, ovoid, up to 7 × 5 mm; bud scales clustered, ovate to broadly ovate, puberulent abaxially and on margin. Leaves alternate; petiole red-brown when dry, 2–4 cm, plano-convex, glabrous; leaf blade greenish abaxially, green adaxially, ovate, 7–12.5 × 2.8–7.8 cm, thinly leathery, pinninerved, lateral veins ca. 5 pairs, arcuate-ascendant, gradually evanescent within leaf margin, lateral veins and midrib yellow-brown on both surfaces when dry, very elevated abaxially and slightly elevated adaxially, axils of lateral veins inconspicuously dome-shaped abaxially, transverse veins and veinlets reticulate, shallowly and finely foveolate, slightly conspicuous on both surfaces, base subrounded, apex shortly acuminate. Flowers unknown. Inflorescence paniculate, lateral, up to 6 cm; rachis sparsely yellow-brown puberulent. Fruit ovoid, ca. 2 × 1.7 cm, apex rounded;

perianth cup in fruit shallowly cupuliform, ca. 1.5 cm long and broad, ± woody, reddish brown when dry. Fr. May–Oct.

- Sunny sites on mountain slopes; 1700–2100 m. S Yunnan.

13. *Cinnamomum micranthum* (Hayata) Hayata, Icon. Pl. Formosan. 3: 160. 1913.

沉水樟 chen shui zhang

Machilus micrantha Hayata, Icon. Pl. Formosan. 2: 130. 1912; *Cinnamomum kanehirae* Hayata; *C. micranthum* f. *kanehirae* (Hayata) S. S. Ying; *C. xanthophyllum* H. W. Li.

Trees, 14–20(–30) m tall, (25–)40–50(–65) cm d.b.h. Bark rigid, up to 4 mm thick, black-brown or reddish brownish gray outside, brown inside, irregularly and longitudinally fissured. Branchlets tea-brown, terete, longitudinally striate when dry, scattered with convex orbicular lenticels, young ones not lenticellate, ± compressed, glabrous. Terminal buds large, ovoid, ca. 6 × 5 mm; bud scales densely imbricate, broadly ovate, brown sericeous-pubescent, apex obtuse or apiculate. Leaves alternate, always inserted on upper part of young branchlets; petiole tea-brown, 2–3 cm, plano-convex, glabrous; leaf blade yellow-brown abaxially and yellow-green adaxially when dry, oblong-elliptic or ovate-elliptic, 7.5–9.5(–10) × 4–5(–6) cm, papery to subleathery, glabrous on both surfaces, pinninerved, lateral veins 4 or 5 pairs, arcuate-ascendant, anastomosing within leaf margin, lateral veins and midrib conspicuous on both surfaces, axils of lateral veins dome-shaped and puberulent abaxially, bullate adaxially, transverse veins and veinlets reticulate, foveolate on both surfaces, base broadly cuneate to subrounded, ± slightly asymmetric on sides, margin cartilaginous and involute, apex shortly acuminate. Panicles tea-brown when dry, terminal and axillary, short, 3–5 cm, subglabrous or slightly puberulent at base, branched almost from base; branches patent, ca. 2 cm, terminal one bearing a cyme. Pedicels ca. 2 mm, slightly dilated at base, glabrous. Flowers white or purple-red, scented, ca. 2.5 mm. Perianth glabrous outside, densely villous inside; perianth tube campanulate, ca. 1.2 mm; perianth lobes 6, narrowly ovate, ca. 1.3 mm, obtuse at apex. Fertile stamens 9, ca. 1 mm; filaments villous at base, a little longer than anthers, complanate, those of 3rd whorl each with 2 shortly stalked suborbicular-reniform glands near base, others glandless; anthers broadly oblong, 4-celled; cells lateral-introrse (of 1st and 2nd whorl) or lateral-extrorse (of 3rd whorl). Staminodes 3, including stalk ca. 0.8 mm, triangular-subulate; stalk ca. 0.4 mm. Ovary ovoid, ca. 0.6 mm, abruptly attenuate into a ca. 0.6 mm long style; stigma capitate. Fruit shiny, greenish when fresh, ellipsoid, 1.5–2.2 × 1.5–2 cm, maculate, glabrous; perianth cup in fruit urceolate, ca. 9 mm, column base ca. 2 mm long and broad, abruptly dilated into a trumpet toward apex, trumpet ca. 9–10 mm wide, margin entire or undulate. Fl. Jul–Aug(–Oct), fr. Oct.

Dense forests on mountain slopes or in valleys, roadsides, riverbanks; 300–700 m (to 1800 m in Taiwan). Fujian, Guangdong, Guangxi, Guizhou, Hainan, Jiangxi, Taiwan [N Vietnam].

This species is nearly always mixed with *Cinnamomum parthenoxylon* in forests, but it is easily distinguished by its bark and leaf color and short panicle.

14. *Cinnamomum brachythyrsum* J. Li, Acta Bot. Yunnan.

18: 53. 1996.

短序樟 duan xu zhang

Trees. Branchlets brown, terete, scattered with longitudinally fissured convex lenticels, glabrous; current year branchlets not lenticellate, longitudinally finely striate. Terminal buds long conical, ca. 5 × 2 mm, white sericeous-pubescent outside. Leaves alternate or subopposite; petiole 6–10 mm, concave-convex, glabrous; leaf blade glaucous and opaque abaxially, yellow-green and shiny adaxially, elliptic, 5–9 × 2–4 cm, leathery, white sericeous abaxially, glabrous adaxially, pinninerved, midrib elevated on both surfaces but conspicuously so abaxially, lateral veins 5–8 pairs, subconspicuous on both surfaces, axils of lateral veins not dome-shaped abaxially, transverse veins and veinlets inconspicuous on both surfaces, base broadly cuneate to subrounded, apex acute to shortly acuminate. Flowers unknown. Inflorescence paniculate, subterminal or axillary, 2–3 cm; peduncle short, ca. 2 mm, peduncle and rachis sparsely sericeous-villous. Fruit dark brown, globose, 1–1.5 cm in diam., glabrous; perianth cup in fruit dilated, crateriform, up to 1.3 cm in diam. at apex; fruit stalk 5–8 mm, sparsely sericeous-villous. Fr. May.

- Mountain slopes. SE Yunnan.

15. *Cinnamomum camphora* (Linnaeus) J. Presl in Berchtold & J. Presl, Pfl. Rostlin 2(2): 36. 1825.

樟 zhang

Laurus camphora Linnaeus, Sp. Pl. 1: 369. 1753; *Camphora officinarum* Nees; *C. officinarum* var. *glaucescens* A. Braun; *Cinnamomum camphora* var. *glaucescens* (A. Braun) Meisner; *C. camphora* var. *nominale* Hayata; *C. camphoroides* Hayata; *C. nominale* (Hayata) Hayata; *C. simondii* Lecomte; *C. taquetii* H. Léveillé; *Persea camphora* (Linnaeus) Sprengel.

Evergreen large trees, up to 30 m tall, to 3 m d.b.h.; corona broadly ovate; whole plant strongly camphor-scented. Bark yellow-brown, irregularly and longitudinally fissured. Branchlets brownish, terete, glabrous. Terminal buds broadly ovoid; bud scales broadly ovate or suborbicular, sparsely sericeous outside. Leaves alternate; petiole slender, 2–3 cm, concave-convex, glabrous; leaf blade yellow-green or gray-green and glaucous abaxially, green or yellow-green and shiny adaxially, ovate-elliptic, 6–12 × 2.5–5.5 cm, subleathery, glabrous on both surfaces or sparsely puberulent abaxially only when young, triplinerved or sometimes inconspicuously 5-nerved, midrib conspicuous on both surfaces, lateral veins 1–5(–7) pairs, basal veins with a few additional veins outside, axils of lateral veins and veins conspicuously dome-shaped and always villous abaxially, conspicuously bullate adaxially, base broadly cuneate or subrounded, margin cartilaginous, entire or sometimes undulate, apex acute. Panicle axillary, 3.5–7 cm; peduncle 2.5–4.5 cm, peduncle and rachis glabrous or gray- to yellow-brown puberulent especially on node. Pedicels 1–2 mm, glabrous. Flowers green-white or yellowish, ca. 3 mm. Perianth glabrous or puberulent outside, densely pubescent inside; perianth tube obconical, ca. 1 mm; perianth lobes elliptic, ca. 2 mm. Fertile stamens 9, ca. 2 mm; filaments pubescent. Ovary ovoid, ca. 1 mm, glabrous; style ca. 1 mm. Fruit purple-black, ovoid or subglo-

bose, 6–8 mm in diam.; perianth cup in fruit cupuliform, ca. 5 mm, longitudinally sulcate, base ca. 1 mm wide, apex truncate and up to 4 mm wide. Fl. Apr–May, fr. Aug–Nov.

Cultivated in valleys and on mountain slopes. S of Chang Jiang river on mainland, Taiwan [Japan, Korea, Vietnam; introduced or cultivated in many countries around the world].

This species is the main source of camphor, which is derived from chipped wood of the stems and roots and also from branchlets and leaves by steam distillation. It contains a fixed volatile oil. The plant is used medicinally as a stimulant, antispasmodic, antiseptic, and rubefacient. It also is used in the manufacture of celluloid. The wood is beautifully grained, light brownish, easily polished, and used for furniture, cabinets, and interior finish in buildings.

16. *Cinnamomum longepaniculatum* (Gamble) N. Chao ex H. W. Li, Acta Phytotax. Sin. 13(4): 48. 1975.

油樟 you zhang

Cinnamomum inunctum (Nees) Meisner var. *longepaniculatum* Gamble in Sargent, Pl. Wilson. 2: 69. 1914.

Trees, up to 20 m tall, to 50 cm d.b.h. Bark gray, smooth. Branchlets terete, glabrous; young branchlets slender, ± compressed, glabrous. Buds larger, ovoid, up to 8 mm; bud scales dense, ovate, apiculate, densely gray puberulent. Leaves alternate; petiole greenish red, 2–3.5 cm, plano-convex, glabrous; leaf blade gray-green and opaque abaxially, dark green and shiny adaxially, ovate or elliptic, 6–12 × 3.5–6.5 cm, thinly leathery, glabrous on both surfaces, pinninerved, lateral veins 4 or 5 pairs, basal ones sometimes opposite and becoming triplinerved, lateral veins and midrib elevated on both surfaces, evanescent within margin, axils of lateral veins dome-shaped abaxially, bullate adaxially, transverse veins ± conspicuous on both surfaces, veinlets reticulate and foveolate under lens, base cuneate to subrounded, margin cartilaginous and involute, apex abruptly shortly acuminate to acuminate and sometimes triplinerved, falcate. Panicle axillary, slender, 9–20 cm, branched; branches slender, divaricate, up to 5 cm, dichotomous at top, each branchlet bearing a 3–7-flowered cyme; peduncle slender, 3–10 cm, peduncle and rachis glabrous. Pedicels slender, 2–3 mm, glabrous. Flowers yellowish, scented, ca. 2.5 mm, up to 4 mm in diam. when open. Perianth tube obconical, ca. 1 mm; perianth lobes 6, ovate, ca. 1.5 mm, subequal, acute, glabrous outside, densely white sericeous-villous inside, glandular. Fertile stamens 9, ca. 1.5 mm (of 1st and 2nd whorls) or ca. 1.8 mm (of 3rd whorl); filaments white villous, those of 3rd whorl each with 2 shortly stalked orbicular-reniform glands at base, others glandless; anthers ovate-oblong (of 1st and 2nd whorls) or oblong and slightly shorter than filament (of 3rd whorl), all 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, ca. 1 mm, white villous. Ovary ovoid, ca. 1 mm, glabrous; style slender, ca. 1.5 mm; stigma inconspicuous. Young fruit green, globose, ca. 8 mm in diam.; perianth cup in fruit ca. 5 mm, apex discoid-dilated, up to 4 mm wide. Fl. May–Jun, fr. Jul–Sep.

- Evergreen broad-leaved forests; 600–2000 m. Sichuan.

The branchlets and leaves contain essential oil; the main chemical constituents of the oil are cineole, linalol, and camphor. The fruit kernel

contains oil and fat.

17. *Cinnamomum parthenoxylon* (Jack) Meisner in A. Candolle, Prodr. 15(1): 26. 1864.

黄樟 huang zhang

Laurus parthenoxylon Jack, Malayan Misc. 1: 28. 1820; *Camphora parthenoxylon* (Jack) Nees; *C. porrecta* (Roxburgh) Voigt; *Cinnamomum barbatoaxillatum* N. Chao; *C. porrectum* (Roxburgh) Kostermans; *C. purpureum* H. G. Ye & F. G. Wang; *L. porrecta* Roxburgh; *Parthenoxylon porrectum* (Roxburgh) Blume; *Phoebe latifolia* Champion ex Benthams; *Sassafras parthenoxylon* (Jack) Nees.

Evergreen trees; trunk straight, 10–20 m tall, up to 40 cm d.b.h. Bark dark green-brown, gray-yellow on upper part, longitudinally deeply fissured, peeling off in lamellae, 3–5 mm thick, reddish inside, camphor-scented. Branchlets green-brown, robust, terete; young branchlets gray-green, angled, glabrous. Buds ovoid; bud scales suborbicular, sericeous. Leaves alternate; petiole 1.5–3 cm, concave-convex, glabrous; leaf blade greenish or glaucous green abaxially, dark green and shiny adaxially, usually elliptic-ovate or narrowly elliptic-ovate, 6–12 × 3–6 cm, those on fertile branchlets smaller, leathery, glabrous on both surfaces, pinninerved, lateral veins 4 or 5 pairs, lateral veins and midrib conspicuous on both surfaces, axils of lateral veins inconspicuously dome-shaped abaxially and inconspicuously bullate adaxially, transverse veins and veinlets reticulate, base cuneate or broadly cuneate, margin entire, apex usually acute or shortly acuminate. Panicle axillary on upper part of branchlet or subterminal, 4.5–8 cm; peduncle 3–5.5 cm, peduncle and rachis glabrous. Pedicels slender, up to 4 mm, glabrous. Flowers green-yellow, small, ca. 3 mm. Perianth glabrous outside, pubescent inside; perianth tube obconical, ca. 1 mm; perianth lobes narrowly elliptic, ca. 2 × 1.2 mm, punctate, obtuse. Fertile stamens 9, ca. 1.5 mm (of 1st and 2nd whorls) or ca. 1.7 mm (of 3rd whorl); filaments pubescent, those of 3rd whorl each with 2 shortly stalked subcordate glands, others glandless; anthers ovate or oblong, ca. 0.7 mm, all 4-celled. Staminodes 3, triangular-cordate, including stalk less than 1 mm; stalk pubescent. Ovary ovoid, ca. 1 mm, glabrous; style curved, ca. 1 mm; stigma discoid, inconspicuously 3-lobed. Fruit black, globose, 6–8 mm in diam.; perianth cup in fruit red, narrowly obconical, ca. 1 cm or less, longitudinally striate, base ca. 1 mm wide. Fl. Mar–May, fr. Apr–Oct.

Evergreen broad-leaved forests, thickets; below 1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Thailand, Vietnam].

The roots, bark, wood, and leafy branchlets contain volatile oil and camphor. The fruit kernel contains oil and fat (up to 60%), which are used in soap manufacture. The wood is finely grained and used for furniture and cabinets. The leaves are used as feed for the silkworm native to Hainan.

18. *Cinnamomum glanduliferum* (Wallich) Meisner in A. Candolle, Prodr. 15(1): 25. 1864.

云南樟 yun nan zhang

Laurus glandulifera Wallich, Trans. Med. Soc. Calcutta 1:

45. 1825; *Camphora glandulifera* (Wallich) Nees; *Cinnamomum cavaleriei* H. Léveillé; *Machilus dominii* H. Léveillé; *M. mekongensis* Diels.

Evergreen trees, 5–15(–20) m tall, up to 30 cm d.b.h. Bark gray-brown, longitudinally deeply fissured, peeling off in lamellae, red-brown inside, camphor-scented. Branchlets green-brown, robust, terete; young branchlets angled. Buds ovoid, large; bud scales suborbicular, densely sericeous. Leaves alternate; petiole 1.5–3(–3.5) cm, robust, concave-convex, subglabrous; leaf blade usually glaucous and greenish abaxially, dark green and shiny adaxially, very variable in shape, elliptic to ovate-elliptic or lanceolate, 6–15 × 4–6.5 cm, those on fertile branchlets smaller, leathery, puberulent abaxially only when young, glabrous on both surfaces or glabrous adaxially and ± puberulent abaxially when mature, pinninerved or occasionally subtriplinerved, lateral veins 4 or 5 pairs, lateral veins and midrib conspicuous on both surfaces, oblique, gradually evanescent within leaf margin, axils of lateral veins dome-shaped and hairy or glabrate abaxially, conspicuously bullate adaxially, transverse veins and veinlets reticulate, fine and inconspicuous, base cuneate or broadly cuneate to subrounded, sometimes unequal on sides, apex generally acute to shortly acuminate. Panicle axillary, shorter than leaf blade, 4–10 cm; peduncle 2–4 cm, peduncle and rachis glabrous. Pedicels short, 1–2 mm, glabrous. Flowers small, up to 3 mm, yellowish. Perianth sparsely white puberulent outside, pubescent inside; perianth tube obconical, ca. 1 mm; perianth lobes 6, broadly ovate, subequal, ca. 2 × 1.7 mm, acute. Fertile stamens 9, ca. 1.4 mm (of 1st and 2nd whorls) or ca. 1.6 mm (of 3rd whorl); filaments complanate, pubescent, those of 3rd whorl each with 2 shortly stalked cordate glands near base, others glandless; anthers ovate, almost as long as filaments (of 1st and 2nd whorls) or oblong and ca. 1 mm (of 3rd whorl), all 4-celled; cells introrse (of 1st and 2nd whorl) or extrorse (of 3rd whorl). Staminodes 3, narrowly triangular, including stalk less than 1 mm; stalk pubescent. Ovary ovoid, ca. 1.2 mm, glabrous; style slender, ca. 1.2 mm; stigma discoid, inconspicuously 3-lobed. Fruit black, globose, up to 1 cm in diam.; perianth cup in fruit red, narrowly obconical, ca. 1 cm, longitudinally striate, base ca. 1 mm wide, apex up to 6 mm wide and undulate on margin. Fl. Mar–May, fr. Jul–Sep.

Evergreen broad-leaved forests on hilly land; 1500–2500(–3000) m. S Guizhou, S and SW Sichuan, SE Xizang, C and N Yunnan [Bhutan, India, Malaysia, Myanmar, Nepal].

The leafy branchlets contain volatile oil and camphor. The wood is used for furniture. The fruit kernel fat is used for industrial purposes. The bark and roots are used medicinally.

19. *Cinnamomum chartophyllum* H. W. Li, Acta Phytotax. Sin. 13(4): 49. 1975.

坚叶樟 jian ye zhang

Trees, up to 20 m tall. Bark gray-brown, scented. Branchlets green, terete; young branchlets sometimes red-brown, ± angled, longitudinally striate, very glabrous. Leaves alternate; petiole 1–2 cm, sulcate adaxially, glabrous; leaf blade green, greenish and opaque abaxially and ± reddish brown and shiny adaxially when dry, variable in shape, broadly ovate, ovate-oblong to oblong, or lanceolate, 6–14 × 1.5–7.5 cm, papery, very glabrous on both surfaces, pinninerved, midrib extending to

leaf apex, midrib and lateral veins elevated on both surfaces, lateral veins ca. 5 pairs, arcuate, anastomosing within leaf margin, axils of lateral veins glabrous and conspicuously dome-shaped with 1 or 2 domes abaxially, bullate adaxially, transverse veins and veinlets reticulate, conspicuous on both surfaces, base broadly cuneate to subrounded, always unequal on sides, margin entire, apex obtuse or acute to shortly acuminate. Panicle axillary, usually 4–6 cm, 7–11-flowered, branched; branches short, each bearing a 3-flowered cyme; peduncle 2–4 cm, peduncle and rachis glabrous. Pedicels 2–3.5 mm, very glabrous. Flowers yellow, small, ca. 2 mm. Perianth very glabrous outside, densely sericeous-villous inside; perianth tube obconical, ca. 0.5 mm; perianth lobes 6, broadly ovate, subequal, ca. 1.5 × 1.1 mm, obtuse. Fertile stamens 9, ca. 1 mm (of 1st and 2nd whorls) or ca. 1.2 mm (of 3rd whorl); filaments complanate, villous, those of 3rd whorl each with 2 sessile glands near base, others glandless; anthers broadly ovate and almost as long as filaments (of 1st and 2nd whorls) or oblong and slightly shorter than filaments (of 3rd whorl), all obtuse, 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, short, spatulate, ca. 0.6 mm, stalked. Ovary ovoid, ca. 0.8 mm, glabrous; style short, ca. 0.7 mm; stigma inconspicuous. Fruit subglobose, ca. 8 mm in diam., apiculate; perianth cup in fruit dilated, up to 12 mm, longitudinally sulcate when dry, apex ca. 7 mm wide. Fl. Jun–Aug, fr. Aug–Dec.

• Sparse forests beside ditches on mountain slopes, dense valley forests; 300–600 m. S and SE Yunnan.

20. *Cinnamomum reticulatum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 239. 1911.

网脉桂 wang mai gui

Small trees. Branchlets reddish, divaricate, scabrid, glabrous. Terminal bud ovoid; bud scales scarious, glabrous. Leaves subopposite; petiole 1–1.5 cm; leaf blade glaucous and opaque abaxially, dark green and shiny adaxially, obovate, 4–6 × 2–3 cm, subleathery, trinerved or triplinerved, midrib extending to leaf apex, with 2 or 3 additional veins on each side, transverse veins and veinlets conspicuously reticulate and elevated on both surfaces, base attenuate, margin involute, apex obtuse or rounded. Inflorescence axillary, corymbose, (1.5–)2–5 cm, (1–)3–5-flowered, glabrous. Perianth lobes 6, ovate, subequal, ca. 3.5 mm, 5-nerved, few white punctate outside, appressed pubescent inside, obtuse at apex. Fertile stamens 9, subequal, ca. 3 mm; filaments of 1st and 2nd whorls eglandular and spatulate, but those of 3rd whorl each with 2 sessile ovoid ca. 1 mm glands near middle. Staminodes 3, sagittate, ca. 2.5 mm, stalked. Ovary robust; style ca. 3 mm; stigma discoid-dilated, emarginate at apex. Fruit ovoid, ca. 1 × 0.7 cm; perianth cup in fruit dilated, truncate at apex. Fr. Nov.

• Low elevations. Taiwan.

21. *Cinnamomum pauciflorum* Nees in Wallich, Pl. Asiat. Rar. 2: 75. 1831.

少花桂 shao hua gui

Cinnamomum calcareum Y. K. Li; *C. petrophilum* N. Chao; *C. recurvatum* (Roxburgh) Wight; *Laurus recurvata*

Roxburgh.

Trees, 3–14 m tall, up to 30 cm d.b.h. Bark yellow-brown, white lenticellate, scented. Branchlets subterete, longitudinally striate, glabrous; young branchlets ± tetragonous, subglabrous or sparsely fine pubescent. Bud ovoid, small, ca. 2 mm; bud scales rigid, sparsely puberulent outside. Leaves alternate; petiole up to 12 mm, concave-convex, subglabrous; leaf blade glaucous green and opaque abaxially, green and ± shiny adaxially, ovate or ovate-lanceolate, (3.5–)6.5–10.5 × (1.2–)2.5–5 cm, thickly leathery, densely or sparsely gray sericeous when young but glabrate or glabrous when mature abaxially, glabrous adaxially, trinerved or triplinerved, midrib and basal lateral veins elevated on both surfaces, basal lateral veins opposite, arising at or up to 10 mm above leaf base, arcuate-ascendant, evanescent near leaf margin, with few oblique veins outside, these veins interconnected within leaf margin, transverse veins ± conspicuous, veinlets ± reticulate under lens, base broadly cuneate to subrounded, margin involute, apex shortly acuminate. Panicle axillary, always corymbose, 2.5–5(–6.5) cm, usually much shorter than leaf blade, 3–5(–7)-flowered; peduncle 1.5–4 cm, elongate, bilaterally compressed, peduncle and rachis sparsely gray puberulent. Pedicels 5–7 mm, gray puberulent. Flowers yellow-white, 4–5 mm. Perianth shortly gray sericeous outside and inside; perianth tube obconical, ca. 1 mm; perianth lobes 6, oblong, subequal, 3–4 mm, acute. Fertile stamens 9, ca. 2.5 mm (of 1st and 2nd whorls) or ca. 2.8 mm (of 3rd whorl); filaments sparsely villous, complanate, those of 3rd whorl each with 2 shortly stalked orbicular-reniform glands; anthers ovate-oblong and almost as long as filament (of 1st and 2nd whorls) or oblong and ca. 1/2 as long as filament (of 3rd whorl), all 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, ca. 1.7 mm, long stalked, cordate at apex. Ovary ovoid, ca. 1 mm; style curved, ca. 2 mm; stigma discoid. Fruit ellipsoid, ca. 11 × 5–5.5 mm, purple-black when mature, corky-maculate, obtuse at apex; perianth cup in fruit shallowly cupuliform, ca. 3 × 4 mm, regularly truncate toothed on margin; fruit stalk up to 9 mm, slightly dilated at apex. Fl. Mar–Aug, fr. Sep–Oct.

Sparse or dense forests on hilly land of calcareous or sandy rocks, valley forests; 400–1800(–2200) m. Guangdong, Guangxi, Guizhou, Hubei, W Hunan, Jiangxi, E Sichuan, NE Yunnan [India, Nepal].

The bark and roots are used as medicine for abdominal pain. The leafy branchlets contain volatile oil (ca. 35%), the main chemical constituent of which is saffrole (80%–95%).

22. *Cinnamomum jensenianum* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 58: 63. 1921.

野黄桂 ye huang gui

Cinnamomum pauciflorum Chun ex Hung T. Chang (1959), not Nees (1831).

Small trees, less than 6 m tall. Bark gray-brown, cassia-scented. Branchlets flexuous; 2-year-old branchlets brown and densely denticulate; 1-year-old branchlets angled; current year branchlets black when dry, very glabrous. Bud fusiform; bud scales crustaceous, ca. 6 mm, acute, shortly sericeous outside. Leaves always subopposite; leaf blade opaque and waxy but not

glaucous when fresh abaxially, green and shiny adaxially, lanceolate or oblong-lanceolate, 5–10(–20) × 1.5–3(–6) cm, thickly leathery, pulverulent-puberulent when young but glabrous when mature abaxially, glabrous adaxially, triplinerved, midrib and basal lateral veins elevated on both surfaces, basal lateral veins arising 2–18 mm above leaf base, excurrent into upper 1/3 along leaf margin and almost reaching leaf apex, very rarely with basal additional veins near leaf margin, transverse veins numerous, arcuate, delicate adaxially and barely elevated abaxially or inconspicuous on both surfaces, base broadly cuneate to subrounded, margin thick and entire, apex caudate-acuminate. Inflorescence corymbose, 2–5-flowered, usually 3–4 cm, always remote, or even 1- or 2-flowered on base of current year branchlet, branchlet not elongate; peduncle usually 1.5–2.5 cm, slender, black when dry, glabrous; bracts and bracteoles ca. 2 mm, caducous. Pedicels 5–10(–20) mm, straight, gradually dilated toward apex, black when dry. Flowers yellow or white, ca. 4(–8) mm. Perianth very glabrous outside, sericeous inside, papillate-ciliolate on margin; perianth tube very short, 1.5(–2) mm; perianth lobes 6, obovate, subequal, 2–5(–6) × 1.7(–2.2) mm, acute. Fertile stamens 9; filaments of 1st and 2nd whorls broad and complanate, pilose at base, glandless, but those of 3rd whorl slender, pilose, each with 2 discoid glands near middle; anthers of 1st and 2nd whorls ovate-oblong, glabrous, but those of 3rd whorl oblong, ca. 1/2 as long as those of 1st and 2nd whorls, sparsely villous. Staminodes 3, triangular, ca. 1.7 mm, stalked; stalk villous. Ovary ovoid; style twice as long as ovary, glabrous; stigma discoid, irregularly lobed. Fruit ovoid, up to 1(–1.2) × 6(–7) mm, apiculate, glabrous; perianth cup in fruit obovoid, ca. 6 × 8 mm, dentate, teeth truncate at apex. Fl. Apr–Jun, fr. Jul–Aug.

• Evergreen broad-leaved forests or bamboo forests on mountain slopes; 500–1600 m. Fujian, Guangdong, Hubei, W Hunan, Jiangxi, Sichuan.

The bark is sweet and bitter and is used as a medicine similar to cassia bark.

23. *Cinnamomum japonicum* Siebold, Verh. Batav. Genootsch. Kunsten 12: 23. 1830.

天竺桂 tian zhu gui

Cinnamomum acuminatifolium Hayata; *C. chekiangense* Nakai; *C. chenii* Nakai; *C. insularimontanum* Hayata; *C. japonicum* var. *chekiangense* (Nakai) M. B. Deng & G. Yao; *C. macrostemon* Hayata var. *pseudolourei* (Hayata) Yamamoto; *C. pedunculatum* Nees; *C. pseudolourei* Hayata.

Evergreen trees, 10–15 m tall, 30–35 cm d.b.h. Branchlets red or red-brown, slender, terete, very glabrous, scented. Leaves subopposite or those on upper part of branchlet alternate; petiole red-brown, robust, concave-convex, glabrous; leaf blade gray-green and opaque abaxially, green and shiny adaxially, ovate-oblong or oblong-lanceolate, 7–10 × 3–3.5 cm, leathery, glabrous on both surfaces, triplinerved, midrib extending to leaf apex, with a few additional veins on upper part of leaf blade, basal lateral veins oblique, arising 1–1.5 cm above leaf base, with a few additional veins outside, sometimes a pair of slightly conspicuous additional veins arising from leaf base, midrib and lateral veins elevated on both surfaces, transverse veins and

veinlets finely foveolate abaxially and conspicuously densely reticulate adaxially, base broadly cuneate or obtuse, margin entire, apex acute to acuminate. Panicle axillary, 3–4.5(–10) cm, branched, apex of branch bearing a 3–5-flowered cyme; peduncle 1.5–3 cm, glabrous. Pedicels 5–7 mm, glabrous. Flowers ca. 4.5 mm. Perianth tube obconical, short, ca. 1.5 mm; perianth lobes 6, ovate, ca. 3 × 2 mm, acute, glabrous outside, villous inside. Fertile stamens 9, included; filaments ca. 2 mm, those of 3rd whorl each with 2 orbicular-reniform glands near middle, others glandless; anthers ovate-elliptic, obtuse, 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3. Ovary ovoid, ca. 1 mm, slightly puberulent; style a little longer than ovary; stigma discoid. Fruit oblong, ca. 7 × 5 mm, glabrous; perianth cup in fruit shallowly cupuliform, apex very open and up to 5 mm wide, entire or shallowly dentate on margin, base abruptly contracted into a slender stalk. Fl. Apr–May, fr. Jul–Sep.

Evergreen broad-leaved forests on low hills, near seashores; 300–1000 m. Anhui, Fujian, Jiangsu, Jiangxi, Taiwan, Zhejiang [Japan, Korea].

Cinnamomum macrostemon Hayata (Icon. Pl. Formosan. 3: 160. 1913) was described from Taiwan. Although Li (Woody Fl. Taiwan, 204. 1963) regarded it as a synonym of *C. japonicum*, the present authors prefer to leave it unplaced because they have seen no material.

The leafy branchlets and bark contain volatile oil, which is a source of perfume. The fruit kernel contains oil and fat, which are used in soap manufacture. The wood is hard and durable and is used for house construction and furniture.

24. *Cinnamomum osmophloeum* Kanehira, Formos. Trees, 428. 1917.

土肉桂 tu rou gui

Medium-sized trees. Bark scented. Branchlets slender, glabrous. Leaves alternate or subopposite; petiole ca. 1 cm, complanate, glabrous; leaf blade ovate, ovate-oblong, or ovate-lanceolate, 8–12 × (2.5–)3.5–5(–5.5) cm, thinly leathery, glaucous and pubescent initially but soon glabrate abaxially, glabrous adaxially, subtriplinerved, basal lateral veins extending to ca. 2/3 of leaf blade, other lateral veins ca. 3 pairs, slightly conspicuous abaxially, inconspicuous adaxially, base obtuse to subrounded, apex shortly acuminate. Panicle cymose, few flowered, lax, axillary. Pedicels slender, 8–12 mm, slightly hirsute. Perianth tube campanulate, ca. 1 mm; perianth lobes oblong, ca. 4 mm, obtuse, pubescent outside, villous inside. Fertile stamens 9; filaments of 1st and 2nd whorls ca. 1.5 mm, subglabrous, those of 3rd whorl each with 2 glands at middle, villous at base; anthers 4-celled. Staminodes 3, sagittate, pilose adaxially, stalked; stalks subglabrous. Ovary ovoid, ca. 1 mm, glabrous; style ca. 1.8 mm, glabrous; stigma discoid. Fruit ovoid, ca. 10 × 5 mm, with persistent lobe parts at apex. Fl. Apr–May, fr. Jul–Sep.

• Evergreen broad-leaved forests; 400–1500 m. Taiwan (Gao-xiong, Nantou, Taibei, Taizhong).

25. *Cinnamomum rigidissimum* Hung T. Chang, Acta Sci. Nat. Univ. Sunyatseni 1959(1): 19. 1959.

卵叶桂 luan ye gui

Cinnamomum brevipedunculatum C. E. Chang; *C. ovatum* C. K. Allen (1939), not Lukmanoff (1889).

Small- to medium-sized trees, 3–22 m tall, ca. 50 cm d.b.h. Bark brown. Branchlets gray-brown or blackish brown, terete, glabrous, resin-scented, slightly compressed, angled especially when young, gray-brown tomentose when young. Leaves opposite; petiole (0.8–)1–2 cm, complanate, slightly sulcate adaxially, glabrous; leaf blade greenish and opaque abaxially, green and shiny adaxially, ovate, broadly ovate, or elliptic, (3.5–)4–7(–8) × (2.2–)2.5–4(–6) cm, leathery or thickly leathery, glabrous on both surfaces or sparsely puberulent initially but soon glabrate abaxially, triplinerved, midrib and basal lateral veins elevated on both surfaces, basal lateral veins arising at or up to 5(–7) mm above leaf base, arcuate, evanescent below leaf apex, with a few inconspicuous additional veins outside, sometimes also with additional delicate short veins from leaf base, transverse veins ± visible on both surfaces, veinlets reticulate and inconspicuous on both surfaces, base broadly cuneate or obtuse to subrounded, apex obtuse or acute. Inflorescence axillary on current year branchlets, subumbellate, 3–6(–8.5) cm, 3–7(–11)-flowered; peduncle 2–4 cm, sparsely appressed pubescent. Flowers unknown. Mature fruit ovoid, ca. 2 × 1.4 cm, cream-yellow; stalk ca. 5 mm, subterete; perianth cup in fruit greenish to green-blue, shallowly cupuliform, ca. 1 cm, apex truncate, ca. 1.5 cm wide.

• Forests by streams; below 1700 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan.

26. *Cinnamomum validinerve* Hance, J. Bot. 20: 80. 1882.

粗脉桂 cu mai gui

Trees. Branchlets angled, blackish when dry, glabrous or finely pubescent toward apex. Petiole up to 1.3 cm; leaf blade reddish and glaucous abaxially, shiny adaxially, elliptic, 4–9.5 × 2–3.5 cm, thickly leathery, triplinerved, midrib and lateral veins very elevated abaxially, slightly impressed adaxially, lateral veins evanescent toward leaf apex, transverse veins entirely inconspicuous abaxially, almost inconspicuous adaxially, base cuneate, apex abruptly shortly acuminate, acumen short and obtuse. Panicle laxly flowered, trichotomous, as long as leaf, branched; branches divaricate, apex of branch bearing a 3-flowered cyme. Pedicel very short. Perianth finely gray sericeous; perianth lobes ovate, slightly obtuse. Fruit unknown. Fl. Jul.

• Forests. Guangdong, Guangxi.

27. *Cinnamomum liangii* C. K. Allen, J. Arnold Arbor. 20: 58. 1939.

软皮桂 ruan pi gui

Trees, 4–20 m tall. Branches terete, striate, scented; branchlets glabrous, angled. Leaves opposite or subopposite; petiole dark brown, 0.5–0.7(–1) cm, concave-convex, glabrous; leaf blade opaque and greenish white abaxially, shiny and brownish green when dry adaxially, elliptic-lanceolate, 5.5–11 × 1.6–4(–5) cm, papery, glabrous on both surfaces, triplinerved, midrib and basal lateral veins elevated on both surfaces, basal

lateral veins arising at or up to 5 mm above leaf base, arcuate, evanescent under leaf apex, transverse veins undulate and parallel, \pm conspicuous on both surfaces, veinlets irregularly reticulate, \pm conspicuous abaxially, base acute or subrounded, apex acuminate. Panicle axillary on upper part of branchlet, subracemose, 3–5.5 cm; peduncle short, 2–3(–10) mm, peduncle and rachis sparsely puberulent; bracts ovate, ca. 2 mm, obtuse or acute, densely puberulent outside but sparsely so inside, bracteoles lanceolate-subulate, ca. 1 mm, acute, curved, with same indumentum as bracts. Pedicels 3–5(–7) mm, slender, sparsely pubescent. Flowers yellowish, ca. 5.5 mm, scented. Perianth sparsely gray puberulent outside and inside; perianth tube obconical, ca. 1.5 mm; perianth lobes oblong, subequal, ca. 4×2 mm, acute. Fertile stamens 9, ca. 3.5 mm (of 1st and 2nd whorls) or ca. 3.8 mm (of 3rd whorl); filaments villous, those of 3rd whorl each with 2 shortly stalked cordate-reniform glands at middle; anthers of 1st and 2nd whorls oblong, a little shorter than filaments, but those of 3rd whorl ca. $1/2$ as long as filaments, all 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, triangular-cordate, ca. 0.8 mm, stalked; stalk ca. 1.2 mm, villous. Ovary ovoid, ca. 1.5 mm, glabrous; style slightly dilated, flexuous, ca. 1.5 mm; stigma discoid, irregularly lobed. Fruit ellipsoid, up to 1.3×0.7 – 0.8 cm, apiculate, glabrous; perianth cup in fruit ca. 3 mm, irregularly dentate. Fl. Feb–Mar, fr. May.

Valley thickets, evergreen broad-leaved forests. Guangdong, Guangxi, Hainan [N Vietnam].

28. *Cinnamomum tonkinense* (Lecomte) A. Chevalier, Bull. Écon. Indochine, n.s., 21: 856. 1918.

假桂皮树 jia gui pi shu

Cinnamomum albiflorum Nees var. *tonkinense* Lecomte, Fl. Indo-Chine 5: 115. 1914.

Trees, up to 30 m tall, to 45 cm d.b.h. Bark gray-brown. Two-year-old branchlets dark brown, terete, glabrous; 1-year-old branchlets pubescent initially soon glabrate. Leaves alternate or those on upper part of branchlet subopposite; petiole 0.5–1.5 cm, somewhat sulcate adaxially, glabrous; leaf blade whitish green and opaque abaxially, shiny and green but brownish when dry adaxially, ovate-oblong or ovate-lanceolate to oblong, (6–)8–12(–17) \times (2.5–)3–5(–5.5) cm, leathery, sparsely finely pubescent abaxially, glabrous adaxially, triplinerved, midrib and basal lateral veins elevated abaxially, inconspicuous adaxially, extending to leaf apex, basal lateral veins arising 5–10(–15) mm above leaf base, each with 6 or 7 additional veins outside, sometimes also each with 1 additional vein at base near leaf margin, transverse veins undulate, \pm conspicuous abaxially and inconspicuous adaxially, base broadly cuneate to subrotund, margin entire, apex shortly acuminate or obtuse. Panicle axillary or subterminal, always axillary in leaf axils remote from apex of branchlet, short, 2.5–6 cm, densely many flowered, branched, apex of branch bearing a 3-flowered cyme; peduncle 0.5–2 cm, peduncle and rachis gray sericeous-pubescent. Pedicels 5–7 mm, gray sericeous-pubescent. Flowers white, up to 5 mm. Perianth sparsely pubescent outside but densely so inside; perianth tube obconical, ca. 2 mm; perianth

lobes ovate, acute, ca. 6 mm, outer ones broader, ca. 3.5 mm wide, inner ones ca. 3 mm wide. Fertile stamens 9, ca. 3 mm (of 1st and 2nd whorls) or ca. 4 mm (of 3rd whorl); filaments pubescent, those of 3rd whorl each with 2 sessile reniform glands slightly above middle, others glandless; anthers pubescent abaxially, slightly longer than filaments, ovate (of 1st and 2nd whorls) or oblong (of 3rd whorl), all 4-celled; cells introrse (of 1st and 2nd whorls) or lateral-extrorse (of 3rd whorl). Staminodes 3, sagittate, ca. 2 mm, shortly stalked. Ovary ovoid, ca. 1.5 mm, sparsely puberulent; style ca. 3.5 mm; stigma discoid. Fruit ovoid, ca. 1.3×9 mm, apex truncate and entire. Fl. Apr–May, fr. Oct.

Humid sites among evergreen broad-leaved forests; 1000–1800 m. SE Yunnan [N Vietnam].

29. *Cinnamomum tsoi* C. K. Allen, J. Arnold Arbor. 20: 57. 1939.

平托桂 ping tuo gui

Trees, ca. 12 m tall, up to 45 cm d.b.h. Bark gray, scented. Branches terete, glabrous, resin-scented; branchlets somewhat compressed, angled, young part brown tomentose and conspicuously angled. Leaves subopposite; petiole 6–10 mm, sulcate adaxially, sparsely tomentose initially but soon glabrate; leaf blade brownish green and opaque abaxially, brown-green when dry and shiny adaxially, elliptic-lanceolate, 7–11 \times 1.5–3.5 cm, leathery, sparsely undulate pubescent initially but soon glabrate abaxially, glabrous adaxially, triplinerved, midrib and basal lateral veins conspicuous abaxially, somewhat elevated adaxially, basal lateral veins with few additional veins outside, transverse veins and veinlets \pm conspicuous abaxially, inconspicuous adaxially, base cuneate, margin entire, apex acuminate. Panicle axillary or subterminal, 2–3.5 cm; rachis appressed tomentose. Flowers unknown. Fruit ovoid, ca. 1.5 cm, less than 1 cm wide, apiculate; perianth cup in fruit shallowly cupuliform, ca. 0.5 cm, woody, entire. Fr. Oct–Dec.

• Evergreen broad-leaved forests; below 2400 m. Guangxi (Mengshan), Hainan.

The wood is finely grained, soft, light, and is used for furniture and house construction.

30. *Cinnamomum heyneanum* Nees in Wallich, Pl. Asiat. Rar. 2: 76. 1831.

狭叶桂 xia ye gui

Cinnamomum burmannii (Nees & T. Nees) Blume var. *angustifolium* (Hemsley) C. K. Allen; *C. burmannii* f. *heyneanum* (Nees) H. W. Li; *C. linearifolium* Lecomte; *C. pedunculatum* Nees var. *angustifolium* Hemsley.

Small trees. Branchlets slender, glabrous. Leaves alternate or subopposite; petiole terete, ca. 1 cm, glabrous; leaf blade glaucous green and opaque abaxially, green and shiny adaxially, linear to linear-lanceolate or lanceolate, (3.8–)4.5–12(–15) \times (0.7–)1–2(–4), papery, appressed sericeous-pubescent initially soon glabrate abaxially, glabrous adaxially, triplinerved, midrib extending to leaf apex, with additional veins on upper part, midrib and basal lateral veins very elevated abaxially, conspicuous

adaxially, basal lateral veins arising 3–8 mm above leaf base, evanescent toward leaf apex, transverse veins and veinlets slightly elevated on both surfaces, base attenuate, apex acuminate. Panicle axillary, few flowered, shorter than leaf, densely gray pubescent, branched, apex of branch bearing a 3-flowered cyme; peduncle slender, 5–9 cm. Pedicels slender, up to 10(–12) mm. Flowers green-white, ca. 5 mm. Perianth lobes 6, oblong, ca. 3 mm, sparsely villous outside. Fertile stamens 9, ca. 3.5 mm; filaments villous at base, those of 1st and 2nd whorls glandless, those of 3rd whorl each with 2 shortly stalked glands; anthers oblong, all 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, triangular, stalked. Ovary ovoid; style almost as long as ovary; stigma peltate. Fruit unknown. Fl. Apr(–May).

Thickets on mountain slopes along rivers; 100–500 m. Guangxi, SW Guizhou, W Hubei, E Sichuan, SE Yunnan [India].

The leafy branchlets contain volatile oil. Three types of the oil are found in Yunnan: safrole type (safrole 97%–99%), camphor-safrole type (camphor ca. 49%, safrole ca. 21%), and camphor-cineole type (camphor ca. 35%, cineole ca. 34%).

31. *Cinnamomum burmannii* (Nees & T. Nees) Blume, Bijdr. 569. 1826.

阴香 yin xiang

Laurus burmannii Nees & T. Nees, Cinnam. Disp. [Amen. Bot. Bonn. Fasc. 1:] 57. 1823; *Cinnamomum chinense* Blume; *C. dulce* (Roxburgh) Sweet; *C. hainanense* Nakai; *C. kiamis* Nees; *C. miaoshanense* S. K. Lee & F. N. Wei; *L. dulcis* Roxburgh.

Trees, up to 14 m tall, to 30 cm d.b.h. Bark smooth, gray-brown to dark brown outside, red inside, cassia-scented. Branchlets green or brown-green, slender, striate, glabrous. Leaves alternate or subopposite, rarely opposite; petiole 0.5–1.2 cm, plano-convex, subglabrous; leaf blade glaucous green and opaque abaxially, green and shiny adaxially, ovate or oblong to lanceolate, 5.5–10.5 × 2–5 cm, leathery, glabrous on both surfaces, triplinerved, midrib and basal lateral veins very elevated abaxially, conspicuous adaxially, basal lateral veins arising 3–8 mm above leaf base, evanescent toward leaf apex, transverse veins and veinlets somewhat elevated on both surfaces, ± reticulate, base broadly cuneate, apex shortly acuminate. Panicle axillary or subterminal, shorter than leaf, (2–)3–6 cm, few flowered, lax, densely gray puberulent, branched, apex of branch bearing a 3-flowered cyme. Pedicels slender, 4–6 mm, gray puberulent. Flowers green-white, ca. 5 mm. Perianth densely gray puberulent outside and inside; perianth tube short, obconical, ca. 2 mm; perianth lobes oblong-ovate, acute. Fertile stamens 9, ca. 2.5 mm (of 1st and 2nd whorls) or ca. 2.7 mm (of 3rd whorl); filaments puberulent, those of 3rd whorl each with 2 subsessile globose glands, others glandless; anthers oblong, 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, narrowly triangular, ca. 1 mm, stalked; stalk ca. 0.7 mm, puberulent. Ovary subglobose, ca. 1.5 mm, somewhat puberulent; style ca. 2 mm, angled, somewhat puberulent; stigma discoid. Fruit ovoid, ca. 8 × 5 mm; perianth cup in fruit ca. 4 mm, apex ca. 3 mm wide, dentate, teeth truncate. Fl. Mar–Apr, fr. Oct–Nov.

Sparse or dense forests and thickets, roadsides along streams; 100–1400 m (to 2100 m in Yunnan). Fujian, Guangdong, Guangxi, Hainan, Yunnan [India, Indonesia, Myanmar, Philippines, Vietnam].

The dried bark is a source of an important spice, which is used as a substitute for cassia bark. The wood is heavy, soft, finely grained, and used for house construction. The leafy branchlets contain volatile oil. Three types of the oil are found in Yunnan: linalol type (linalol ca. 57%), citral type (citral ca. 77%), and cineole type (cineole ca. 47%).

32. *Cinnamomum bejolghota* (Buchanan-Hamilton) Sweet, Hort. Brit. 344. 1827.

钝叶桂 dun ye gui

Laurus bejolghota Buchanan-Hamilton, Trans. Linn. Soc. London 13: 559. 1822; *Cinnamomum obtusifolium* (Roxburgh) Nees; *L. obtusifolia* Roxburgh.

Small to large trees, 5–25 m tall, up to 30 cm d.b.h. Bark green, scented. Branches always opposite, robust; branchlets terete or obtusely tetragonal, red-brown when dry, puberulent initially soon glabrate. Buds small, ovoid; bud scales densely sericeous. Leaves subopposite; petiole robust, 1–1.5 cm, plano-convex; leaf blade greenish or yellow-green and ± glaucous abaxially, green and shiny adaxially, elliptic-oblong, 12–30 × 4–9 cm, thickly leathery, glabrous on both surfaces, trinerved or triplinerved, basal lateral veins arising 0.5–1.5 cm above leaf base, oblique, lateral veins and midrib extending to leaf apex, conspicuously elevated abaxially, slightly impressed or elevated adaxially, transverse veins and veinlets reticulate, slightly conspicuous abaxially, inconspicuous adaxially, base subrounded or attenuate, margin entire, apex obtuse, acute, or acuminate. Panicle axillary on upper part of branchlet, 13–16 cm, densely many flowered, much branched; branches ca. 3 cm; peduncle 7–11 cm, peduncle and rachis sparsely gray pubescent. Pedicels 4–6 mm, gray pubescent. Flowers yellow, up to 6 mm. Perianth tube short, obconical, ca. 1 mm; perianth lobes 6, ovate-oblong, ca. 5 × 2.5 mm, acute, gray pubescent except apex subglabrous on both surfaces. Fertile stamens 9, ca. 3.5 mm (of 1st and 2nd whorls) or ca. 3.7 mm (of 3rd whorl); filaments complanate, those of 3rd whorl each with 2 long stalked orbicular-reniform glands, others glandless; anthers of 1st and 2nd whorls ovate-oblong, almost as long as filaments and with introrse cells, those of 3rd whorl narrower, oblong, ca. 1.7 mm, with extrorse cells. Staminodes 3, conspicuous, sagittate-deltoid, ca. 3 mm, long stalked. Ovary oblong, ca. 1.5 mm; style slender, up to 3 mm; stigma discoid. Fruit ellipsoid, ca. 1.3 × 0.8 cm, green when fresh; perianth cup in fruit yellow but purple-red tinged, somewhat dilated, obconical, apex up to 7 mm wide, dentate, teeth truncate; fruit stalk purple, somewhat dilated. Fl. Mar–Apr, fr. May–Jul.

Sparse or dense forests on mountain slopes and in valleys; 600–1800 m. S Guangdong, Hainan, S Yunnan [Bangladesh, Bhutan, India, Laos, Myanmar, Nepal, Thailand, Vietnam].

The wood is finely grained, somewhat soft, and used for house construction. Volatile oil is derived from the leafy branchlets, roots, and bark by steam distillation. The bark powder is the source of an important spice, used especially by local people in Hainan.

33. *Cinnamomum kotoense* Kanehira & Sasaki, Trans. Nat.

Hist. Soc. Formosa 20: 380. 1930.

兰屿肉桂 lan yu rou gui

Evergreen trees, ca. 15 m tall. Dry bark, branches, and leaves almost unscented. Branchlets brown, terete, glabrous. Leaves opposite or subopposite; petiole red-brown or brown, ca. 1.5 cm, concave-convex; leaf blade green when fresh but gray-green when dry, opaque abaxially and shiny adaxially, ovate to oblong-ovate, 8–11(–14) × 4–5.5(–9) cm, leathery, glabrous on both surfaces, triplinerved, basal lateral veins arising ca. 1 cm above leaf base, evanescent at 3/4 of leaf blade or inconspicuously anastomosing, sometimes each with an additional vein outside, veinlets conspicuous on both surfaces, foveolate, base rounded, apex acute. Flowers unknown. Inflorescence 3–5 cm. Fruit ovoid, ca. 1.4 × 1 cm; perianth cup in fruit cupuliform, glabrous, shortly crenate on margin; fruit stalk ca. 1 cm, glabrous. Fr. Aug–Sep.

- Forests. S Taiwan (Lan Yu).

Cinnamomum kotoense is very closely related to *C. myrianthum* Merrill, from the Philippines. The latter species differs in the shape of its leaf blade (oblong or elliptic-oblong) and in its longer infructescence (up to 15 cm), so it is reasonable to regard these as distinct species.

34. *Cinnamomum verum* J. Presl in Berchtold & J. Presl, Pfl. Rostlin 2(2): 36. 1825.

锡兰肉桂 xi lan rou gui

Laurus cinnamomum Linnaeus, Sp. Pl. 1: 369. 1753; *Cinnamomum zeylanicum* Blume.

Evergreen small trees, up to 10 m tall. Bark black-brown, inner bark with cinnamic aldehyde flavor. Young branchlets gray, somewhat tetragonus, white-maculate. Buds sericeous-puberulent. Leaves usually opposite; petiole ca. 2 cm, glabrous; leaf blade greenish white abaxially, green and shiny adaxially, ovate or ovate-lanceolate, 11–16 × 4.5–5.5 cm, leathery or subleathery, glabrous on both surfaces, triplinerved, midrib and lateral veins elevated on both surfaces, transverse veins and veinlets reticulate, conspicuously foveolate abaxially, base acute, margin entire, apex acuminate. Panicle axillary or terminal, 10–12 cm; peduncle and rachis sericeous-puberulent. Flowers yellow, ca. 6 mm. Perianth tube obconical; perianth lobes 6, oblong, subequal, gray puberulent outside. Fertile stamens 9; filaments hairy near base, those of 3rd whorl each with 2 glands, others glandless; anthers 4-celled; cells of 1st and 2nd whorls introrse but those of 3rd whorl extrorse. Ovary ovoid, 10–15 mm, glabrous; style short; stigma discoid. Fruit ovoid, 10–15 mm, black when mature; perianth cup in fruit cupuliform, dilated, dentate, teeth truncate or acute at apex.

Cultivated. Guangdong, Taiwan [native to Sri Lanka; also cultivated in many countries in Asia].

The dried bark is the source of the important spice cinnamon. It is used medicinally to treat stomachache. The bark and leafy branchlets contain volatile oil.

35. *Cinnamomum pingbienense* H. W. Li, Acta Phytotax. Sin. 16(2): 91. 1978.

屏边桂 ping bian gui

Trees, 5–10 m tall, 10–25 cm d.b.h. Bark gray. Two-year-old branchlets yellow-brown, terete, ca. 5 mm in diam., sparsely oblong lenticellate; current year branchlets subtetragonus, densely gray puberulent. Buds small, ovoid; bud scales few, broadly ovate, acute, subglabrous or sparsely gray puberulent. Leaves subopposite or opposite; petiole 1–1.5 cm, concave-convex, densely gray sericeous-puberulent when young but glabrous when mature; leaf blade green-white and opaque abaxially, green and shiny adaxially, oblong or oblong-ovate, 12.5–24 × 4.5–8.5(–10.5) cm, thinly leathery, densely gray sericeous-puberulent on both surfaces especially abaxially when young, glabrate on both surfaces when mature, tiny gray puberulent hairs visible under lens abaxially, triplinerved, midrib extending to leaf apex, basal lateral veins arising (2–)5–10(–15) mm above leaf base, obliquely ascendant, evanescent near leaf apex, each with 4–6 additional veins outside, additional veins, midrib, and basal lateral veins very elevated abaxially, plane or slightly impressed adaxially, transverse veins subparallel, indurate, ± conspicuous abaxially and ± visible adaxially, interconnected by veinlets, base broadly cuneate, margin entire, apex acute. Panicle 4.5–6.5(–10.5) cm, always inserted in leaf axils remote from apex of branchlet, branched, apex of branch bearing a 3–5-flowered cyme; peduncle (1–)1.5–3 cm, peduncle and rachis compressed bilaterally, gray sericeous-puberulent. Pedicels slender, 2.5–5 mm, gray sericeous-puberulent. Flowers greenish, ca. 4.5 mm. Perianth sparsely sericeous-puberulent outside but densely so inside; perianth tube obconical, short, ca. 1.5 mm; perianth lobes oblong, subequal, ca. 3 × 1–1.2 mm, obtuse. Fertile stamens 9; filaments villous, those of 3rd whorl each with 2 shortly stalked orbicular-reniform glands, others glandless; anthers of 1st and 2nd whorls a little longer than filaments, ovate-oblong, acute, with introrse cells, those of 3rd whorl as long as filaments, subrectangular, with extrorse cells. Staminodes 3, villous, including stalk ca. 1.5 mm, apex narrowly sagittate-triangular; stalk ca. 0.5 mm. Ovary ovoid, ca. 1 mm, subglabrous; style slender, almost equal to ovary in size; stigma small, inconspicuous. Fruit unknown. Fl. Apr–May.

- Evergreen broad-leaved forests on limestone mountains or in valleys, watersides; 500–1100 m. SW Guangxi, S Guizhou, SE Yunnan.

36. *Cinnamomum tamala* (Buchanan-Hamilton) T. Nees & Nees in T. Nees & C. H. Ebermaier, Handb. Med.-Pharm. Bot. 2: 426. 1831.

柴桂 chai gui

Laurus tamala Buchanan-Hamilton, Trans. Linn. Soc. London 13: 555. 1822.

Trees, up to 20 m tall, to 20 cm d.b.h. Bark gray-brown, scented. Branchlets tea-brown, terete, glabrous, young ones ± angled, sparsely gray puberulent initially soon glabrate. Leaves alternate or those on young branchlets sometimes subopposite; petiole 0.5–1.3 cm, slightly sulcate adaxially, glabrous; leaf blade green-white and opaque abaxially, green and shiny adaxially, ovate, oblong, or lanceolate, 7.5–15 × (2.5–)3–5.5 cm, thinly leathery, glabrous on both surfaces, triplinerved, midrib extending to leaf apex, basal lateral veins very elevated abax-

ially, slightly elevated adaxially, transverse veins undulate, veinlets reticulate, \pm conspicuous on both surfaces, base acute or broadly cuneate, margin entire, apex long acuminate. Panicle axillary or terminal, 5–10 cm, many flowered, branched, apex of branch bearing a 3–5-flowered cyme; peduncle 1–4 cm, peduncle and rachis sparsely finely gray puberulent. Pedicels 4–6 mm, slender, finely gray puberulent. Flowers white-green, up to 6 mm. Perianth sparsely gray puberulent outside but densely so inside; perianth tube obconical, short, less than 2 mm; perianth lobes obovate-oblong, ca. 4×1.5 mm, obtuse. Fertile stamens 9, ca. 3.8 mm (of 1st and 2nd whorls) or ca. 4 mm (of 3rd whorl); filaments gray villous, ca. 2.5 mm, those of 3rd whorl each with 2 finely stalked ovate-cordate glands at lower 1/3, others glandless; anthers of 1st and 2nd whorls ovate-oblong, ca. 1.3 mm, with introrse cells, those of 3rd whorl oblong, ca. 1.5 mm, with extrorse cells. Staminodes 3, ca. 1.7 mm, villous, long stalked, apex triangular-sagittate. Ovary ovoid, ca. 1.2 mm, villous; style slender, ca. 3.6 mm; stigma small, inconspicuous. Fruit obovoid or ellipsoid, 10–14 mm; perianth lobes persistent on rim of cupule. Fl. Apr–May.

Mountain slopes, evergreen broad-leaved forests in valleys, watersides; 1100–2000 m. W Yunnan [Bhutan, India, Nepal].

The dried bark is used medicinally to treat stomachache.

37. *Cinnamomum pittosporoides* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 19. 1925.

刀把木 dao ba mu

Trees, up to 25 m tall. Branchlets slender, terete; 1-year-old branchlets glabrous, with large, elongate, and sparse lenticels and cinnamic-aldehyde-flavored bark; current year branchlets angled, covered with dirty yellow tomentose-pubescent hairs. Leaves alternate; petiole 8–12(–16) mm, ca. 1.5 mm in diam., concave-convex, dirty yellow tomentose-pubescent; leaf blade purplish glaucous abaxially, brownish and opaque adaxially, elliptic or lanceolate-elliptic, 9–13(–16) \times 3–5(–7.5) cm, thinly leathery, pubescent abaxially, glabrous except scurfy-pilose on slightly elevated veins adaxially, triplinerved, basal lateral veins arising 2–6 mm above leaf base, oblique, with few additional veins extending to leaf margin, other lateral veins 2 or 3 pairs, arising from above 1/3 or 1/2 of leaf blade, arcuate, parallel, not interconnected, and not reaching leaf apex, transverse veins dense, curved, conspicuous abaxially and inconspicuous adaxially, base cuneate, apex acuminate. Panicles axillary in leaf axils nearly at apex of branchlet and always densely clustered, short, (2–)3–4 cm, 1–7-flowered, dirty yellow tomentose-pubescent; peduncle 1–1.5 cm or almost absent; bracts and bracteoles triangular or latter always nearly subulate, ca. 1 mm, densely covered with dirty yellow tomentose-pubescent hairs. Pedicels slightly robust, 3–6 mm. Flowers golden yellow, up to 5 mm. Perianth densely dirty yellow tomentulose outside, sericeous inside; perianth tube campanulate, ca. 2 mm; perianth lobes ovate-oblong, obtuse at apex, subequal, ca. 5 mm, outer ones ca. 3 mm wide, inner ones ca. 2.5 mm wide. Fertile stamens 9, a little shorter than perianth; filaments shorter than anthers, villous, those of 3rd whorl each with 2 large reniform glands ca. 1/2 length of filament; anthers oblong, 4-celled, 2

lower cells large and elongate, all lateral, 2 upper cells introrse or extrorse. Staminodes 3, sagittate, shortly stalked. Ovary ovoid, attenuate at apex into a style; style attaining height of stamen, hirsute; stigma dilated, discoid. Fruit ovoid, up to 2.5×2 cm, apiculate, attenuate at base; exocarp scabrid, glabrous except sparsely villous at apex; perianth cup in fruit shallowly discoid, ca. 0.5 cm, woody, longitudinally sulcate, sparsely dirty yellow puberulent, apex 1.2–1.4 cm wide, 6-dentate, teeth rounded at apex; fruit stalk ca. 1 cm, apex slightly dilated and up to 2.5 mm in diam. Fl. Feb–May, fr. Jun–Oct.

• Evergreen broad-leaved forests; 1800–2500 m. S Sichuan (Pingshan), C and SE Yunnan.

38. *Cinnamomum kwangtungense* Merrill, Lingnan Sci. J. 13: 25. 1934.

红辣槁树 hong la gao shu

Small trees, 3–9 m tall, ca. 16 cm d.b.h. Branchlets terete, glabrous, young ones ca. 1 mm in diam., dark brown pubescent. Leaves opposite; petiole 1.5–2 cm, brown pubescent when young but blackish pubescent when mature; leaf blade glaucous and shiny adaxially, elliptic to oblong-lanceolate, 7–9 \times 2.5–4 cm, rigidly leathery, very densely and evenly finely brown pubescent abaxially, glabrous adaxially, trinerved or inconspicuously triplinerved, midrib and basal veins elevated abaxially, very impressed adaxially, axils of lateral veins dome-shaped abaxially, transverse veins parallel, very fine, base broadly cuneate to subrounded, margin involute, entire, apex conspicuously acuminate. Panicle terminal, ca. 8 cm, densely and evenly finely brown pubescent, branched from base; branches opposite, lowest one ca. 7 cm, apex of branch bearing a 2- or 3-flowered cyme. Pedicels 2–3 mm. Perianth lobes oblong-elliptic to oblong-ovate, ca. 5 mm, pubescent outside, apex rounded. Fertile stamens 9; filaments 1–1.2 mm, finely pubescent, those of 3rd whorl each with 2 glands, others glandless; anthers ellipsoid, as long as filament, apex rounded, all 4-celled. Staminodes 3, ca. 1 mm. Ovary glabrous; style ca. 2 mm. Fruit unknown. Fl. May.

• Shady mountain slopes. C Guangdong.

39. *Cinnamomum wilsonii* Gamble in Sargent, Pl. Wilson. 2: 66. 1914.

川桂 chuan gui

Cinnamomum wilsonii var. *multiflorum* Gamble.

Trees, ca. 25 m tall, ca. 30 cm d.b.h. Branchlets terete, dark brown or purple-brown when dry. Leaves alternate or opposite; petiole 10–15 mm, slightly sulcate adaxially, glabrous; leaf blade gray-green and opaque abaxially, green and shiny adaxially, ovate or ovate-oblong, 8.5–18 \times 3.2–3.5 cm, leathery, white sericeous when young but soon glabrate abaxially, glabrous adaxially, triplinerved, midrib and basal lateral veins elevated on both surfaces, all yellowish when dry, basal lateral veins arising 5–15 mm above leaf base, arcuate and evanescent in leaf apex, sometimes each with 3–10 additional veins outside, additional veins arcuate and connected by rib on leaf margin, transverse veins arcuate, numerous, slender, \pm conspicuous abaxially, base attenuate and decurrent into petiole but some-

times subrounded, margin cartilaginous and involute, apex acuminate, acumen obtuse. Panicles axillary, solitary, few flowered, or many and clustered, subracemose or cymose, cymes 2–5-flowered; peduncle slender, 1.5–6 cm, peduncle and rachis glabrous or sparsely pubescent. Pedicels filiform, 6–20 mm, finely puberulent. Flowers white, ca. 6.5 mm. Perianth sericeous-puberulent outside and inside; perianth tube obconical, ca. 1.5 mm; perianth lobes ovate, acute, subequal, 4–5 × ca. 1 mm. Fertile stamens 9, ca. 3 mm (of 1st and 2nd whorls) or ca. 3.5 mm (of 3rd whorl); filaments villous, those of 3rd whorl each with 2 sessile reniform glands at middle, others glandless; anthers of 1st and 2nd whorls ovate-oblong, slightly shorter than filaments, obtuse at apex, each with 4 introrse cells, anthers of 3rd whorl oblong, as long as 2/5 of filaments, each with 4 extrorse cells. Staminodes 3, ovate-cordate, ca. 2.8 mm, acute, stalked. Ovary ovoid, ca. 1 mm; style thick, ca. 3 mm; stigma broad, capitate. Mature fruit unknown. Perianth cup of immature fruit almost truncate but with very short lobes at apex. Fl. Apr–May, fr. after Jun.

• Sparse or dense forests on sunny sites of mountain slopes, watersides, valleys; (near sea level to) 800–2400 m. Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan.

The dried bark is used medicinally to treat, for example, traumatic injuries and abdominal pain. The leafy branchlets and fruit contain essential oil, which is used as a fragrant ingredient in food or soap.

40. *Cinnamomum contractum* H. W. Li, Acta Phytotax. Sin. 16(2): 91. 1978.

聚花桂 ju hua gui

Small trees, up to 8 m tall, to 32 cm d.b.h. Bark gray-black, smooth, with cinnamic aldehyde flavor. Old branchlets terete, robust, tea-brown or red-brown when dry, many lenticellate, glabrous, young ones striate, glabrous. Leaves alternate or subopposite; petiole 1–2 cm, plano-convex, glabrous; leaf blade gray-green and opaque abaxially, shiny green adaxially, ovate to broadly ovate, 9–14 × 3.5–7.5 cm, leathery, white sericeous-pubescent when young but eventually glabrate abaxially, glabrous adaxially, triplinerved, midrib extending to leaf apex, midrib and basal lateral veins elevated abaxially, conspicuous adaxially, all yellowish when dry, basal lateral veins subopposite, adaxially arising 5–10 mm from leaf base, arcuate, evanescent at leaf apex, sometimes with 3–5 additional veins outside, additional veins arcuate and interconnected within leaf margin, transverse veins numerous, arcuate, slender, ± conspicuous abaxially, base broadly cuneate to subrounded, margin cartilaginous and involute, apex acuminate, acumen obtuse. Panicles axillary and terminal, many flowered, composed of shortly pedunculate or sessile 2–11-flowered cymes, axillary ones 4–8.5 cm, shortly branched at lower part or subracemose, terminal ones elongate, up to 12 mm, branched almost from base and upward, lowest branches up to 4 cm, other branches gradually shorter upward; peduncles very short, 0.5–1.5 cm, peduncle and rachis densely finely gray puberulent. Pedicels short, 2–4 mm, densely finely gray puberulent. Flowers yellow-green, up to 7 mm. Perianth sericeous-puberulent outside and inside; perianth tube obconical, ca. 1.5 mm; perianth lobes ovate or oblong-ovate, acute, outer ones ca. 5 × 3.8 mm, inner ones ca. 5 × 3

mm. Fertile stamens 9, ca. 3.6 mm (of 1st and 2nd whorls) or ca. 4 mm (of 3rd whorl); filaments of 1st and 2nd whorls slender, up to 2 mm, glandless, those of 3rd whorl robust, complanate, each with 2 shortly stalked reniform glands; anthers of 1st and 2nd whorls oblong-ovate, ca. 1.6 mm, obtuse, each with 4 introrse cells, those of 3rd whorl oblong, ca. 1.8 mm, each with 4 extrorse cells. Staminodes 3, triangular-sagittate, including short stalk ca. 2.5 mm. Ovary ovoid, ca. 1.5 mm, glabrous; style robust, ca. 3.5 mm; stigma dilated, capitate. Fruit unknown. Fl. May.

• Evergreen broad-leaved forests on mountain slopes, valley sides; 1800–2800 m. SE Xizang, NW Yunnan.

41. *Cinnamomum iners* Reinwardt ex Blume, Bijdr. 570. 1826.

大叶桂 da ye gui

Trees, up to 20 m tall, to 20 cm d.b.h. Branches always opposite, robust; branchlets terete or obtusely tetragonal, dark brown when dry, densely puberulent initially but soon glabrate. Buds small, ovoid; bud scales densely sericeous. Leaves subopposite; petiole red-brown, robust, 1–3 cm, ± densely pubescent; leaf blade opaque yellow-green abaxially, shiny green adaxially, ovate or elliptic, 12–35 × 5.5–8.5 cm, thickly leathery, densely pubescent initially soon glabrate but not glabrous abaxially, glabrous adaxially, trinerved or triplinerved, basal lateral veins arising at or up to 10 mm above leaf base, basal lateral veins and midrib elevated on both surfaces, transverse veins and veinlets slightly conspicuous on both surfaces or inconspicuous adaxially and ± visible abaxially, base broadly cuneate to subrounded, apex obtuse or emarginate. Panicles axillary or terminal, solitary or ternate, 6–26 cm, several branched; branches 1–2.5(–6) cm, apex bearing a 3–7-flowered cyme; peduncles 3–10(–15) cm, peduncle and rachis densely pubescent. Pedicels 2.5–5 mm, densely gray pubescent. Flowers greenish, 4–5(–6) mm. Perianth densely gray pubescent outside and inside; perianth tube obconical, 1–2 mm; perianth lobes 6, acute, outer ones ovate-oblong, ca. 4 × 2 mm, inner ones oblong, narrower, ca. 4 × 1.5 mm. Fertile stamens 9, ca. 3 mm (of 1st and 2nd whorls) or ca. 3.6 mm (of 3rd whorl); filaments villous, those of 3rd whorl each with 2 orbicular glands near base, others glandless; anthers of 1st and 2nd whorls ovate-oblong, nearly as long as filaments, each with 4 introrse cells, those of 3rd whorl oblong, narrower, ca. 1.5 mm, slightly shorter than filaments, each with 4 extrorse cells. Staminodes 3, conspicuous, sagittate-triangular, ca. 2.3 mm, long stalked. Ovary ovoid, ca. 1.5 mm; style slender, ca. 3 mm; stigma discoid, lobed. Fruit ovoid, 9–10(–12) × ca. 7 cm, apiculate, greenish or green when fresh; perianth cup in fruit obconical or bowl-shaped, slightly dilated, up to 8 mm wide, with somewhat dilated or patent persistent lobes at apex; fruit stalk somewhat thickened. Fl. Mar–Apr, fr. May–Jun.

Roadsides in valleys, sparse or dense forests; 100–1000 m. SW Guangxi (Longzhou), SE Xizang (Mêdog), S Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

42. *Cinnamomum austroyunnanense* H. W. Li, Acta Phytotax. Sin. 16(2): 92. 1978 [“*austro-yunnanense*”].

滇南桂 dian nan gui

Trees, up to 20 m tall, ca. 25 cm d.b.h. Bark gray, smooth. Old branchlets yellow-brown, terete, longitudinally striate, glabrous, divaricate; young branchlets \pm compressed tetragonous, gray-brown in color due to dense appressed gray puberulent indumentum. Buds small, narrowly ovoid, up to 4 mm; bud scales acute, densely gray puberulent outside. Leaves alternate or those on young branchlets always subopposite; petiole gray-brown, 0.5–1.2 cm, somewhat concave adaxially, densely puberulent; leaf blade greenish or gray-green and opaque abaxially, dark green and shiny adaxially, oblong to lanceolate-oblong, 7–17(–22) \times 2–4.5(–6) cm, thinly leathery, \pm appressed gray puberulent abaxially, glabrous adaxially, trinerved or triplinerved, midrib extending to leaf apex, midrib and basal lateral veins elevated on both surfaces and yellow-brown, basal lateral veins arising at or up to 6 mm above leaf base, arcuate-ascendant, evanescent below leaf apex, transverse veins and veinlets inconspicuous on both surfaces, base subrounded, apex obtuse or acute. Panicles axillary and terminal, 6–12 cm, several branched from base; branches elongate, branches and rachis \pm compressed tetragonous, densely gray sericeous-puberulent. Pedicels 3–4 mm, densely gray puberulent. Flowers yellowish brown, ca. 4 mm when open. Perianth densely gray sericeous-puberulent outside and inside; perianth tube obconical, ca. 1 mm, longitudinally sulcate when dry; perianth lobes 6, narrowly ovate, subequal, ca. 3 \times 1.6 mm, acute. Fertile stamens 9, subequal, ca. 2.5 mm; filaments pilose, those of 3rd whorl each with 2 shortly stalked orbicular-reniform glands near base, others glandless; anthers oblong, almost as long as filaments, 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, ca. 1.6 mm, stalked, narrowly sagittate-triangular at apex. Ovary ovoid, ca. 1.2 mm; style elongate, ca. 1.8 mm; stigma somewhat discoid. Fruit green when fresh, dark brown when dry, ovoid, ca. 6 \times 5 mm, rounded and apiculate at apex, apex brown; perianth cup in fruit dark brown, caplike, up to 6 mm wide, apex truncate or slightly undulate. Fl. Apr. fr. May–Jun.

- Shady sites in tropical forests; 200–600 m. S Yunnan.

43. *Cinnamomum tsangii* Merrill, Lingnan Sci. J. 13: 26. 1934.

辣汁树 la zhi shu

Cinnamomum merrillianum C. K. Allen.

Small trees. Branchlets terete, glabrous, compressed or angled, ca. 1 mm in diam., densely silver sericeous initially soon glabrate. Petiole 5–12 mm, concave-convex, densely silver sericeous when young but soon glabrate; leaf blade lanceolate or oblong-lanceolate, 5–10 \times 1.5–2.5 cm, thinly leathery, silver sericeous on both surfaces when young, densely brownish sericeous abaxially and glabrous adaxially or glabrate on both surfaces when mature, triplinerved, basal lateral veins arising 2–5 mm above leaf base, basal lateral veins and midrib conspicuously elevated abaxially, slightly elevated adaxially, transverse veins and veinlets inconspicuous on both surfaces, base broadly cuneate, apex conspicuously falcate-acuminate. Inflorescences axillary, cymose, ca. 3 cm, solitary or few in

cluster, 3–5-flowered, \pm silver sericeous, long pedunculate. Pedicels up to 5 mm, densely silver sericeous. Flowers green-white, 3–4 mm. Perianth densely silver sericeous outside and inside; perianth tube obconical, ca. 1 mm; perianth lobes 6, ovate, subequal, ca. 2 mm. Fertile stamens 9, ca. 1 mm; filaments villous, those of 3rd whorl each with 2 stalked glands at base, others glandless; anthers of 1st and 2nd whorls ovate, with introrse cells, those of 3rd whorl oblong-ovate, with extrorse cells. Staminodes 3, triangular, ca. 0.6 mm, shortly stalked. Ovary narrowly ellipsoid-ovoid, ca. 1 mm, glabrous; style slender, ca. 1.2 mm; stigma discoid, inconspicuously 3-lobed. Fruit unknown. Fl. Oct.

- Sparse forests on mountaintops, dense mixed forests. Fujian, Guangdong, Hainan, S Jiangxi.

44. *Cinnamomum mairei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 13: 174. 1914.

银叶桂 yin ye gui

Cinnamomum argenteum Gamble.

Trees, 6–16 m tall, 30–80 cm d.b.h. Branchlets purple-brown, terete, \pm angled. Buds ovoid, ca. 2.5 mm, white sericeous. Leaves alternate or subopposite; petiole 1–1.5 cm, concave-convex, glabrous; leaf blade glaucous and opaque abaxially, green and shiny adaxially, lanceolate, 6–11 \times 2.5–4 cm, leathery, densely silver sericeous when young but appressed sericeous-tomentulose when mature abaxially, glabrous adaxially, trinerved or triplinerved, midrib extending to leaf apex, with 1 or 2 pairs of additional veins curving toward leaf apex, midrib and basal lateral veins elevated abaxially, almost inconspicuous adaxially, basal lateral veins arising at or up to 5 mm above leaf base, arcuate, evanescent near leaf apex, with a few inconspicuous additional veins outside, sometimes with 2 slender secondary lateral veins along leaf margin from base, transverse veins numerous, arcuate, inconspicuous, base attenuate to subrounded, apex acuminate, acumen obtuse. Panicle 4–7(–9) cm, arising from base of current year branchlet, 5–12-flowered; peduncle slender, subfiliform, 2–4 cm, finely pubescent. Pedicels filiform, 4–8 mm, pubescent. Flowers white, ca. 5 mm. Perianth densely sericeous-pubescent outside and inside; perianth tube very short, obconical, ca. 1.5 mm; perianth lobes obovate, subequal, ca. 3.5 \times 2 mm, inner ones slightly narrower, all acute. Fertile stamens 9, ca. 7.5 mm; filaments almost as long as anthers, those of 3rd whorl broad, each with 2 shortly stalked reniform glands, others glandless; anthers of 1st and 2nd whorls broadly ovate, obtuse, with introrse cells, those of 3rd whorl oblong-ovate, with extrorse cells. Staminodes 3, cordate, ca. 1.5 mm, shortly stalked. Ovary ovoid, ca. 1 mm; style robust, ca. 2.3 mm; stigma dilated, capitate. Fruit ovoid, ca. 13 \times 7–8 mm, glabrous; perianth cup in fruit semiglobose, entire and 4–5 mm wide at apex; fruit stalk slender, barely thickened. Fl. Apr–May, fr. Aug–Oct.

- Forests; 700–1800 m. W Sichuan, NE Yunnan.

The bark of the branchlets is used as an aromatic spice. The roots, trunk, and leafy branchlets contain essential oil.

45. *Cinnamomum javanicum* Blume, Bijdr. 570. 1826.

爪哇肉桂 zhua wa rou gui

Evergreen trees, up to 20 m tall, ca. 25 cm d.b.h. Branchlets obtusely tetragonous, red-brown when dry, very densely yellow-brown tomentose when young. Buds small, ovoid, densely yellow-brown tomentose. Leaves opposite; petiole robust, 1–1.2 cm, plano-convex, densely yellow-brown tomentose; leaf blade yellow-green and opaque abaxially, dark green and shiny adaxially, elliptic or elliptic-ovate, 11–22 × 5–6.5 cm, papery or subleathery, very densely yellow-brown tomentose abaxially, glabrous or yellow-brown tomentose only along lower part of veins adaxially, subtriplinerved, midrib and basal lateral veins very elevated abaxially, impressed adaxially, basal lateral veins arising at or up to 6 mm above leaf base, arcuate-ascendant and interconnected up to leaf apex, with a few oblique additional veins outside, transverse veins numerous, conspicuously elevated abaxially, slightly impressed when young but almost invisible with naked eye when mature adaxially, base subrounded, margin involute, apex caudate. Flowers unknown. Inflorescence panicleate, axillary on upper part of branchlet, robust, 10–15 cm; peduncle 5–9 cm, ± angled, peduncle and rachis densely yellow-brown tomentose. Fruit ellipsoid, ca. 1.5 × 1.2 cm; perianth cup in fruit obconical or bowl-shaped, ca. 6 mm, truncate and up to 1.2 cm wide at apex, abruptly contracted into ca. 4 mm long stalk at base; fruit stalk densely yellow-brown tomentose.

Dense forests; ca. 1400 m. SE Yunnan (Pingbian) [Indonesia, Malaysia, Vietnam].

The plants from Yunnan are very similar to *Cinnamomum javanicum* var. *neglectum* (Blume) Meisner (*C. neglectum* Blume), from Indonesia, especially in their subtriplinerved leaves and yellow-brown tomentose indumentum.

46. *Cinnamomum appelianum* Schewe, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 20. 1925.

毛桂 mao gui

Cinnamomum appelianum var. *tripartitum* Yen C. Yang; *C. szechuanense* Yen C. Yang; *C. taimoshanicum* Chun ex Hung T. Chang; *C. trinervatum* Yen C. Yang; *C. villosulum* S. K. Lee & F. N. Wei.

Small trees, 4–6 m tall, up to 8 cm d.b.h., several branched with branches opposite. Bark gray-brown or olive-green. Branchlets yellow-brown or chestnut-brown, terete, slightly robust, slightly scented, scattered with gray-brown and oblong lenticels; old branchlets glabrous; 1-year-old branchlets glabrate; current year branchlets densely covered with dirty yellow hirsute-tomentose hairs. Buds narrowly ovoid, acute; bud scales brown, imbricate, leathery, densely covered with dirty yellow hirsute-tomentose hairs. Leaves alternate or subopposite; petiole robust, 4–5(–9) mm, plano-convex, densely covered with dirty yellow hirsute-tomentose or villous hairs; leaf blade yellow-brown and opaque abaxially, green-brown and slightly shiny adaxially, elliptic, elliptic-lanceolate to ovate, or ovate-elliptic, 4.5–11.5 × 1.5–4 cm, leathery, densely covered with crisped dirty yellow pilose hairs along veins adaxially and densely so everywhere abaxially when young, glabrous adaxially and densely covered with crisped yellow hairs abaxially when mature, slightly wrinkled on both surfaces, triplinerved, midrib and basal lateral veins extending to leaf apex, basal lateral veins arising 1–3 mm above leaf base, arcuate-ascendant,

with a few additional veins outside interconnected within leaf margin, transverse veins and veinlets numerous, ± conspicuous abaxially, base cuneate to subrounded, apex abruptly shortly acuminate. Panicle axillary on base of current year branchlet, generally much shorter than leaf, 4–6.5 cm, (3–)5–11-flowered, branched; branches ca. 0.5 mm; peduncle slender, elongate, 1–1.5(–3.5) cm, peduncle and rachis densely covered with yellowish brown hirtellous-villous or villous hairs; bracts linear or lanceolate, 2.5–3 × ca. 0.7 mm, caducous, villous on both surfaces. Pedicels 2–3 mm, very densely covered with yellow-brown hirtellous-pubescent or villous hairs. Flowers white, 3–5 mm. Perianth covered with yellowish brown sericeous-puberulent or villous hairs outside and inside but hairs longer inside; perianth tube obconical, 1–1.5 mm; perianth lobes broadly obovate to oblong-ovate, 3–3.5 × ca. 2 mm, acute. Fertile stamens 9, slightly shorter than perianth lobes, 2.5–3.5 mm; filaments pilose, those of 3rd whorl each with 2 sessile cordate-orbicular glands at middle part, others glandless; anthers oblong, 4-celled, those of 1st and 2nd whorls as long as filaments, cells extrorse, those of 3rd whorl almost as long as filaments, cells extrorse. Staminodes 3, triangular-sagittate, 1.3–1.7 mm, shortly stalked; stalk villous. Ovary broadly ovoid, ca. 1.2 mm, glabrous; style robust; stigma peltate or capitate, entire or slightly 3-lobed. Immature fruit green, ellipsoid, ca. 6 × 4 mm; perianth cup in fruit dilated, funnelform, up to 1 cm, dentate and 7 mm wide at apex.

• Thickets or sparse forests on mountain slopes or in valleys; (300–)500–1400 m. Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan.

The bark is used medicinally as an astringent.

47. *Cinnamomum cassia* (Linnaeus) D. Don, Prodr. Fl. Nepal. 67. 1825.

肉桂 rou gui

Laurus cassia Linnaeus, Sp. Pl. 1: 369. 1753; *Cinnamomum aromaticum* Nees; *Persea cassia* (Linnaeus) Sprengel.

Medium-sized trees. Bark gray-brown, up to 13 mm thick when mature. One-year-old branchlets dark brown, terete, longitudinally striate, slightly pubescent; current year branchlets yellow-brown, ± tetragonous, longitudinally striate, densely grayish yellow tomentulose. Terminal buds small, ca. 3 mm; bud scales broadly ovate, acuminate, densely grayish yellow tomentulose. Leaves alternate or subopposite; petiole robust, 1.2–2 cm, adaxially plane or slightly sulcate on lower part, yellow tomentulose; leaf blade greenish opaque abaxially, green and shiny adaxially, narrowly elliptic to sub lanceolate, 8–16(–34) × 4–5.5(–9.5) cm, leathery, sparsely yellow tomentulose abaxially, glabrous adaxially, triplinerved, midrib and basal lateral veins very elevated abaxially, conspicuously impressed adaxially, basal lateral veins subopposite, arising 5–10 mm above leaf base, arcuate-ascendant and evanescent below leaf apex, with numerous additional veins outside, these veins arcuately interconnected, transverse veins undulate and subparallel at a distance of 3–4 mm, elevated abaxially, inconspicuous adaxially, connected by veinlets only visible abaxially, base acute, margin cartilaginous and involute, apex slightly acute. Panicle axillary or subterminal, 8–16 cm, triplicate-branched, apex of

branch bearing a 3-flowered cyme; peduncle as long as 1/2 of inflorescence, peduncle and rachis yellow tomentose. Pedicels 3–6 mm, yellowish brown tomentulose. Flowers white, ca. 4.5 mm. Perianth densely yellowish brown tomentulose outside and inside; perianth tube obconical, ca. 2 mm; perianth lobes ovate-oblong, subequal, ca. 2.5×1.5 mm, obtuse or subacute at apex. Fertile stamens 9, ca. 2.3 mm (of 1st and 2nd whorls) or ca. 2.7 mm (of 3rd whorl); filaments of 1st and 2nd whorls ca. 1.4 mm, complanate, dilated at upper 1/3, those of 3rd whorl ca. 1.9 mm, each with 2 orbicular-reniform glands at upper 1/3; anthers ovate-oblong, 4-celled; cells introrse (of 1st and 2nd whorls) or lateral-extrorse (of 3rd whorl). Staminodes 3, including stalk ca. 2 mm, sagittate-deltoid at apex; stalk slender, complanate, ca. 1.3 mm, villous. Ovary ovoid, ca. 1.7 mm, glabrous; style slender, as large as ovary; stigma small, inconspicuous. Fruit ellipsoid, ca. 10×7 –8(–9) mm, black-purple when mature, glabrous; perianth cup in fruit shallowly cupuliform, ca. 4 mm, truncate or slightly dentate and up to 7 mm wide at apex. Fl. Jun–Aug, fr. Oct–Dec.

• Evidently originating in S China, now widely cultivated in tropical or subtropical areas of Fujian, Guangdong, Guangxi, Guizhou, Hainan, Taiwan, and Yunnan [cultivated in India, Indonesia, Laos, Malaysia, Thailand, and Vietnam].

The dried bark is the source of the important spice cassia. The immature fruits are a source of cassia buds. An essential oil, called oil of cassia or oil of cinnamon, is obtained by steam distillation of the leaves and twigs; it is used as a flavoring agent. The plant is used medicinally as a carminative. It contains cinnamic aldehyde.

48. *Cinnamomum austrosinense* Hung T. Chang, Acta Sci. Nat. Univ. Sunyatseni 1959(1): 20. 1959.

华南桂 hua nan gui

Cinnamomum cassia (Linnaeus) D. Don subsp. *pseudomelastoma* J. C. Liao et al.; *C. pseudomelastoma* (J. C. Liao et al.) J. C. Liao.

Trees, 5–8(–16) m tall, up to 40 cm d.b.h. Bark gray-brown. One-year-old branchlets dark brown, terete, ca. 3 mm wide, longitudinally striate, puberulent; current year branchlets \pm depressed, slightly angled, longitudinally striate and sulcate, shortly gray-brown appressed puberulent. Terminal buds small, ovoid, 3–4 mm; bud scales compact, densely covered with gray-brown short and appressed puberulent hairs. Leaves subopposite or alternate; petiole 1–1.5 mm, plano-convex, densely covered with gray-brown short and appressed puberulent hairs; leaf blade greenish and opaque abaxially, green and opaque or slightly shiny adaxially, elliptic, old leaves on 1-year-old branchlets 14 – 16×6 – 7.5 (–8) cm, new leaves on current year branchlets 6.5 – 8.5 (–12) $\times 3$ – 4 (–5) cm, all thinly leathery or leathery, densely covered with gray-brown short and appressed puberulent hairs abaxially, grayish brown puberulent when young but glabrate when mature adaxially, trinerved or triplinerved, midrib and basal lateral veins very elevated abaxially, slightly elevated adaxially, basal lateral veins arising at or up to 5 mm above leaf base, slightly arcuate-ascendant and evanescent below leaf apex, always with 8–10 additional veins outside, these veins \pm conspicuous abaxially, inconspicuous adaxially, arcuately interconnected near leaf margin, transverse veins

undulate, subparallel at a distance of 2–3 mm, elevated abaxially, inconspicuous adaxially, base obtuse, margin cartilaginous and involute, apex acute, acumen 5–10(–15) mm. Panicle axillary on current year branchlet, 9 – 13×5 – 7 cm, triplicate-branched, apex of branchlet generally bearing a 3-flowered cyme; peduncle (3–)6–7.5 cm, peduncle and rachis slightly depressed and densely covered with gray-brown short and appressed puberulent hairs. Pedicels ca. 2 mm, densely grayish brown puberulent. Flowers yellow-green, ca. 4.5 mm. Perianth densely gray-brown puberulent outside and inside; perianth tube obconical, ca. 2 mm; perianth lobes ovate, ca. 2.5 mm, outer ones ca. 1.5 mm wide, inner ones narrower, all acute. Fertile stamens 9; filaments villous, those of 3rd whorl each with 2 sessile suborbicular glands, others glandless; anthers villous abaxially, 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, triangular, ca. 1 mm, stalked, villous. Ovary globose, ca. 1 mm, glabrous; style ca. 1.5 mm; stigma discoid. Fruit ellipsoid, ca. 1×0.9 cm; perianth cup in fruit shallowly cupuliform, ca. 2.5 mm and up to 5 mm in diam., shallowly dentate at top margin, teeth truncate. Fl. Jun–Aug, fr. Aug–Oct.

• Evergreen broad-leaved forests, thickets on mountain slopes, along streams; 600–700 m. Fujian, Guangdong, Guangxi, SE Guizhou, Jiangxi, Zhejiang.

Cinnamomum austrosinense shares similar uses with *C. cassia* and may represent the wild form of that species.

49. *Cinnamomum subavenium* Miquel, Fl. Ned. Ind. 1(1): 902. 1858.

香桂 xiang gui

Cinnamomum albiflorum Nees var. *kwangtungense* H. Liu; *C. bartheifolium* Hayata; *C. chingii* F. P. Metcalf; *C. lioui* C. K. Allen; *C. longicarpum* Kanehira; *C. randaiense* Hayata; *C. validinerve* Hance var. *poilanei* H. Liu.

Trees up to 20 m tall and 50 cm d.b.h. Bark gray, smooth. Branchlets slender, densely covered with yellow appressed sericeous-pubescent hairs. Leaves on young branchlets subopposite, those on old branchlets alternate; petiole 5–15 mm, densely covered with appressed yellow sericeous-pubescent hairs; leaf blade yellow-green and opaque abaxially, dark green and shiny adaxially, elliptic or ovate-elliptic to lanceolate, 4 – 13.5×2 – 6 cm, leathery, densely appressed yellow sericeous-pubescent but sparsely so when mature abaxially, appressed yellow sericeous-pubescent when young but glabrate to glabrous when mature adaxially, trinerved or triplinerved, midrib and basal lateral veins conspicuously elevated abaxially, impressed adaxially, basal lateral veins arising at or up to 4 mm above leaf base, oblique and extending to leaf apex, axils of basal lateral veins sometimes inconspicuously saccate abaxially and slightly bullate adaxially, transverse veins and veinlets inconspicuous on both surfaces, base cuneate to rounded, apex acuminate or acute. Pedicels 2–3

mm, covered with same hairs as petiole. Flowers yellowish, 3–4 mm. Perianth densely pubescent outside and inside; perianth tube obconical, short, ca. 1 mm; perianth lobes 6, outer ones narrower, oblong-lanceolate or lanceolate, ca. 3×1.5 mm, inner ones ovate-oblong, ca. 3×1.7 mm. Fertile stamens 9, ca. 2.4 mm (of 1st and 2nd whorls) or ca. 2.7 mm (of 3rd whorl); filaments villous, those of 3rd whorl each with 2 orbicular reniform glands; anthers villous abaxially, 4-celled; cells introrse (of 1st and 2nd whorls) or extrorse (of 3rd whorl). Staminodes 3, ca. 1.2 mm, villous, stalked. Ovary globose, ca. 1 mm in diam., glabrous; style ca. 2.5 mm, slightly curved; stigma dilated, discoid. Fruit ellipsoid, ca. 7×5 mm, blue-black when mature; perianth cup in fruit cupuliform, entire and up to 5 mm wide at apex. Fl. Jun–Jul, fr. Aug–Oct.

Evergreen broad-leaved forests on mountain slopes or in valleys; 400–1100(–2500) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, N Thailand, Vietnam].

The leaves are an important spice.

