

ZINGIBERACEAE

姜科 jiang ke

Wu Delin (吴德邻 Wu Te-lin)¹; Kai Larsen²

Herbs perennial, terrestrial, rarely epiphytic, aromatic, with fleshy, tuberous or non-tuberous rhizomes, often with tuber-bearing roots. Stems usually short, replaced by pseudostems formed by leaf sheaths. Leaves distichous, simple, those toward base of plant usually bladeless and reduced to sheaths; leaf sheath open; ligule usually present; petiole present or not, located between leaf blade and sheath, cushionlike in *Zingiber*; leaf blade suborbicular or lanceolate to narrowly strap-shaped, rolled longitudinally in bud, glabrous or hairy, midvein prominent, lateral veins usually numerous, pinnate, parallel, margin entire. Inflorescence terminal on pseudostems or on separate, short, sheath-covered shoots arising from rhizomes, cylindrical or fusiform, sometimes globose, lax to dense, few to many flowered, sometimes with bracteolate cincinni in bract axils and then a thyrse, sometimes a raceme or spike; bracts and bracteoles present, often conspicuous, colored. Flowers bisexual, epigynous, zygomorphic. Calyx usually tubular, thin, split on 1 side, sometimes spathe-like, apex 3-toothed or -lobed. Corolla proximally tubular, distally 3-lobed; lobes varying in size and shape. Stamens or staminodes 6, in 2 whorls. Lateral 2 staminodes of outer whorl petaloid, or forming small teeth at base of labellum, or adnate to labellum, or absent. Median staminode of outer whorl always reduced. Labellum formed from lateral 2 staminodes of inner whorl. Fertile stamen median, of inner whorl; filament long or short; anther locules 2, introrse, dehiscent by slits or occasionally pores; connective often extended basally into spurs and/or apically into a crest. Ovary inferior, 3-loculed initially, 1- or 3-loculed when mature; ovules \pm numerous per locule; placentation parietal, basal, or axile. Developed style 1, very thin, placed in a furrow in filament and between anther locules; stigma appearing above anther, funnelliform, papillose, \pm wet, margin often ciliate. Stylodes 2, reduced to nectaries at apex of ovary. Fruit a capsule, fleshy or dry, dehiscent or indehiscent, sometimes berrylike. Seeds few to many, arillate; aril often lobed or lacerate.

About 50 genera and 1300 species: pantropical with center of diversity in S and SE Asia, some species in America and subtropical and warm-temperate Asia; 20 genera (one endemic) and 216 species (141 endemic, four introduced) in China.

Zingiberaceae subfam. Costoideae and subfam. Zingiberoideae, as treated in FRPS, are treated here as Costaceae and Zingiberaceae, respectively. Many new taxa of Zingiberaceae have been described from China since 1981. These are often little known and their relationships are not yet fully understood. Therefore, a taxonomic sequence of species, as given in FRPS, has been considered impractical in this account; instead, taxa are arranged in the sequence in which they appear in the keys.

Some members of the Zingiberaceae yield dyes, spices, perfumes, and medicines. Various species are cultivated for their showy flowers.

Wu Te-lin, Chen Sen-jen, Tsai Hsi-tao, Tong Shao-quan, Chen Pei-shan & Zhao Shi-wang. 1981. Zingiberaceae subfam. Zingiberoideae. *In*: Wu Te-lin, ed., *Fl. Reipubl. Popularis Sin.* 16(2): 22–148.

- 1a. Lateral staminodes forming small teeth at base of labellum, or adnate to labellum (forming a 3-lobed structure), or absent.
- 2a. Lateral staminodes adnate to labellum forming a 3-lobed structure; style extended well beyond fertile part of anther; anther connective crest elongate, wrapped around style 1. *Zingiber*
- 2b. Lateral staminodes forming small teeth at base of labellum or absent; style extended just beyond fertile part of anther; anther connective crest (if present) not wrapped around style.
- 3a. Inflorescences terminal or lateral on pseudostems.
- 4a. Inflorescences lateral, breaking through leaf sheaths 2. *Plagiostachys*
- 4b. Inflorescences terminal.
- 5a. Labellum horizontal or pendulous, broad; filament usually shorter than corolla or labellum 3. *Alpinia*
- 5b. Labellum erect, narrow, or absent; filament exerted above corolla.
- 6a. Labellum erect, narrowly spatulate, base adnate to filament; leaf blade subsagittate or cordate at base 4. *Pommerschea*
- 6b. Labellum absent; filament boat-shaped, apex narrow; leaf blade rounded or acute at apex 5. *Rhynchanthus*
- 3b. Inflorescences on separate shoots arising from rhizomes.
- 7a. Inflorescence not surrounded by a conspicuous involucre of sterile bracts.
- 8a. Bracteoles tubular; leaves usually numerous 6. *Amomum*
- 8b. Bracteoles not tubular; leaves 1 or 2 7. *Elettariopsis*
- 7b. Inflorescence surrounded by a conspicuous involucre of sterile bracts.
- 9a. Base of labellum adnate to filament to form a distinct tube above lateral staminodes and corolla lobes; corolla tube shorter than or equaling labellum 8. *Etilingera*

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- 9b. Base of labellum free from filament; corolla tube more than 2 × as long as labellum 9. *Hornstedtia*
- 1b. Lateral staminodes petaloid.
- 10a. Ovary 1-loculed, placentation parietal; anther long; labellum adnate to filament to form a slender tube above lateral staminodes and corolla lobes 10. *Globba*
- 10b. Ovary 3-loculed, placentation axile; anther short; labellum free from filament.
- 11a. Anther with 2 basal spurs.
- 12a. Inflorescences conical; bracts connate laterally for ca. 1/2 their length, forming basal pouches, each subtending a cincinnus of 2–7 flowers 11. *Curcuma*
- 12b. Inflorescences spikelike; bracts not connate, each subtending 1 flower.
- 13a. Ovary and capsule oblong, cylindric, or clavate; capsule late dehiscent; flowers purple or white, rarely yellow 12. *Roscoea*
- 13b. Ovary and capsule globose; capsule soon dehiscent; flowers yellow or orange 13. *Cautleya*
- 11b. Anther without basal spurs.
- 14a. Leaves all basal or on very short pseudostems; inflorescences terminal on pseudostems or on separate shoots arising from rhizomes.
- 15a. Labellum strongly concave 14. *Boesenbergia*
- 15b. Labellum not concave.
- 16a. Inflorescence surrounded by a campanulate involucre 15. *Stahlianthus*
- 16b. Inflorescence without a campanulate involucre, bracts spirally arranged 16. *Kaempferia*
- 14b. Leaves on conspicuous pseudostems; inflorescences terminal on pseudostems.
- 17a. Bracts 1–3 per inflorescence, margin basally adnate to main axis, apex with leaflike extension 17. *Pyrogophyllum*
- 17b. Bracts 1–10 per inflorescence, rather small or free.
- 18a. Filament very long (rarely very short); anther dorsifixed, apex without appendage ... 18. *Hedychium*
- 18b. Filament short; anther basifixed, apex or connective with appendage.
- 19a. Pedicel articulate; capsule cylindric, torulose, 12–13 cm 19. *Siliquamomum*
- 19b. Pedicel not articulate; capsule ovoid-oblong, not torulose, ca. 1 cm 20. *Caulokaempferia*

1. ZINGIBER Miller, Gard. Dict. Abr., ed. 4, [1545]. 1754, nom. cons.

姜属 *jiang shu*

Rhizomes branched, tuberous, aromatic. Pseudostems erect, leafy. Leaves distichous, held in plane parallel to rhizome; petiole swollen, cushionlike; leaf blade oblong, lanceolate, or linear. Inflorescences conical, arising from rhizomes on peduncle clothed with scalelike sheaths, rarely breaking through leaf sheaths without peduncle; bracts closely imbricate, green or other color, 1-flowered, persistent; bracteoles not tubular. Calyx tubular, split on 1 side, apex 3-toothed. Corolla tube slender; central lobe white or cream, usually wider than lateral lobes. Lateral staminodes adnate to labellum, forming a 3-lobed labellum; central lobe retuse or cleft at apex. Filament short; connective with elongate appendage wrapped around style. Ovary 3-loculed; ovules numerous per locule; placentation axile. Style slender, extending beyond anther locules; stigma not expanded. Capsule dehiscent loculicidally or irregularly. Seeds black, covered by aril; aril white, margin irregularly lacerate.

Between 100 and 150 species: tropical to warm-temperate Asia; 42 species (34 endemic, one introduced) in China.

Zingiber purpureum Roscoe, which is cultivated in Yunnan (Jinghong Xian) for medicinal purposes, is not described in this account.

- 1a. Peduncle erect, 10–30 cm, robust, sometimes absent.
- 2a. Inflorescences breaking through leaf sheaths, peduncle absent; ligule 2-lobed, 1–3 cm 1. *Z. ellipticum*
- 2b. Inflorescences arising from rhizomes on peduncle clothed with scalelike sheaths.
- 3a. Leaf blade 2–3 cm wide.
- 4a. Ligule 2–4 mm; inflorescences ovoid, 4–5 cm; bracts ovate, apex mucronate 2. *Z. officinale*
- 4b. Ligule 8–10 mm; inflorescences fusiform, 4–12 cm; bracts rhombic, apex obtusely acuminate 3. *Z. laoticum*
- 3b. Leaf blade 3–8 cm wide.
- 5a. Ligule 10–20 mm.
- 6a. Ligule 1–1.2 cm; labellum ca. 3 × 2.5 cm, central lobe ligulelike, lateral lobes inconspicuous, ca. 3 mm 4. *Z. neotruncatum*
- 6b. Ligule 1.5–2 cm; labellum ca. 1.5 × 2.5 cm, central lobe suborbicular or subobovate, lateral lobes obovate, ca. 1 cm, free nearly to base 5. *Z. zerumbet*
- 5b. Ligule 1–6 mm.
- 7a. Ligule ca. 6 mm.
- 8a. Ligule 2-lobed; flowers hairy; central lobe of labellum white with orange base, 2-cleft at apex, lateral lobes 2-cleft at apex 6. *Z. menghaiense*
- 8b. Ligule emarginate at apex; flowers glabrous; central lobe of labellum white, emarginate at apex,

- lateral lobes entire at apex 7. *Z. stipitatum*
- 7b. Ligule 1–4 mm.
- 9a. Inflorescences oblong; bracts acute at apex 8. *Z. corallinum*
- 9b. Inflorescences fusiform or ellipsoid; bracts obtuse at apex.
- 10a. Rhizomes white inside; leaf blade elliptic-oblong, 4–11 cm wide, glabrous; ovary glabrous 9. *Z. nudicarpum*
- 10b. Rhizomes yellow inside; leaf blade oblong-ob lanceolate, 1.5–5 cm wide, adaxially glabrous, abaxially sparsely pubescent along midvein and at margin; ovary densely pubescent 10. *Z. paucipunctatum*
- 1b. Peduncle usually to 10 cm, slender, sometimes to 20 cm but then not erect.
- 11a. Labellum not lobed or inconspicuously 3-lobed, lateral lobes absent or very small.
- 12a. Ligule to 0.6 cm.
- 13a. Ligule to 1 mm; corolla ivory white; labellum elliptic 11. *Z. integrilabrum*
- 13b. Ligule 1–6 mm; corolla purple; labellum broadly ovate to lanceolate.
- 14a. Pseudostems 30–40 cm; labellum reddish purple, lanceolate 12. *Z. koshunense*
- 14b. Pseudostems 60–130 cm; labellum yellow with purple stripes, broadly to narrowly ovate.
- 15a. Flowers purple; bracteoles oblong, 2–3 cm; calyx villous, apex 3-toothed 13. *Z. atrorubens*
- 15b. Flowers yellow; bracteoles narrowly ovate, 3.5–4 cm; calyx glabrous, apex subtruncate 14. *Z. longiglande*
- 12b. Ligule 1–5 cm.
- 16a. Ligule 3.5–5 cm.
- 17a. Ligule entire, 4–5 cm, white pubescent; corolla lobes yellowish; labellum ligulelike 15. *Z. longiligulatum*
- 17b. Ligule 2-lobed, to 3.5 cm; corolla lobes slightly red; labellum oblong-cuneate 16. *Z. roseum*
- 16b. Ligule 1–3 cm.
- 18a. Corolla lobes red; labellum orange, 1.8–2 × 0.9–1 cm 17. *Z. yingjiangense*
- 18b. Corolla lobes yellowish or yellowish white; labellum yellow or white, 2.5–3.5 × 1.6–3.5 cm.
- 19a. Corolla lobes yellowish white, apex red; labellum yellow with brown lines, broadly ovate 18. *Z. tuanjuum*
- 19b. Corolla lobes yellowish; labellum white with yellowish margin, narrowly elliptic 19. *Z. wandingense*
- 11b. Labellum conspicuously 3-lobed.
- 20a. Ligule entire.
- 21a. Leaf blade hairy; ligule pale purple, 5–7 cm; corolla lobes red; labellum pale brown with black spots, central lobe ligulelike 20. *Z. integrum*
- 21b. Leaf blade glabrous; ligule green-white, 1.3–1.5 cm; corolla lobes white; labellum white, central lobe semiorbicular 21. *Z. orbiculatum*
- 20b. Ligule 2-lobed.
- 22a. Leaf blade adaxially hairy; petiole absent.
- 23a. Ligule 0.1–0.5 cm.
- 24a. Pseudostems 30–60 cm; leaf blade 20–30 × 6–8 cm; labellum deep violet, obovate 22. *Z. kawagoi*
- 24b. Pseudostems 80–100 cm; leaf blade 28–50 × 10–15 cm; labellum yellow, ligulelike 23. *Z. xishuangbannaense*
- 23b. Ligule 0.8–4 cm.
- 25a. Ligule 3–4 cm; labellum brown with purple-brown spots, central lobe ligulelike 24. *Z. fragile*
- 25b. Ligule 0.8–1.1 cm; labellum white with red spots, central lobe broadly obovate 25. *Z. recurvatum*
- 22b. Leaf blade adaxially glabrous; petiole usually present.
- 26a. Ligule (1–)4–8 cm.
- 27a. Corolla tube yellowish; anther connective appendage purple, ca. 7 mm 26. *Z. flavomaculosum*
- 27b. Corolla tube white; anther connective appendage blue, 11–14 mm.
- 28a. Bracts obovate; bracteoles tubular; corolla tube ca. 2.7 cm; ovary glabrous 27. *Z. monglaense*
- 28b. Bracts and bracteoles oblong; corolla tube 4–4.7 cm; ovary densely villous 28. *Z. bisectum*
- 26b. Ligule to 2 cm.
- 29a. Leaf blade abaxially densely black spotted 29. *Z. nigrimaculatum*
- 29b. Leaf blade abaxially not black spotted.
- 30a. Labellum white, white with purple lines, or yellowish white with purple or red apex.
- 31a. Leaves aggregated at apex of pseudostems; petiole 2–5 cm 30. *Z. densissimum*
- 31b. Leaves not aggregated at apex of pseudostems; petiole absent to 1.5 cm.
- 32a. Labellum white with purple lines or yellowish white with purple or red apex.
- 33a. Central lobe of labellum white with purple lines, elliptic, ca. 2.8 cm, apex entire 31. *Z. yunnanense*
- 33b. Central lobe of labellum yellowish white, oblanceolate, ca. 2 cm, apex purple or red, 3-toothed 32. *Z. cochleariforme*
- 32b. Labellum wholly white.
- 34a. Calyx ca. 2.5 cm, apex subtruncate; central lobe of labellum broadly ovate 33. *Z. leptorrhizum*
- 34b. Calyx 1.1–1.4 cm, apex 2- or 3-toothed; central lobe of labellum fan-shaped or obovate.
- 35a. Leaf blade narrowly lanceolate, 15–27 × 1.8–3.5 cm; bracts purple; central lobe of

- labellum obovate, ca. 1 cm, lateral lobes ca. 0.3 cm 34. *Z. lingyunense*
- 35b. Leaf blade obovate, oblanceolate, or oblong, 1.5–35 × 1.2–7.5 cm; bracts green or white; central lobe of labellum fan-shaped, 1.7–2.5 cm, lateral lobes 1–1.5 cm 35. *Z. simaoense*
- 30b. Labellum yellow, red, or purple.
- 36a. Labellum yellow, at least centrally.
- 37a. Labellum yellowish; corolla lobes linear, 3.5–4 × ca. 0.5 cm 36. *Z. guangxiense*
- 37b. Labellum yellow at center, white at margin; corolla lobes lanceolate, 2.7–3 × ca. 0.7 cm 37. *Z. mioga*
- 36b. Labellum red or purple.
- 38a. Leaf blade 25–40 × 5–11 cm, abaxially appressed villous and glandular spotted 38. *Z. longyanjiang*
- 38b. Leaf blade 9–35 × 3–6 cm, abaxially glabrous except for slightly hairy midvein, rarely sparsely villous, not glandular spotted.
- 39a. Petiole ca. 2 mm, ligule 2–4 mm 39. *Z. teres*
- 39b. Petiole 3–12 mm, ligule 4–7 mm.
- 40a. Bracts broadly ovate or elliptic, pubescent; corolla lobes 3–3.5 cm 40. *Z. striolatum*
- 40b. Bracts lanceolate or linear-lanceolate, glabrous; corolla lobes 2–2.1 cm.
- 41a. Petiole 10–17 mm; leaf blade abaxially sparsely villous; corolla tube ca. 2.6 cm 41. *Z. gulinense*
- 41b. Petiole 3–6 mm; leaf blade abaxially glabrous; corolla tube ca. 3.8 cm 42. *Z. pleiostachyum*

1. *Zingiber ellipticum* (S. Q. Tong & Y. M. Xia) Q. G. Wu & T. L. Wu in Q. G. Wu et al., *Acta Phytotax. Sin.* 34: 416. 1996.

侧穗姜 *ce sui jiang*

Plagiostachys elliptica S. Q. Tong & Y. M. Xia, *Acta Phytotax. Sin.* 25: 460. 1987.

Rhizomes deep purple-red inside. Pseudostems 60–100 cm. Leaf sheath brown; ligule 2-lobed, 1–3 cm, brown pubescent; petiole 1–9 cm; leaf blade elliptic or elliptic-lanceolate, 40–55 × 14–16 cm, adaxially sparsely hairy, abaxially densely pubescent, base cuneate or attenuate, margin ciliate, apex shortly acuminate. Inflorescences breaking through leaf sheaths 20–50 cm above ground, sessile, ellipsoid to oblong, 11–18 × 4–5.5 cm; bracts yellowish white or pale yellowish green, obovate, 4–4.5 × 3–4.5 cm, pubescent, copiously slimy. Calyx yellowish, 1.5–2 cm, split on 1 side, pubescent. Corolla tube yellowish, 4–4.5 cm; central lobe narrowly ovate, 2–3 cm × 8–10 mm; lateral lobes lanceolate, 5–7 mm wide. Labellum 2.4–2.8 cm; central lobe purple with 2 parallel, yellow lines and yellow blotches at base, obovate-oblong, 1.5–2 cm × 7–9 mm; lateral lobes yellow with purple blotches, elliptic, 1.2–1.6 cm × 6–8 mm. Filament 5–10 mm; anther yellow, 1.3–1.4 cm; connective appendage purple, 1–1.3 cm. Ovary glabrous. Capsule yellow-green, obovoid, 3-angled, apex with persistent calyx. Seeds 4–6 per valve, brownish black, enclosed by white aril. Fl. Aug, fr. Oct. $2n = 22^*$.

- Forests; ca. 600 m. SE Yunnan (Maguan Xian).

2. *Zingiber officinale* Roscoe, *Trans. Linn. Soc. London* 8: 348. 1807.

姜 *jiang*

Amomum zingiber Linnaeus, *Sp. Pl.* 1: 1. 1753; *Zingiber sichuanense* Z. Y. Zhu et al.

Rhizomes branched, yellowish inside, thickened, fleshy, strongly aromatic. Pseudostems 50–100 cm. Leaves sessile; ligule slightly 2-lobed, 2–4 mm, membranous; leaf blade lanceolate or linear-lanceolate, 15–30 × 2–2.5 cm, glabrescent. Inflorescences arising from rhizomes, ovoid, 4–5 × ca. 1.5 cm; peduncle to 25 cm; bracts pale green, sometimes yellowish at

margin, ovate, ca. 2.5 cm, apex mucronate; bracteoles equaling bracts. Calyx ca. 1 cm. Corolla yellowish green; tube 2–2.5 cm; lobes lanceolate, ca. 1.8 cm. Central lobe of labellum with purple stripe and cream blotches, oblong-obovate, shorter than corolla lobes; lateral lobes ovate, ca. 6 mm, free nearly to base. Stamen dark purple; anther ca. 9 mm; connective appendage curved, ca. 7 mm. Fl. Oct. $2n = 22^*$.

Cultivated. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [native origin unknown; widely cultivated in the tropics and subtropics].

Widely cultivated for medicine and spice.

3. *Zingiber laoticum* Gagnepain, *Bull. Soc. Bot. France* 54: 168. 1907.

梭穗姜 *suo sui jiang*

Pseudostems ca. 80 cm. Leaves sessile; leaf sheath 2–7 cm; ligule entire, 8–10 mm, membranous; leaf blade linear, ca. 30 × 3 cm, glabrescent, base attenuate, apex caudate. Inflorescences arising from rhizomes, fusiform, 8–12 × ca. 2.5 cm; peduncle 15–30 cm; bracts purple, rhombic, 3–4 × 1.5–2.5 cm, margin membranous, apex obtuse-acuminate. Calyx 2.5–2.8 cm, pubescent. Corolla tube 3–4 cm; lobes with brown stripe, lanceolate, ca. 2 cm. Labellum with brown stripe, ca. 2 cm. Anther sessile, ca. 1.3 cm; connective appendage incurved, ca. 7 mm. Ovary hirsute. Fl. Apr.

Roadsides; ca. 800 m. S Yunnan [Laos].

4. *Zingiber neotruncatum* T. L. Wu et al., *Novon* 10: 91. 2000.

截形姜 *jie xing jiang*

Zingiber truncatum S. Q. Tong, *Acta Phytotax. Sin.* 25: 147. 1987, not Stokes (1812, nom. illeg., included *Amomum zedoaria* Christmann).

Pseudostems 1–1.5 m, base with purple sheaths. Leaves sessile; ligule 1–1.2 cm, densely white pubescent, apex truncate; leaf blade narrowly lanceolate, 30–40 × 4.5–6 cm, adaxially glabrous except densely white pubescent at base of midvein, abaxially white pubescent, base cuneate, apex acuminate or

caudate. Inflorescences arising from rhizomes, oblong or narrowly ellipsoid, 10–13 × 3–3.5 cm; peduncle erect, 6–13 cm; bracts red, ovate or broadly so, 3–4 × 2.5–3.5 cm, densely white pubescent; bracteoles white with red apex, tubular, ca. 3.5 cm. Flowers white. Calyx ca. 1.5 cm, apex truncate. Corolla tube ca. 5 cm, apex slightly yellowish; central lobe narrowly lanceolate, ca. 3 × 1 cm; lateral lobes ca. 7 mm wide. Labellum ovate, ca. 3 × 2.5 cm; central lobe ligulelike, apex emarginate; lateral lobes inconspicuous, ca. 3 mm. Anther sessile, ca. 1.5 cm; connective appendage ca. 5 mm. Ovary green, sparsely white pubescent. Fl. Aug.

- Moist places in forests; ca. 800 m. S and W Yunnan.

5. *Zingiber zerumbet* (Linnaeus) Roscoe ex Smith, Exot. Bot. 2: 105. 1806.

红球姜 hong qiu jiang

Amomum zerumbet Linnaeus, Sp. Pl. 1: 1. 1753.

Rhizomes yellowish inside, tuberous. Pseudostems 0.6–2 m. Leaves sessile or shortly petiolate; ligule entire, 1.5–2 cm; leaf blade lanceolate or oblong-lanceolate, 15–40 × 3–8 cm, glabrescent or abaxially somewhat pilose, base narrowed, apex acuminate. Inflorescences arising from rhizomes, conical or ovoid-oblong, 6–15 × 3.5–5 cm, apex obtuse; peduncle 10–30 cm, scalelike sheaths 5–7; bracts closely imbricate, green when young, red when old, slightly hairy, slimy adaxially, margin membranous; bracteoles ca. 1.5 cm. Calyx 1.2–2 cm, membranous, split on 1 side, apex 3-toothed. Corolla tube 2–3 cm, slender; lobes pale yellow, lanceolate, central one 1.5–2.5 cm. Labellum pale yellow, ca. 1.5 × 2.5 cm; central lobe suborbicular or subobovate, 1.5–2 × ca. 1.5 cm, apex emarginate; lateral lobes obovate, ca. 1 cm, free nearly to base. Stamen ca. 1 cm; connective appendage beaklike, ca. 8 mm. Ovary ca. 4 mm, glabrous. Capsule ellipsoid, 0.8–1.2 cm. Seeds black. Fl. Jul–Sep, fr. Oct. $2n = 22^*$.

Moist places in forests. Guangdong, Guangxi, Taiwan, Yunnan [Cambodia, India, Laos, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

Widely cultivated, medicinal.

6. *Zingiber menghaiense* S. Q. Tong, Acta Phytotax. Sin. 25: 145. 1987.

勐海姜 meng hai jiang

Pseudostems 1.3–1.8 m, base purplish red. Ligule 2-lobed, ca. 6 mm, margin membranous, white; petiole ca. 3 mm, pubescent; leaf blade narrowly lanceolate, ca. 25 × 3.5–4 cm, glabrous, base cuneate, margin membranous, white, apex caudate. Inflorescences arising from rhizomes, narrowly ellipsoid or oblong, 9–12 × 3–4 cm; peduncle erect, purplish red, 15–20 cm, white pubescent; bracts red when old, purplish red at margin, ovate or broadly so, 3.5–4 × 3–3.5 cm, white pubescent; bracteoles ca. 3 cm, glabrous. Calyx white, ca. 1.5 cm, base white pubescent. Corolla tube white, yellow at apex, ca. 3.5 cm; lobes orange, central one narrowly elliptic, ca. 2 × 1 cm, lateral ones ca. 5 mm wide. Labellum slightly villous; central lobe white, orange at base, narrowly obovate, ca. 2.2 × 1.2 cm, apex 2-cleft; lateral lobes white, red at basal margin, ca. 1.2 cm × 4 mm,

apex 2-cleft. Filament ca. 2 mm; anther yellowish, ca. 1 cm; connective appendage orange, ca. 5 mm.

- Forests; ca. 1200 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou).

7. *Zingiber stipitatum* S. Q. Tong, Acta Phytotax. Sin. 25: 146. 1987.

唇柄姜 chun bing jiang

Pseudostems 1–1.6 m, base purplish red. Leaf sheath green, with conspicuous, longitudinal stripes; ligule emarginate, ca. 6 mm; petiole ca. 4 mm; leaf blade narrowly lanceolate, 24–30 × 3.5–4.5 cm, glabrous, base rounded or cuneate, apex acuminate or caudate. Inflorescences arising from rhizomes, oblong or narrowly ellipsoid, 12–17 × 4–5 cm; peduncle erect, 11–19 cm; bracts green when young, becoming red, purplish red at apex, nearly white at margin, ovate or broadly so, 3–4.5 × 2.5–3.5 cm, puberulent; bracteoles tubular, ca. 2.5 cm. Flowers white, glabrous. Calyx ca. 1.5 cm, apex 1-toothed. Corolla tube ca. 3.8 cm; lobes lanceolate, ca. 1.7 × 1 cm, central one wider than lateral ones. Labellum white; central lobe suborbicular, ca. 1.8 × 1.2 cm, base narrowed into a claw, apex emarginate; lateral lobes red at basal margin, ca. 1.1 cm × 3 mm, apex acute. Anther sessile, ca. 1 cm; connective appendage ca. 6 mm. Ovary pale green, densely white pubescent. Fl. Jul.

- Moist places in forests; ca. 1200 m. W Yunnan (Ruili Xian).

8. *Zingiber corallinum* Hance, J. Bot. 18: 301. 1880.

珊瑚姜 shan hu jiang

Pseudostems ca. 1 m. Leaves sessile; leaf sheath sparsely hairy or glabrous; ligule 2–4 mm; leaf blade oblong-lanceolate or lanceolate, 20–30 × 4–6 cm, adaxially glabrous, abaxially sparsely hairy or glabrous. Inflorescences arising from rhizomes, oblong, 15–30 cm; peduncle 15–20 cm, scalelike sheaths 4–5 cm; bracts red, ovate, 3–4 cm, apex acute. Calyx 1.5–1.8 cm, split to middle. Corolla tube ca. 2.5 cm; lobes with purple stripe, oblong, ca. 1.5 cm, apex acute, central lobe larger than lateral ones. Central lobe of labellum obovate, ca. 1.5 cm; lateral lobes ca. 8 mm, apex acute. Anther sessile, ca. 1 cm; connective appendage beaklike, curved, ca. 5 mm. Ovary 2–2.5 mm, sericeous. Seeds black, glossy. Fl. May–Aug, fr. Aug–Oct. $2n = 22^*$.

- Dense forests. Guangdong, Guangxi, Hainan.

Medicinal.

9. *Zingiber nudicarpum* D. Fang, Guihaia 2: 139. 1982.

光果姜 guang guo jiang

Rhizomes white inside, 1.5–2.5 cm in diam. Pseudostems 1.5–2.5 m. Ligule ca. 2 mm, apex emarginate; petiole ca. 5 mm; leaf blade elliptic-oblong, 20–45 × 4–11 cm, glabrous, base narrowed, apex acuminate. Inflorescences arising from rhizomes, fusiform, 7–14 × 2.5–3 cm; peduncle erect, 17–25 cm, scalelike sheaths 1–4.5 cm; bracts obovate, 3.7–5 × 1.5–6 cm, apex obtuse; bracteoles ovate-oblong, 3–3.3 × ca. 1.7 cm, membranous. Flowers white or yellowish. Calyx 2.5–3.2 cm, membranous, apex slightly 3-toothed. Corolla tube ca. 4.5 cm; lobes

lanceolate, ca. 2 cm, central one cucullate, larger than lateral ones. Labellum purple dotted, ca. 2.5 cm; central lobe ovate, ca. 1.5 cm wide, apex 2-4-lobed; lateral lobes ovate, 6-8 mm, apex emarginate. Filament ca. 2 mm; anther 1.3-1.5 cm; connective appendage 1.2-1.4 cm. Ovary glabrous. Fl. Jun. $2n = 22^*$.

- Forest floors; ca. 300 m. Guangxi.

10. *Zingiber paucipunctatum* D. Fang in D. Fang & D. H. Qin, *Guihaia* 16: 6. 1996.

少斑姜 shao ban jiang

Rhizomes yellow inside, tuberous. Pseudostems ca. 1.8 m. Leaf sheath subglabrous; ligule 2-lobed, 1-2 mm, papery, margin ciliate; petiole ca. 2 mm, pubescent; leaf blade oblong-ob-lanceolate, 6-40 × 1.5-5 cm, adaxially glabrous, abaxially pubescent along midvein and at margin, base attenuate, apex acuminate. Inflorescences arising from rhizomes, ellipsoid, rarely subconical, 10-20 × 3-4 cm, many flowered; peduncle erect, 19-32 cm; bracts imbricate, purple with green margin, obovate to broadly ovate, 2.5-3.5 cm, pubescent, apex obtuse; bracteoles pale purple with white margin, broadly elliptic, ca. 2.8 × 2 cm, apex 2-cleft. Calyx ca. 1.7 cm, split on 1 side, apex 3-toothed, ciliate. Corolla tube white, ca. 3.5 cm; lobes yellowish, central one ca. 2.3 × 1.3 cm, lateral ones lanceolate, ca. 1.7 cm × 7 mm. Labellum yellowish; central lobe suborbicular or broadly ovate, 1.6-2 × 2-2.5 cm, inconspicuously sparsely punctate, margin erose, apex 2-cleft; lateral lobes broadly ovate, ca. 5 × 7 mm, apex entire or 1-toothed. Anther subsessile, ca. 1.2 cm; connective appendage ca. 1 cm. Ovary densely appressed pubescent. Fl. Jul-Aug.

- S and W Guangxi.

11. *Zingiber integrilabrum* Hance, *J. Bot.* 20: 80. 1882.

全唇姜 quan chun jiang

Rhizomes branched, odorless. Pseudostems 40-100 cm. Ligule orbicular, 2-lobed, to 1 mm; petiole absent to 5 mm; leaf blade lanceolate, 15-18 × ca. 3 cm, adaxially glabrous, abaxially pubescent or pilose. Inflorescences arising from rhizomes, ca. 1/2 embedded in ground, 4- or 5-flowered; peduncle 1-2 × as long as inflorescence, scalelike sheaths 2-3 cm; bracts becoming brownish when old, lanceolate, 2-3 cm, glabrous; bracteoles ca. 2 cm, membranous. Calyx ca. 2 cm, split on 1 side, glabrous. Corolla ivory white; tube ca. 2.7 cm; lobes lanceolate, ca. 1.8 cm. Labellum elliptic; lateral lobes reduced to rounded teeth or absent. Anther sessile, ca. 8 mm; connective appendage ca. 7 mm. Fl. Apr.

- Hong Kong.

12. *Zingiber koshunense* C. T. Moo in T. L. Wu et al., *Novon* 10: 88. 2000.

恒春姜 heng chun jiang

Rhizomes subcreeping, slender. Pseudostems 30-40 cm. Ligule small, membranous; petiole short; leaf blade linear-lanceolate, 15-25 × 5-6 cm, base narrowed, apex acuminate. Inflorescences 2 or 3 arising from rhizomes, oblong; bracts green, lanceolate; bracteoles 2 per flower. Calyx short. Corolla lobes purple. Labellum reddish purple, lanceolate. Capsule

orange-red, oblong, 3-angled, with bracteoles adnate, pink, persistent. Seeds 3 or 4 per valve, brown, subglobose; aril saclike. Fl. Jan, fr. Sep.

- S Taiwan (including Lan Yu).

13. *Zingiber atrorubens* Gagnepain, *Bull. Soc. Bot. France* 49: 252. 1902.

川东姜 chuan dong jiang

Rhizomes gingerlike, strongly aromatic. Pseudostems 80-110 cm. Leaves sessile; ligule with red lines, obtusely deltoid, 2-lobed, ca. 6 mm; leaf blade glaucous, lanceolate, 15-25 × 3-6 cm, adaxially glabrous, abaxially pilose near base. Inflorescences arising from rhizomes, ovoid, laxly few flowered; peduncle embedded in ground, very short; bracts green or pale purple, ovate-oblong or lanceolate, ca. 5 cm, pilose; bracteoles oblong, ca. 2.3 cm, membranous. Flowers purple. Calyx ca. 3 cm, split on 1 side to middle, villous, apex 3-toothed. Corolla tube 4-5 cm; lobes lanceolate, central one 1.5-1.8 cm wide, lateral ones pale purple, narrower than central one. Labellum with purple stripes, ovate or narrowly so, ca. 3 × 2 cm, apex entire or emarginate; lateral lobes absent. Anther sessile, ca. 1.5 cm; connective appendage ca. 1.5 cm. Ovary villous.

- Guangxi, E Sichuan.

14. *Zingiber longiglande* D. Fang & D. H. Qin, *Guihaia* 16: 7. 1996.

长腺姜 chang xian jiang

Rhizomes yellow inside, tuberous; roots with fusiform tubers at tip. Pseudostems ca. 1.3 m. Leaf sheath membranous at margin; ligule 2-lobed, 1-6 mm, membranous; petiole absent to 5 mm, appressed pubescent; leaf blade narrowly elliptic, rarely lanceolate, 8-30 × 1.5-5 cm, adaxially glabrous, abaxially sparsely appressed pubescent, base attenuate, apex acuminate. Inflorescences arising from rhizomes, ovoid or narrowly ellipsoid, 5-6.6 × 2-3.5 cm; bracts purple, narrowly ovate, ca. 4.5 × 1.3(-2) cm, sparsely appressed pubescent abaxially, apex shortly acuminate; bracteoles narrowly ovate, 3.4-4 × ca. 1 cm, apex obtuse. Calyx glabrous, 2.3-2.5 cm, split on 1 side, apex subtruncate, with 3 rounded teeth. Corolla tube 3-4 cm; lobes yellow, central one ovate, ca. 3 × 1.4 cm, lateral ones lanceolate, ca. 2.5 cm × 8 mm. Labellum yellow with pink spots, broadly ovate, ca. 3.5 × 3 cm, margin slightly undulate, apex retuse; lateral lobes absent. Anther subsessile, ca. 1.4 cm; connective appendage ca. 1.8 cm. Ovary densely appressed pubescent. Style 6-6.7 cm; stigma ciliate. Stylodes needle-shaped, ca. 8 mm. Fl. Jul.

- Hill slopes; ca. 700 m. Guangxi.

15. *Zingiber longiligulatum* S. Q. Tong, *Acta Phytotax. Sin.* 25: 140. 1987.

长舌姜 chang she jiang

Pseudostems 80-100 cm, base with purple sheaths. Ligule entire, 4-5 cm, white pubescent; petiole 5-10 mm; leaf blade lanceolate or narrowly lanceolate-elliptic, 40-50 × ca. 10 cm, adaxially glabrous, abaxially white pubescent, base narrowed, apex acuminate. Inflorescences arising from rhizomes, oblong,

4–4.5 × 2–2.4 cm; peduncle 2–6 cm; bracts narrowly lanceolate, 4–4.5 cm × 8–9 mm, white pubescent, apex acuminate; bracteoles 3.8–4.2 cm. Calyx 2–2.3 cm, membranous, puberulent, apex 3-toothed. Corolla tube yellowish at apex, 3.8–4.2 cm, densely pubescent; lobes yellowish, central one linear-lanceolate, 2.8–3.2 cm × ca. 3 mm, lateral ones ca. 2 mm wide. Labellum yellowish, ligulelike, ca. 3 × 1 cm, apex entire; lateral lobes absent. Anther sessile, white, ca. 1.7 cm; connective appendage orange, ca. 8 mm. Ovary densely brown pubescent. Fl. Aug.

- Forest floors; ca. 900 m. W Yunnan (Yingjiang Xian).

16. Zingiber roseum (Roxburgh) Roscoe, Trans. Linn. Soc. London 8: 348. 1807.

红冠姜 hong guan jiang

Anomum roseum Roxburgh, Pl. Coromandel 2: 15. 1800.

Pseudostems ca. 1.5 m. Leaves sessile; ligule 2-lobed, to 3.5 cm, membranous; leaf blade oblong or oblong-lanceolate, ca. 30 × 3–5 cm, adaxially glabrous, abaxially villous. Inflorescences arising from rhizomes, ellipsoid, ca. 6 cm, very dense; peduncle very short; bracts red, 3.5–4.5 cm, outer ones broadly ovate, inner ones ovate-lanceolate. Calyx green, ca. 1.5 cm. Corolla tube white, ca. 2 cm; lobes pale red, lanceolate. Labellum white, oblong-cuneate, shorter than corolla lobes, margin recurved, crisped; lateral lobes yellow, orbicular, very small. Stamen arching over and equaling labellum; anther equaling connective appendage. Fl. autumn. $2n = 22$.

Moist places of forests; ca. 900 m. SW Yunnan [India, Myanmar, Thailand].

17. Zingiber yingjiangense S. Q. Tong, Acta Phytotax. Sin. 25: 142. 1987.

盈江姜 ying jiang jiang

Pseudostems 1–1.2 m, base with red sheaths. Leaf sheath longitudinally striate, white pubescent; ligule 2-lobed, 1.5–2.4 cm, hairy; petiole reddish adaxially, ca. 5 mm; leaf blade elliptic or lanceolate-elliptic, 25–45 × 9–11 cm, abaxially pubescent, midvein elevated adaxially when dry, base attenuate, apex acuminate or shortly so. Inflorescences arising from rhizomes, oblong, 5–6 × 2.4–3 cm; peduncle 2–6 cm; outer bracts ovate or oblong, 3.5–5.5 × 2–2.5 cm, inner bracts narrowly lanceolate, 4–4.5 × 0.7–1 cm, pubescent; bracteoles red at margin, narrowly triangular, equaling bracts. Calyx 1.6–2 cm, pubescent, apex minutely 2-toothed. Corolla tube 3–3.3 cm, densely pubescent; lobes red, lanceolate, 2.2–2.5 cm × 4–6 mm, glabrous. Labellum orange, oblong, 1.8–2 × 0.9–1 cm, apex entire; lateral lobes absent. Filament very short; anther white, ca. 1.6 cm; connective appendage orange, ca. 9 mm. Ovary densely brown pubescent. Fl. Aug.

- Forests; ca. 1000 m. W Yunnan (Yingjiang Xian).

18. Zingiber tuanjuum Z. Y. Zhu, Acta Bot. Yunnan. 6: 187. 1984.

团聚姜 tuan ju jiang

Rhizomes irregularly branched, yellowish white inside.

Pseudostems 0.8–1.5 m. Ligule 2-lobed, 1–2.8 cm; petiole 0.5–1.5 cm; leaf blade lanceolate, rarely elliptic, ca. 15 × 3.5–8.5 cm, adaxially glabrous, abaxially appressed villous, base cuneate, apex caudate-acuminate. Inflorescences arising from rhizomes, subellipsoid, 5–7 × 2–3 cm, 12–20-flowered; peduncle 2–6(–16) cm, villous; bracts purple-brown or purplish red, broadly ovate or lanceolate, 3.5–5.5 × 1–5 cm, sparsely appressed villous, apex acuminate, outer ones subdistichous; bracteoles equaling bracts, villous. Calyx white, ca. 2.8 cm, membranous, split on 1 side. Corolla yellowish white; tube 3.5–4 cm, throat sparsely pubescent; lobes red at apex, lanceolate, central one ca. 3.5 × 1.7 cm, lateral ones 2.5–3.5 cm, margin entire or crisped. Lateral lobes of labellum toothlike or absent. Filament ca. 2 mm; anther ca. 1.5 cm; connective appendage 1.8–2.2 cm. Ovary densely villous.

- Forests; ca. 900 m. C Sichuan (Emei Shan).

Used as a vegetable.

19. Zingiber wandiangense S. Q. Tong, Acta Phytotax. Sin. 25: 143. 1987.

碗町姜 wan ding jiang

Pseudostems 1.3–1.6 m × 1.3–2.2 cm, base with purplish red sheaths. Leaf sheath conspicuously longitudinally striate; ligule 2-lobed, 1.2–1.5 cm; leaf blade lanceolate or lanceolate-elliptic, 30–40 × 6–7.5 cm, adaxially glabrous, abaxially sparsely hairy, midvein basally purplish red and enlarged, base cuneate or attenuate, apex acuminate or shortly so. Inflorescences arising from rhizomes, ellipsoid, 6–9 × 2.5–3.5 cm; peduncle 3–7 cm, scalelike sheaths deep red; bracts white with pale red base and apex, oblong to narrowly lanceolate, 3.4–4 × 0.8–2.1 cm; bracteoles 3–3.5 cm. Calyx white, 1.8–2 cm, apex entire. Corolla tube white, 3.5–4 cm; lobes yellowish, central one narrowly lanceolate, 2–2.2 cm × 6–8 mm, lateral ones narrower. Labellum white with yellowish margin, narrowly elliptic, 2.8–3 × 1.6–1.8 cm, apex entire; lateral lobes absent. Anther sessile, yellow, ca. 1.4 cm; connective appendage orange, ca. 8 mm. Ovary densely white pubescent. Fl. Jul.

- Forests; ca. 1000 m. W Yunnan (Wanding Zhen).

20. Zingiber integrum S. Q. Tong in S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 465. 1987.

全舌姜 quan she jiang

Pseudostems 1.5–2 m. Leaves sessile; ligule pale purple, entire, 5–7 cm; leaf blade lanceolate or oblong-lanceolate, 40–70 × 8–9.5 cm, adaxially sparsely hairy along sides of midvein, abaxially sparsely hairy except densely pubescent along sides of midvein, midvein basally enlarged and densely red dotted at sides, base subrounded or cuneate, apex acuminate. Inflorescences arising from rhizomes, ovoid or capitate, 5–7 × 4–4.5 cm; peduncle 2–4 cm; bracts ovate or broadly oblong, 4–4.5 × 2–2.3 cm, inner ones attenuate-deltoid, 3.4–4 cm × 4–5 mm, apex acute; bracteoles red, 3.4–4 cm. Calyx white, 2.5–3 cm, 3-angled, apex 3-toothed. Corolla tube white with red apex, 4–4.3 cm; lobes red, lanceolate, central one 2.5–3 × 1.5–3 cm, lateral ones narrower. Labellum pale brown, black dotted; central lobe ligulelike, 2.8–3.2 × 0.9–1.1 cm; lateral lobes 1.6–1.9 × 1.1–1.3

cm. Anther sessile, white, ca. 1.3 cm; connective appendage ca. 1.4 cm. Ovary pale brown pubescent. Fl. Jul.

- Gullies; ca. 900 m. SW Yunnan (Jinghong Xian) [?Thailand]. Tentatively recorded from Thailand by Theilade (Nordic J. Bot. 19: 409. 1999).

21. *Zingiber orbiculatum* S. Q. Tong in S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 463. 1987.

圆瓣姜 yuan ban jiang

Pseudostems 1.4–3.2 m. Ligule greenish white, 1.3–1.5 cm, glabrous, apex subtruncate; leaf blade narrowly lanceolate, 45–60 × 7–9 cm, glabrous, midvein basally enlarged and densely red dotted at sides, base cuneate, apex acuminate. Inflorescences arising from rhizomes, ovoid or capitate, 5–8 × 3.5–5 cm; peduncle 2–5 cm; bracts ovate or broadly so, 3–4 × 2.8–3.6 cm, apex acute or shortly acuminate; bracteoles pale proximally, red distally, tubular, 3.4–4.1 cm, white pubescent. Calyx 1.8–2.2 cm, puberulent except densely pubescent at base, apex 3-toothed. Corolla tube 3.4–3.6 cm; lobes white with red apex, lanceolate, 2.7–3 cm, pubescent. Labellum white, orbicular, 2.2–2.4 × 2–2.2 cm; central lobe semiorbicular, margin crisped, apex emarginate; lateral lobes auriculate, ca. 1.4 cm × 5 mm. Filament ca. 2 mm; anther yellow, ca. 1.2 cm; connective appendage ca. 1.2 cm. Ovary pale proximally, yellow distally, subellipsoid, densely pubescent. Capsule dark red with pale brown base, oblong, 4–5 × 2–2.5 cm, 3-angled. Seeds black, obovoid, ca. 6 × 5 mm. Fl. Jul.

- Forests; ca. 600 m. S Yunnan (Mengla Xian).

22. *Zingiber kawagoi* Hayata, Icon. Pl. Formos. 10: 35. 1921.

毛姜 mao jiang

Rhizomes creeping, ca. 1 cm in diam., subterete, slender. Pseudostems 30–60 cm. Ligule auriculate, 2-lobed; petiole very short; leaf blade oblong or oblong-lanceolate, 20–30 × 6–8 cm, sparsely pubescent on both surfaces, base obtuse, apex acuminate. Inflorescences arising from rhizomes, 4–5 cm, many flowered; peduncle 4–5 cm; bracts lanceolate, ca. 2 cm, base sheathlike. Calyx ca. 1 cm, split on 1 side, base hirsute, apex truncate. Corolla tube slender, 2–3 cm; lobes purple, ca. 2 cm, central one ca. 9 mm wide, wider than lateral ones, concave. Labellum obovate, ca. 2.2 × 2 cm; central lobe deep violet, obovate-oblong, 1.5–1.2 cm, apex emarginate; lateral lobes yellowish at base, violet at margin and apex, smaller than central lobe. Anther linear, subcylindric, ca. 1 cm; connective appendage linear, curved, ca. 1 cm. Ovary glabrous. Capsule enclosed by persistent bracts and bracteoles, loculicidally dehiscent; pericarp fleshy, red inside. Seeds black; aril cushionlike.

- Taiwan.

23. *Zingiber xishuangbannaense* S. Q. Tong in S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 461. 1987.

版纳姜 ban na jiang

Pseudostems 80–100 cm, base with red sheaths. Leaves sessile; ligule 2-lobed, 2–4 mm; leaf blade purplish red abaxially on basal leaves, elliptic or narrowly lanceolate, 28–50 × 10–

15 cm, adaxially sparsely hairy along sides of midvein, abaxially densely pubescent, base subrounded or cuneate, apex caudate or acuminate. Inflorescences arising from rhizomes, red, ellipsoid or lanceolate, 3–9 × 3–4 cm; peduncle 4–13 cm; bracts ovate or elliptic, 4–4.5 × 3–3.3 cm; bracteoles pale with red apex, 2.4–2.6 cm × 5–6 mm. Calyx 1–1.5 cm, apex 2-toothed. Corolla pale with yellowish apex; tube 4–6 cm; lobes red, lanceolate, curved, central one 2.3–3 × 0.7–1.2 cm, lateral ones narrower. Labellum yellow; central lobe ligulelike, 2.1–2.5 cm × 6–7 mm, margin curved; lateral lobes auriculate, 1.3–1.5 cm × 7–8 mm. Anther ca. 1.4 cm; connective appendage yellow, ca. 1.4 cm. Ovary glabrous. Capsule obpyriform, 3.5–4.5 × 2–2.5 cm, 3-angled. Seeds oblong, ca. 5 mm. Fl. Jul.

- Forests; ca. 800 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou).

24. *Zingiber fragile* S. Q. Tong in S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 464. 1987.

脆舌姜 cui she jiang

Pseudostems 0.8–3 m. Leaves sessile; ligule red spotted at base, 2-lobed, 3–4 cm, membranous, fragile; leaf blade lanceolate or narrowly so, 40–50 × 9–11 cm, slightly puberulent except densely pubescent along sides of midvein, base cuneate, apex acuminate. Inflorescences arising from rhizomes, ovoid or capitate, 4–8 × 3–7.5 cm; peduncle very short; bracts red, ovate or oblong, 3–5 × 2.8–3.8 cm, brown pubescent, apex convex, acute, inner bracts triangular, 3.8–4 × 1.1–1.3 cm, apex attenuate; bracteoles pale red, 2.8–3 cm, white puberulent. Calyx 1.9–2.2 cm, apex 3-toothed, bearded. Corolla tube 3.1–4.2 cm, white pubescent; lobes red, lanceolate, 2.3–3.2 cm × 8–9 mm, lateral ones narrower. Labellum brown with purplish brown spots; central lobe ligulelike, 2–2.4 cm × 7–9 mm; lateral lobes auriculate, 1.3–1.5 cm. Filament ca. 3 mm; anther ca. 2 cm; connective appendage purple, ca. 1.3 cm. Ovary white, pubescent. Fl. Jul.

- Forests; ca. 600 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [N Thailand].

25. *Zingiber recurvatum* S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 470. 1987.

弯管姜 wan guan jiang

Pseudostems 2–3 m × 2–3.5 cm, robust. Leaves sessile; ligule 2-lobed, 8–11 mm, densely pale brown pubescent; leaf blade abaxially purplish red, elliptic-lanceolate or narrowly so, 45–55 × 11–15 cm, adaxially hairy along sides of midvein, abaxially puberulent except densely pubescent along sides of midvein, base rounded, apex acuminate or caudate. Inflorescences arising from rhizomes, red, ovoid or capitate, 7–9 × 6–7 cm; peduncle embedded in ground, 3–5(–15) cm; outer bracts ovate-orbicular or broadly ovate, 3.4–5 × 2.6–4 cm, inner bracts elliptic or narrowly so, 5–5.6 × 1.6–2 cm, apex acuminate or shortly so; bracteoles red, ca. 4.5 cm. Calyx ca. 1.9 cm, apex 2-subulate, slightly red dotted. Corolla red with pale base; tube recurved, 4.6–5 cm, 4-angled, slightly white hairy; lobes lanceolate, 3–3.2 × 0.8–1.2 cm. Labellum white with red spots; central lobe broadly obovate, apex convex; lateral lobes auriculate. Filament ca. 1 mm; anther ca. 1.5 cm; connective appendage ca.

1.7 cm. Ovary yellowish, densely and softly white hairy. Capsule purple, ovoid, 4.5–5 × 2.2–2.6 cm, 3-angled, apex with persistent calyx. Seeds black. Fl. Jul.

- Moist places in forests; ca. 700 m. S Yunnan (Mengla Xian).

26. *Zingiber flavomaculosum* S. Q. Tong, Acta Phytotax. Sin. 25: 144. 1987.

黄斑姜 huang ban jiang

Pseudostems 1–1.5 m. Ligule 2-lobed, 4–5 cm; petiole present on proximal leaves; leaf blade narrowly lanceolate or narrowly elliptic, 40–55 × 9–11 cm, abaxially white pubescent, base cuneate or broadly so, apex shortly acuminate. Inflorescences arising from rhizomes, capitate, ca. 6 × 4 cm; peduncle 2–5 cm, scalelike sheaths red; bracts pale red, ovate-orbicular or oblong, 3–3.2 × 1.7–2 cm, pubescent; bracteoles ca. 2.8 cm, white pubescent. Calyx ca. 1.6 cm, puberulent. Corolla tube yellowish, ca. 3.5 cm; central lobe lanceolate, ca. 2.2 × 1.1 cm; lateral lobes narrower. Labellum lobes gray with yellow-spotted apex, central one nearly ligulelike, ca. 2.5 × 1 cm, apex entire, lateral ones auriculate, ca. 1.5 cm × 8 mm. Anther sessile, ca. 1.3 cm; connective appendage purple, ca. 7 mm. Ovary pale green, densely brown pilose. Fl. Aug.

- Forests; ca. 600 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou).

27. *Zingiber monglaense* S. J. Chen & Z. Y. Chen, Guihaia 8: 315. 1988.

斑蝉姜 ban chan jiang

Pseudostems 1.6–2 m. Leaf sheath green; ligule 2-lobed to middle, 4.5–8 cm, membranous; petiole absent to 2 cm; leaf blade elliptic or oblong-elliptic, 30–70 × 6–15 cm. Inflorescences arising from rhizomes, ca. 1/2 embedded in ground, globose or ellipsoid, 3.5–4.3 cm in diam.; bracts red, white at base and margin, obovate, 3–4 × 1.3–1.5 cm, abaxially pilose, apex tomentose; bracteoles white or red, tubular, 2.7–3 × ca. 1.3 cm, abaxially pubescent. Calyx white, 1.5–2 cm, split on 1 side, pubescent, apex 3-toothed. Corolla tube white, ca. 2.7 cm, pubescent; lateral lobes ca. 2.4 cm × 5 mm. Labellum purplish brown with dense, yellow spots and yellow base; central lobe linear-oblong, 1.7–2.4 cm × 7–8 mm, apex entire or emarginate; lateral lobes ca. 1.4 cm. Anther subsessile, orange, 1.3–1.5 cm; connective appendage pale blue, 1.1–1.4 cm. Fl. Jun–Jul. *2n* = 22*.

- Forests; ca. 800 m. S Yunnan (Mengla Xian).

28. *Zingiber bisectum* D. Fang in D. Fang & D. H. Qin, Guihaia 16: 5. 1996.

裂舌姜 lie she jiang

Rhizomes yellowish inside, tuberous; roots tuberous at tip. Pseudostems to 3.4 m. Leaf sheath villous; ligule 2-cleft, 1–6 cm, subsclerous; petiole absent to 5 mm, villous abaxially; leaf blade suboblong or oblong-oblancoate, ca. 8.5 × 4.5–10 cm, adaxially densely brown dotted along midvein, abaxially sparsely villous, base attenuate, apex acuminate. Inflorescences arising from rhizomes, ovoid or suboblong, 7–10 × 2.5–7 cm, many flowered; peduncle 2–12.5 cm, villous; bracts red or green, oblong, 4–4.5 × ca. 1.1 cm, villous; bracteoles oblong, 3.5–4 cm

× ca. 7 mm, villous. Calyx ca. 2 cm, split on 1 side, villous, apex 3-toothed. Corolla tube white, 4–4.7 cm; lobes yellowish, central one ca. 2.5 cm × 8–9 mm, lateral ones lanceolate, ca. 2.3 cm × 5 mm. Labellum black-purple spotted; central lobe obovate, ca. 2 × 1.3 cm, apex 3-toothed; lateral lobes ca. 10 × 7 mm. Anther subsessile, ca. 1.5 cm; connective appendage ca. 1.2 cm. Ovary densely villous. fl. Aug.

- Hill slopes; ca. 300 m. S Guangxi (Yongning Xian).

29. *Zingiber nigrimaculatum* S. Q. Tong, Acta Phytotax. Sin. 27: 287. 1989.

黑斑姜 hei ban jiang

Pseudostems 0.8–1.2 m × 6–12 mm. Leaf sheath green, white puberulent; ligule bright red at margin, 2-lobed, or entire (when apex truncate), ca. 6 mm, white puberulent; petiole 3–10 mm; leaf blade abaxially densely black spotted, elliptic or narrowly lanceolate, 15–40 × 3–9 cm, abaxially glabrous except puberulent along midvein, lateral veins prominent adaxially, base cuneate, apex acuminate or caudate-acuminate. Inflorescences arising from rhizomes. Flowers unknown. Inflorescence capitate, 3.5–5 × 5–6 cm; peduncle white, apex purplish red, 2–6 cm, glabrous; bracts green, purplish red at apex, lanceolate, ca. 2.5 cm × 6 mm, glabrous. Capsule yellowish green, ovoid, 3.5–4 × 2–2.2 cm, 3-angled, apex with persistent calyx. Seeds purplish black, subovoid, ca. 7 × 5 mm. Fr. Nov.

- Forests; ca. 1800 m. S Yunnan (Mengla Xian).

30. *Zingiber densissimum* S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 467. 1987.

多毛姜 duo mao jiang

Pseudostems 40–70 cm. Leaves aggregated at pseudostem apex; ligule 2-lobed, 0.6–1(–2) cm, densely silvery villous; petiole 2–5 cm, densely silvery villous; leaf blade lanceolate or narrowly so, 22–45 × 4–9 cm, adaxially glabrous, abaxially densely silvery villous, base cuneate or attenuate, apex shortly acuminate. Inflorescences arising from rhizomes, pale or with pale red apex, narrowly ovoid or ovoid, 4.5–5 × 3.4–4.5 cm; peduncle embedded in ground, 3–13 cm, slender; bracts red at apex, elliptic, 3.8–4.2 cm, apex mucronate; bracteoles 2.4–2.6 cm × 4–6 mm, silvery villous. Flowers white. Calyx 1.3–1.5 cm, silvery villous, apex unequally 3-toothed. Corolla tube 4.5–5 cm; lobes lanceolate, central one 2.8–3.1 cm × 8–10 mm, lateral ones 2.2–2.5 cm × 5–6 mm. Labellum fan-shaped; central lobe obovate, 2.5–3 × 2–2.5 cm, apex emarginate; lateral lobes narrower than central one, 2–2.4 × 1–1.2 cm. Filament ca. 2 mm; anther yellow, ca. 1.3 cm; connective appendage ca. 9 mm. Ovary white, silvery villous. Capsule ovoid, ca. 3 × 2 cm, 3-angled. Seeds pale, obovoid, ca. 3 mm. Fl. Jul.

Mixed forests; ca. 1400 m. SW Yunnan (Menghai Xian) [N Thailand].

31. *Zingiber yunnanense* S. Q. Tong & X. Z. Liu, Acta Bot. Yunnan. 13: 27. 1991.

云南姜 yun nan jiang

Pseudostems 1–1.5 m, base with purplish red sheaths. Leaves subsessile; ligule 2-lobed, 4–7 mm, densely pubescent;

leaf blade abaxially purplish red on basal leaves, lanceolate or narrowly so, 15–32 × 5–6.5 cm, abaxially sparsely hairy, base cuneate, apex acuminate or caudate. Inflorescences arising from rhizomes, ellipsoid, ca. 5.7 × 3.5 cm; peduncle embedded in ground, 4–12 cm; bracts slightly hairy, outer ones densely purplish red spotted, yellowish green at base, elliptic, apex mucronate, inner ones green, densely purplish red spotted at apex, tubular, 4–4.5 cm × 6–8 mm; bracteoles ca. 3 cm. Calyx white with red base and apex, ca. 1 cm, sparsely hairy. Corolla tube white with red apex, ca. 3.7 cm, glabrous; central lobe red with slightly yellowish green base, ca. 3.3 × 1.3 cm. Labellum glabrous; central lobe white with purple lines, elliptic, ca. 2.8 × 1.7 cm; lateral lobes auriculate, ca. 1/4 as long as central lobe. Anther yellowish, ca. 1 cm; connective appendage purplish, 2-cleft, ca. 1.5 cm. Ovary densely white pubescent. Fl. Jul.

• W Yunnan (Tengchong Xian).

32. *Zingiber cochleariforme* D. Fang, Acta Phytotax. Sin. 18: 225. 1980.

匙苞姜 *chi bao jiang*

Rhizomes pale yellow, fleshy, strongly aromatic. Pseudostems 0.7–2 m. Ligule 2-lobed, 4–7(–14) mm, glabrous or thinly pubescent; petiole absent to 6 mm, villous; leaf blade elliptic-lanceolate, rarely lanceolate, 35–50 × 8–14 cm, adaxially glabrous, abaxially pilose, glandular spotted on both surfaces, base rounded-cuneate to cuneate, apex acuminate. Inflorescences arising from rhizomes, ovoid to obovoid, 3–6 × 1.5–5 cm; peduncle 1–6 cm, slender, villous; bracts purple or white, cuneate-cochleate to oblong, 1.5–4 × 0.5–2 cm, abaxially pubescent, apex truncate or rounded; bracteoles 2.2–2.8 cm. Calyx yellowish, 1–1.3 cm. Corolla tube 3.5–4 cm; lobes yellowish white, lanceolate, 2.5–3.5 cm. Labellum yellowish white, ca. 2.5 cm; central lobe purple or red at apex, oblanceolate, ca. 2 cm × 8 mm, apex 3-toothed; lateral lobes suboblong, ca. 9 × 5 mm, throat shortly hairy. Anther ca. 1.2 cm; connective appendage purple or red, rarely yellow, ca. 1.2 cm. Ovary densely villous. Capsule red, ovoid-ellipsoid, ca. 4 × 2 cm, obtusely 3-angled, pilose. Seeds black; aril white. Fl. Aug–Oct, fr. Oct–Nov.

• NW Guangxi (Longlin Ge Zu Zizhixian).

33. *Zingiber leptorrhizum* D. Fang, Guihaia 2: 138. 1982.

细根姜 *xi gen jiang*

Rhizomes 1.5–3 mm in diam., slender. Pseudostems 30–150 cm. Ligule 2-lobed, 3–13 mm, villous; petiole very short; leaf blade lanceolate, 4–30 × 2–5 cm, adaxially glabrous, abaxially sparsely appressed villous, base cuneate, apex acuminate. Inflorescences arising from rhizomes, narrowly ovoid, 4.5–7 × 1.5–2 cm, 7–12-flowered; peduncle 5–14 cm, clothed with lanceolate, scalelike sheaths 3–5 cm; bracts deep purple, lanceolate, 4–4.5 × 1–1.2 cm, abaxially villous; bracteoles lanceolate, 3.2–3.5 × ca. 1.2 cm, apex 2-lobed. Flowers white, abaxially villous. Calyx ca. 2.5 cm, apex subtruncate. Corolla tube 3–3.7 cm; lobes lanceolate, hoodlike, 2.6–3 cm × ca. 7 mm. Labellum white, ca. 3 cm; central lobe broadly ovate, ca. 2 cm, apex emarginate or rounded; lateral lobes deltoid, 4–8 mm, apex acute. Filament very short; anther ca. 1.5 cm; connective appen-

dage ca. 1.5 cm. Ovary densely villous. Capsule red. Fl. Aug–Sep. fr. Oct–Nov.

• Forest floors. E Guangxi.

34. *Zingiber lingyunense* D. Fang, Acta Phytotax. Sin. 18: 226. 1980.

乌姜 *wu jiang*

Rhizomes white outside, violet inside, fleshy, tuberous, slightly sweet tasting. Pseudostems 0.5–1.7 m. Ligule 2-lobed, 1–5 mm; petiole 1–5 mm; leaf blade narrowly lanceolate, 15–27 × 1.8–3.5 cm, adaxially glabrous, abaxially pilose, base rounded-cuneate, apex acuminate. Inflorescences arising from rhizomes, ovoid to ovoid-oblong, 3–5.5 × 1–3 cm; peduncle to 24 cm, slender, clothed with purple, oblong or oblanceolate, scalelike sheaths 1–4.5 cm; bracts purple, oblong or oblanceolate, 2.5–4 × 0.6–1.4 cm, abaxially hairy. Flowers white. Calyx 1.1–1.4 cm, base hairy, apex 2- or 3-toothed. Corolla tube ca. 2.5 cm; lobes lanceolate, 1.5–2 cm × ca. 5 mm. Labellum white, ca. 2 cm; central lobe obovate, ca. 1 × 1.2 cm, apex emarginate or rounded; lateral lobes small, ca. 3 mm. Anther ca. 1 cm; connective appendage ca. 1 cm. Ovary villous. Fl. Aug–Sep, fr. Oct–Nov.

• Among rocks in forests. NW Guangxi (Lingyun Xian).

35. *Zingiber simaoense* Y. Y. Qian, Bull. Bot. Res., Harbin 18: 284. 1998.

思茅姜 *si mao jiang*

Rhizomes fleshy; roots ending in tubercles. Pseudostems 30–65 cm. Ligule 2-lobed, 1–8 mm, densely villous; petiole 0.3–1.5(–4.5) cm, gray-brown villous; leaf blade obovate, oblanceolate, or oblong, 1.5–35 × 1.2–7.5 cm, abaxially villous, adaxially glabrous, base cuneate, apex acuminate. Inflorescences arising from rhizomes, green or red, obovoid, 4–7 × 1.5–4 cm; peduncle white, 3–10 cm, villous, scalelike sheaths white, 0.8–3.5 cm, sparsely villous; bracts greenish or white with pinkish apex, obovate or elliptic, 3–5 × 1.3–2.6 cm, villous. Flowers white. Calyx 1–1.5 cm, villous. Corolla tube 4–5 cm; lobes narrowly ovate or lanceolate, 2.4–3 × 0.7–1.1 cm. Labellum fan-shaped, glabrous; central lobe orbicular, 1.7–2.5 × 2.2–3 cm, apex truncate or rounded; lateral lobes obovate, 1–1.5 cm. Anther 1.1–1.2 cm; connective appendage 1.2–1.3 cm. Ovary villous. Capsule red, ovoid, 2–3.5 cm. Seeds black, rarely red. Fl. Sep.

• Forests; 1200–1600 m. S Yunnan (Simao Xian).

36. *Zingiber guangxiense* D. Fang, Acta Phytotax. Sin. 18: 226. 1980.

桂姜 *gui jiang*

Rhizomes tuberous, ca. 1.3 cm in diam. Pseudostems 0.5–1.5 m. Ligule 2–6 mm, puberulent, apex emarginate; petiole 1–4 mm; leaf blade lanceolate or oblong-lanceolate, 25–35 × 5–9 cm, densely purple-brown glandular spotted, abaxially appressed villous, base rounded-cuneate to cuneate, apex acuminate. Inflorescences arising from rhizomes, obovoid, 4–8 × 2–4 cm, more than 20-flowered; peduncle 2.5–20 cm, slender; bracts red or purple, rarely green, oblong-lanceolate, 4–5 × 1–1.5 cm,

abaxially pilose. Calyx 0.9–1.8 cm, hairy. Corolla tube ca. 4.5 cm, glabrous; lobes linear, 3.5–4 cm × ca. 5 mm, pilose. Labellum yellowish, ca. 3 cm; central lobe oblong, ca. 2 cm × 7 mm, apex 2-cleft, rarely entire; lateral lobes suboblong, ca. 10 × 5 mm. Anther ca. 1.4 cm; connective appendage red, ca. 1.8 cm. Ovary ca. 5 mm, densely pilose. Capsule ovoid, 3–4 × 1–1.5 cm, obtusely 3-angled, hairy. Seeds red; aril white. Fl. Sep–Oct. fr. Oct–Nov.

- Forest floors. SE Guangxi (Bobai Xian).

The spelling of the specific epithet follows the protologue; in FRPS it was given as “*Zingiber kwangsiense*.”

37. *Zingiber mioga* (Thunberg) Roscoe, Trans. Linn. Soc. London 8: 348. 1807.

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Amomum mioga Thunberg in Murray, Syst. Veg., ed. 14, 51. 1784; *Zingiber echuanense* Y. K. Yang; *Z. oligophyllum* K. Schumann.

Rhizomes yellowish. Ligule 2-lobed, 3–12 mm, membranous; petiole absent to 1.7 cm; leaf blade lanceolate-elliptic or linear-lanceolate, 20–37 × 4–6 cm, glabrous or abaxially pilose, apex caudate. Inflorescences arising from rhizomes, ellipsoid, 5–7 cm; peduncle absent to 17 cm, scalelike sheaths oblong; bracts reddish green with purple veins, elliptic. Calyx 2.5–3 cm. Corolla tube longer than calyx; lobes yellowish, lanceolate, 2.7–3 cm × ca. 7 mm. Labellum ovate, ca. 3 cm; central lobe yellow with white margin, ca. 2.5 × 1.8 cm; lateral lobes ca. 1.3 cm × 4 mm. Anther ca. 1 cm; connective appendage ca. 1 cm. Capsule obovoid, loculicidally dehiscent; pericarp red inside. Seeds black; aril white. Fl. Aug–Oct. $2n = 22$.

Moist places in mountain valleys; rarely cultivated. Anhui, Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Yunnan, Zhejiang [Japan].

Medicinal and a vegetable.

38. *Zingiber longyanjiang* Z. Y. Zhu, Bull. Sichuan School Chin. Mat. Med. 30(2): 28. 1992.

龙眼姜 long yan jiang

Rhizomes yellowish white inside, tuberous. Pseudostems 1–1.8 m, base purplish brown. Ligule 2-lobed, 4–11 mm; petiole purple or yellowish green, 4–10 mm, white villous; leaf blade oblong or oblong-lanceolate, 25–40 × 5–11 cm, adaxially subglabrous, abaxially appressed villous and glandular spotted, base broadly cuneate, apex acuminate. Inflorescences arising from rhizomes, obovoid or narrowly ovoid, 3–5 × 2–4 cm; peduncle 1–3 cm; bracts greenish white or yellowish white, ovate or oblong, 2.5–3 × 2–3 cm, apex rounded, inner bracts oblanceolate or lanceolate, 2.5–3.8 × 0.8–1.5 cm, abaxially slightly villous, apex emarginate or acute. Calyx white, 8–10 mm, white villous, apex truncate or undulate. Corolla tube yellowish white, 3–4.2 cm, white villous; central lobe lanceolate, 2.5–2.9 cm × 6–9 mm; lateral lobes narrower than central one, apex 2-cleft. Labellum pale purple with yellowish white base, ca. 2.5 cm, throat glabrous; central lobe ligulelike or narrowly oblong, 1.3–1.6 cm; lateral lobes oblong, 6–8 × 3–5 mm, apex 2-cleft. Anther yellowish white, ca. 1.1 cm; connective ap-

pendage purple at apex, ca. 1.5 cm. Ovary densely villous. Capsule purple, oblong, 3–4 × 1.5–2 cm, obtusely 3-angled, slightly villous. Seeds purplish brown, ellipsoid or ovoid. Fl. Aug–Sep, fr. Oct–Nov.

- 600–3200 m. C Sichuan (Emei Shan).

Medicinal.

39. *Zingiber teres* S. Q. Tong & Y. M. Xia, Acta Phytotax. Sin. 25: 468. 1987.

柱根姜 zhu gen jiang

Rhizomes cylindrical, aromatic. Pseudostems 60–100 cm × 6–10 mm, base with green sheaths. Ligule 2-lobed, 2–4 mm, pubescent, lobes rounded at apex; petiole ca. 2 mm; leaf blade narrowly lanceolate, 18–25 × 3–4 cm, glabrous except sparsely puberulent along midvein abaxially, base cuneate, apex acuminate or caudate. Inflorescences arising from rhizomes, ellipsoid or narrowly so, 4.5–5 × 2–3 cm; peduncle embedded in ground, 6–12 cm, slender; bracts elliptic or narrowly so, 3–4 × 1–2 cm, glabrous except red pubescent at acute or acuminate apex; bracteoles red with white base, tubular, 2.5–2.8 cm. Calyx 1.4–1.6 cm, apex obscurely 3-toothed. Corolla tube yellow, 4–5 cm; central lobe lanceolate, 2.6–3 × 0.9–1 cm; lateral lobes 2–2.2 cm × 5–7 mm. Labellum yellow at base; lobes purple with yellow stripes, central one obovate, 1.8–2 × 1.1–1.3 cm, apex acuminate, lateral ones auriculate, small. Anther sessile, ca. 1.1 cm; connective appendage yellow proximally, purple distally, ca. 1 cm. Ovary densely white pubescent. Capsule (immature) white with purple or white apex, oblong, ca. 5 × 1.8 cm, 3-angled. Seeds subobovoid, ca. 5 mm; aril white. Fl. Oct.

Forests; ca. 1200 m. SW Yunnan (Menglian Dai-Lahu-Va Zu Zixhian) [N Thailand].

40. *Zingiber striolatum* Diels, Bot. Jahrb. Syst. 29: 262. 1900.

阳荷 yang he

Zingiber didymoglossum K. Schumann; *Z. emeiense* Z. Y. Zhu; *Z. hupehense* Pampanini; *Z. liangshanense* Z. Y. Zhu.

Rhizomes white, slightly fragrant. Pseudostems 1–1.5 m. Ligule brown striped, 2-lobed, 4–7 mm, membranous; petiole 0.8–1.2 cm; leaf blade lanceolate or elliptic-lanceolate, 25–35 × 3–6 cm, abaxially glabrous or sparsely villous, base attenuate, apex caudate. Inflorescences arising from rhizomes, subovoid; peduncle 1.5–2 cm or longer, scalelike sheaths 2 or 3; bracts red, broadly ovate or elliptic, 3.5–5 cm, pubescent. Calyx ca. 5 cm, membranous. Corolla tube white, 4–6 cm; lobes white or yellowish with purplish brown stripes, oblong-lanceolate, 3–3.5 cm. Labellum pale purple, obovate, ca. 3 × 2.6 cm; lateral lobes ca. 5 mm. Filament very short; anther lanceolate, ca. 1.5 cm; connective appendage ca. 1.5 cm. Capsule ca. 3.5 cm, loculicidally dehiscent; pericarp red inside. Seeds black; aril white. Fl. Jul–Oct, fr. Sep–Dec. $2n = 22^*$.

• Forest floors, streamsides; 300–1900 m. Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan.

Medicinal.

41. *Zingiber gulinense* Y. M. Xia, Acta Bot. Yunnan. 18: 51. 1996.

古林姜 gu lin jiang

Pseudostems 50–90 cm, base with purple sheaths. Leaf sheath green, glabrous; ligule 2-lobed, glabrous; petiole 1–1.7 cm; leaf blade elliptic, 10–18 × 5.6–7 cm, adaxially glabrous, abaxially sparsely villous, base cuneate, apex acuminate. Inflorescences arising from rhizomes, capitate, 1.8–3 × 1.8–2.5 cm; peduncle embedded in ground, 2–7 cm; bracts lanceolate, 3–3.2 × ca. 1.1 cm; bracteoles densely red spotted, tubular, ca. 2.8 cm. Calyx white, ca. 1.4 cm, glabrous, apex emarginate. Corolla yellow, glabrous; tube ca. 2.6 cm; lobes ovate, central one ca. 2.1 cm × 8 mm, apex acuminate; lateral lobes ca. 1.7 cm × 6 mm, apex acute. Labellum purple with white dots, base white; central lobe oblong, ca. 1 cm × 2 mm; lateral lobes linear, ca. 1 cm × 2 mm. Stamen purple; filament ca. 2 mm; anther ca. 9 mm; connective appendage ca. 4 mm. Ovary pale green, glabrous. Capsule purple, ovoid, ca. 2.3 × 1.2 cm, 3-angled. fl. Sep.

- Forests; ca. 600 m. SE Yunnan (Maguan Xian).

2. PLAGIOSTACHYS Ridley, J. Straits Branch Roy. Asiat. Soc. 32: 151. 1899.

偏穗姜属 pian sui jiang shu

Rhizomes on or just below ground, producing closely grouped pseudostems. Ligule usually deeply 2-lobed; leaf blade lanceolate or linear. Inflorescences breaking through leaf sheaths, ovoid, oblong, or conical; bracts densely arranged, margin entire or fimbriate; bracteoles tubular, at least distal ones becoming slimy and decaying early. Calyx tubular or funnellform, split on 1 side, apex 3-toothed. Corolla fleshy; tube shorter than or equaling calyx; lobes oblong or ovate, central one erect, hooded. Lateral staminodes toothlike or subulate. Labellum oblong, flat, apex 2-lobed or entire. Filament thickened, short; anther oblong, apex emarginate; connective appendage absent. Ovary small. Stylodes short. Capsule ovoid or ellipsoid; pericarp dry, brittle. Seeds 3 or 4 per valve, angled.

About 18 species: SE Asia; one species (endemic) in China.

1. Plagiostachys austrosinensis T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 37. 1978.

偏穗姜 pian sui jiang

Rhizomes creeping, 5–10 mm in diam. Pseudostems 60–100 cm. Leaf sheath pubescent; ligule 2-lobed, 2–3 mm; petiole absent to 1.2 cm; leaf blade linear, 30–50 × 3–5 cm, glabrous except pubescent along midvein abaxially. Inflorescences

42. Zingiber pleiostachyum K. Schumann in Engler, Pflanzenr. 20(IV. 46): 185. 1904.

多穗姜 duo sui jiang

Pseudostems ca. 50 cm. Ligule 2-lobed, ca. 6 mm, glabrous; petiole 3–6 mm; leaf blade oblong or oblong-lanceolate, 9–15 × 3–4.5 cm, glabrous. Inflorescences numerous, arising from rhizomes, 4–6-flowered; peduncle flexuous, 4–7 cm, glabrous, clothed with 5 or 6 oblong-lanceolate sheaths; bracts linear-lanceolate, ca. 3 cm, glabrous; bracteoles convolute. Flowers red. Pedicel 6–7 mm, sericeous. Calyx ca. 1.8 cm, split on 1 side. Corolla tube ca. 3.8 cm, very slender; lobes ca. 2 cm. Labellum subrhombic, ca. 2.4 cm; lateral lobes ca. 6 mm, apex acute. Anther ca. 1 cm; connective appendage ca. 1 cm.

- Taiwan.

breaking through leaf sheaths 14–16 cm above ground, sessile, conical, 3.5–6.5 × 2.5–3.5 cm; bracts numerous, densely imbricate, ovate, 1.7–1.4 cm, pilose abaxially and at margin, 2-flowered; bracteoles ovate or oblong. Calyx funnellform, ca. 8 mm, pilose. Corolla tube shorter than calyx; lobes oblong, ca. 6 × 3 mm. Anther sessile, ca. 5 mm. Ovary hairy. Style ca. 6 mm; stigma capitate. Fl. May. $2n = 96^*$.

- Dense forests, scrub. Guangdong, Guangxi.

3. ALPINIA Roxburgh, Asiat. Res. 11: 350. 1810, nom. cons.

山姜属 shan jiang shu

Albina Giseke, nom. rej.; *Buekia* Giseke, nom. rej.; *Zerumbet* J. C. Wendland, nom. rej.

Rhizomes creeping, thick. Pseudostems many, well developed, rarely absent. Leaves many, rarely 1–4; leaf blade oblong or lanceolate. Inflorescence a terminal panicle, raceme, or spike, dense or lax, covered by 1–3 spatulate involucre bracts when immature; bracts (when present) open to base, rarely hooded, each subtending 1 flower or a cincinnus of 2 to many flowers; bracteoles open to base or tubular, rarely hooded, sometimes absent. Calyx usually tubular, sometimes split on 1 side. Corolla central lobe ± hooded, usually wider than lateral lobes. Lateral staminodes small or absent, subulate or toothlike, adnate to base of labellum. Labellum often showy, usually larger than corolla lobes, sometimes inconspicuous, margin variously lobed or entire. Filament present or absent; connective crested or not. Ovary usually 3-loculed and placentation axile. Stigma usually well expanded, sometimes clavate, rarely geniculate. Stylodes often massive. Capsule usually globose, dry or fleshy, indehiscent or irregularly dehiscent. Seeds numerous, often angled, arillate.

About 230 species: tropical and subtropical Asia, Australia, and Pacific Islands; 51 species (35 endemic) in China.

1a. Bracteoles funnellform or deeply concave, enclosing flower buds.

2a. Bracteoles funnellform, persistent; corolla lobes 0.5–1.2 cm; labellum 0.5–1.5 cm; bracts small.

3a. Labellum ca. 1.5 cm; capsule black, 1.2–1.5 cm in diam. 1. *A. nigra*

3b. Labellum ca. 0.5 cm; capsule not black, 0.8–1 cm in diam. 2. *A. conchigera*

- 2b. Bracteoles shell-shaped, deciduous after anthesis; corolla lobes 1.8–4.5 cm; labellum more than 2 cm, bracts absent.
- 4a. Inflorescence a panicle.
- 5a. Capsule ribbed.
- 6a. Inflorescences erect, rachis subglabrous; labellum ca. 3 cm 3. *A. formosana*
- 6b. Inflorescences drooping, rachis densely tomentose; labellum 4–6 cm 4. *A. zerumbet*
- 5b. Capsule not ribbed.
- 7a. Petiole absent; leaf blade glabrous, 2–3.5 cm wide; labellum obovate, 2.7–3.5 × 1.5–2 cm 5. *A. calcarata*
- 7b. Petiole 2.5–9 cm; leaf blade pubescent abaxially, 6–20 cm wide; labellum 3.5–4 × 3–3.8 cm.
- 8a. Ligule 2-lobed; bracteoles deep red, 2–3.3 cm; corolla lobes white tinged with red, ca. 2.2 cm 6. *A. guinanensis*
- 8b. Ligule entire; bracteoles brown, 3–4 cm; corolla lobes wholly white, 3–3.6 cm 7. *A. menghaiensis*
- 4b. Inflorescence a raceme or spike.
- 9a. Inflorescence a spike.
- 10a. Labellum 1.5–2 cm.
- 11a. Bracteoles ca. 1.5 cm, early deciduous; corolla lobes ca. 1.5 cm; labellum ovate-rhomboidal, ca. 1.6 × 1.6 cm 8. *A. shimadae*
- 11b. Bracteoles ca. 3.2 cm, persistent; corolla lobes 1.8–2.2 cm; labellum suborbicular, ca. 2 × 2 cm 9. *A. sessiliflora*
- 10b. Labellum 3–4.5 cm.
- 12a. Corolla lobes ca. 2 cm; lateral staminodes absent; labellum white, with purple stripes toward center 10. *A. dolichocephala*
- 12b. Corolla lobes 3–5 cm; lateral staminodes very small or 4–5 mm; labellum yellow at margin, yellow-red toward center.
- 13a. Spikes ca. 15 cm; bracteoles 2- or 3-toothed at apex; labellum ovate-rhomboidal, not 2-lobed at apex 11. *A. kusshakuensis*
- 13b. Spikes 20–25 cm; bracteoles subrounded at apex; labellum broadly ovate-rhomboidal, shortly 2-lobed at apex 12. *A. tonrokuensis*
- 9b. Inflorescence a raceme.
- 14a. Pedicels less than 2 mm.
- 15a. Leaf blade abaxially glabrous 13. *A. mesanthera*
- 15b. Leaf blade abaxially hairy.
- 16a. Bracteoles ca. 1.2 cm; corolla lobes ciliate at margin; labellum ovate, ca. 2.2 cm 14. *A. kawakamii*
- 16b. Bracteoles 4–5 cm; corolla lobes glabrous at margin; labellum obovate, 4.5–7 cm 15. *A. platyichilus*
- 14b. Pedicels 2–15 mm.
- 17a. Leaf blade adaxially glabrous.
- 18a. Labellum 3–3.8 cm.
- 19a. Ligule 2-cleft, ca. 10 mm; leaf blade cordate at base; labellum red, white at margin 16. *A. ovoideicarpa*
- 19b. Ligule entire, 4–6 mm; leaf blade cuneate at base; labellum red with yellow center, margin not white 17. *A. blepharocalyx*
- 18b. Labellum (3.5–)3.8–5.5 cm.
- 20a. Pedicels 4–8 mm; lateral staminodes 4–8 mm 18. *A. napoensis*
- 20b. Pedicels 2–4 mm; lateral staminodes 2–3 mm.
- 21a. Ligule 3–10 mm; bracteoles 2–3.5 cm; labellum 3.5–4.5 cm 19. *A. hainanensis*
- 21b. Ligule 10–15 mm; bracteoles ca. 5.5 cm; labellum ca. 5 cm 20. *A. uraiensis*
- 17b. Leaf blade adaxially hairy.
- 22a. Petiole 2.5–8 cm.
- 23a. Petiole 2.5–4 cm; ligule 1–2 cm; labellum ca. 4 cm, yellow at center 21. *A. emaculata*
- 23b. Petiole 4–8 cm; ligule ca. 0.8 cm; labellum ca. 2.5 cm, red at center 22. *A. kwangsiensis*
- 22b. Petiole less than 2.5 cm.
- 24a. Lateral staminodes subulate, 6–8 mm.
- 25a. Calyx 4–6-toothed at apex; labellum broadly ovate, 3.9–4.5 cm, yellow with red center 23. *A. rubromaculata*
- 25b. Calyx 3-toothed at apex; labellum ovate, 3–3.5 cm, red with yellow center 17. *A. blepharocalyx*
- 24b. Lateral staminodes absent or ca. 3 mm.
- 26a. Lateral staminodes absent; pedicel ca. 7 mm; corolla lobes densely sericeous 24. *A. malaccensis*
- 26b. Lateral staminodes subulate, ca. 3 mm; pedicel ca. 3 mm; corolla lobes ciliate at margin 19. *A. hainanensis*
- 1b. Bracteoles flat or slightly concave, sometimes very small (ca. 1 mm) or absent.
- 27a. Bracteoles absent or very small (ca. 1 mm); bracts absent or minute.
- 28a. Ligule 1–3 cm or more, membranous.
- 29a. Leaf blade linear, 1.2–2.5 cm wide 25. *A. officinarum*
- 29b. Leaf blade lanceolate, 3–6 cm wide.

- 30a. Inflorescence a panicle; labellum nearly fan-shaped, ca. 1 cm 26. *A. flabellata*
 30b. Inflorescence a raceme; labellum obovate, ca. 2 cm 27. *A. oxyphylla*
- 28b. Ligule less than 0.5 cm, not membranous.
 31a. Leaf blade hairy on both surfaces.
 32a. Leaf blade 25–40 × 4–7 cm; racemes 15–30 cm; labellum ovate, ca. 6 mm wide 28. *A. japonica*
 32b. Leaf blade 10–18 × 2–3 cm; racemes 4–5 cm; labellum oblong-obovate or oblong, 0.8–1.6 cm 29. *A. nanchuanensis*
- 31b. Leaf blade glabrous.
 33a. Inflorescence a spike.
 34a. Leaf sheath pubescent; spikes 1.5–6 cm; flowers usually in pairs proximally on spike rachis, solitary distally; labellum entire at margin 30. *A. bambusifolia*
 34b. Leaf sheath glabrous; spikes 10–20 cm; flowers in clusters of 3 on spike rachis; labellum crisped at margin 31. *A. jiangnanfeng*
- 33b. Inflorescence a raceme.
 35a. Labellum ca. 2 cm.
 36a. Leaf blade linear-lanceolate, ca. 2.3 cm wide; lateral staminodes absent; labellum obovate 32. *A. pricei*
 36b. Leaf blade linear, 0.3–1.5 cm wide; lateral staminodes linear, 8–9 mm; labellum ovate 33. *A. graminifolia*
 35b. Labellum (0.5–)0.7–1.6 cm.
 37a. Ligule cuneate, ca. 4 mm; petiole absent; racemes 4–8(–12) cm; lateral staminodes triangular, ca. 1 mm 34. *A. brevis*
 37b. Ligule 2-lobed, 2–3 mm; petiole 0.5–3 cm; racemes 9–22 cm; lateral staminodes linear, 3–4 mm 35. *A. sichuanensis*
- 27b. Bracteoles flat or concave, more than 1 mm; bracts present.
 38a. Inflorescence a panicle.
 39a. Panicles narrow, branches 3–6 mm; labellum 6–7 mm 36. *A. oblongifolia*
 39b. Panicles spreading, branches more than 8 mm; labellum more than 10 mm.
 40a. Bracts and bracteoles persistent in fruit; capsule oblong or ellipsoid; petiole to 0.6 cm 37. *A. galanga*
 40b. Bracts and bracteoles early deciduous; capsule globose; petiole 1–9 cm.
 41a. Petiole and leaf blade pubescent adaxially (sometimes glabrous in *A. polyantha*).
 42a. Pseudostems to 4.6 m; leaf blade to 100 × 25 cm; labellum suborbicular or oblong, ca. 2.2 × 1.8–2.2 cm 38. *A. polyantha*
 42b. Pseudostems 1–2 m; leaf blade 30–40(–80) × 8–10(–20) cm; labellum oblong-ovate, 1–1.2 × 0.6–0.7 cm 39. *A. maclurei*
- 41b. Petiole and leaf blade glabrous adaxially.
 43a. Ligule 5–6 mm, thin; panicles glabrous 40. *A. intermedia*
 43b. Ligule 10–20 mm, thick; panicles hairy.
 44a. Panicle branches apically 1–3-flowered; labellum 1.5–2 cm 41. *A. guangdongensis*
 44b. Panicle branches apically 3–8-flowered; labellum 1.2–1.4 cm.
 45a. Leaf blade oblong, 10–14 cm wide; bracteoles oblong 42. *A. globosa*
 45b. Leaf blade linear-lanceolate, ca. 7 cm wide; bracteoles ovate 43. *A. tonkinensis*
- 38b. Inflorescence a raceme or spike.
 46a. Inflorescences conelike or cylindric, densely flowered.
 47a. Inflorescences conelike, 4.5–9 × 3–4 cm; bracts 1.7–2.2 cm; petiole absent to 1 cm 44. *A. strobiliformis*
 47b. Inflorescences cylindric, 7–9 × 1.5–2.5 cm; bracts less than 0.8 cm; petiole 2.5–4.5 cm 45. *A. pinmanensis*
 46b. Inflorescences neither conelike nor cylindric, laxly flowered.
 48a. Pseudostems not frondlike; leaves 1–4.
 49a. Leaf blade adaxially green with deep green stripes along veins, glabrous; labellum white with red stripes, ovate, ca. 1.2 cm 46. *A. pumila*
 49b. Leaf blade adaxially uniformly green, glabrous except pubescent along midvein and at margin; labellum yellow with red stripes, broadly ovate, ca. 0.7 cm 47. *A. psilogyna*
- 48b. Pseudostems frondlike; leaves many.
 50a. Leaf blade elliptic or ovate-elliptic; inflorescences ca. 4 cm; labellum oblong 48. *A. coriacea*
 50b. Leaf blade elliptic-lanceolate; inflorescences 5–6 cm; labellum ovate or rhomboidal-ovate.
 51a. Plants with odor of coriander (*Coriandrum sativum*); bracts deciduous 49. *A. coriandriodora*
 51b. Plants without odor of coriander; bracts persistent.
 52a. Leaf blade adaxially glabrous; spikes 10–16 cm; bracts densely tomentose 50. *A. stachyodes*
 52b. Leaf blade adaxially densely pubescent; spikes 7–9 cm; bracts densely sericeous 51. *A. jingxiensis*

Zingiber nigrum Gaertner, Fruct. Sem. Pl. 1: 35. 1788; *Alpinia allughas* (Retzius) Roscoe; *Heritiera allughas* Retzius; *Languas allughas* (Retzius) Burkill.

Pseudostems 1.5–3 m. Leaves sessile or subsessile; ligule orbicular, 4–6 mm, glabrous; leaf blade lanceolate or elliptic-lanceolate, 25–40 × 6–8 cm, glabrous, base and apex acute. Panicles erect, to 30 cm; branches expanded, 2–8 cm; rachis and branches tomentose, usually lax with remote cincinni; bracts ovate; bracteoles funnelform, tomentose, persistent. Pedicel 3–5 mm. Calyx tubular, 1.2–1.5 cm, split down 1 side for ca. 2/3 its length, pubescent abaxially. Corolla tube ca. 1 cm; lobes oblong, ca. 1.2 cm, pubescent abaxially, central one wider than lateral ones, apex cucullate. Lateral staminodes subulate. Labellum obovate, ca. 1.5 cm, base clawed, apex 2-cleft. Stamen ca. 1.5 cm; filament linear, ca. 1 cm; anther curved. Ovary densely pubescent. Capsule black when dry, globose, 1.2–1.5 cm in diam., sparsely pubescent, irregularly dehiscent, apex with flower remains; pedicel 5–10 mm. Seeds 5–6 mm in diam. Fl. and fr. Jul–Aug.

Forests; 900–1100 m. S Yunnan [Bhutan, India, Sri Lanka, Thailand].

Chinese records of *Alpinia aquatica* (J. König) Roscoe (e.g., in FRPS) are referable to *A. nigra*.

Medicinal.

2. *Alpinia conchigera* Griffith, Not. Pl. Asiat. 3: 424. 1851.

节鞭山姜 jie bian shan jiang

Languas conchigera (Griffith) Burkill.

Pseudostems 1.2–2 m. Ligule entire, ca. 5 mm, tomentose or glabrous; petiole 5–10 mm; leaf blade lanceolate, 20–30 × 1–10 cm, glabrous except pubescent along midvein abaxially and at margin, lateral veins very conspicuous and dense when dry, base obtuse, apex acute. Panicles 20–30 cm, usually only 1- or 2-branched; secondary branches many, ca. 1.5 cm; bracts ca. 5 mm; bracteoles funnelform, 3–4 mm, apex obliquely truncate. Pedicel 3–5 mm. Calyx pale green, cupular, 3–4 mm, apex 3-cleft. Corolla white or pale blue-green, abaxially pubescent; tube equaling calyx; lobes 5–7 mm, central one rounded at apex. Lateral staminodes red, quadrate, ca. 1.5 mm. Labellum pale yellow or pinkish with red streaks, obovate, ca. 5 mm, concave, base bearing a purple callosity covering corolla throat. Filament pale yellowish to pinkish, ca. 5 mm, slender; anther ca. 2 mm. Ovary pyriform, glabrous. Capsule globose when fresh, oblong when dry, 8–10 mm in diam. Seeds 3–5, strongly aromatic. Fl. May–Jul, fr. Sep–Dec.

Forests; 600–1100 m. Yunnan [Bangladesh, Cambodia, India, Indonesia (Sumatra), Laos, W Malaysia, Myanmar, Thailand, Vietnam].

Medicinal.

3. *Alpinia formosana* K. Schumann, Bot. Jahrb. Syst. 27: 283. 1899.

美山姜 mei shan jiang

Alpinia koshunensis Hayata; *Languas formosana* (K. Schumann) Sasaki; *L. koshunensis* (Hayata) Sasaki.

Pseudostems to 1(–3.5) m. Ligule to 1 cm, abaxially villous, apex obtuse; petiole absent to 1 cm; leaf blade lanceolate or oblong-lanceolate, 50–70 × 8–12 cm, both ends acuminate. Panicles narrow, 15–20 cm; rachis glabrous or sparsely villous; branches 2- or 3-flowered; bracteoles elliptic, ca. 1.5 cm, apex mucronate. Pedicel ca. 3 mm. Calyx 1.3–1.7 cm, split on 1 side, apex 3-toothed, ciliate. Corolla tube ca. 1 cm, glabrous; lobes oblong, ca. 1.5 cm, apex ciliate. Lateral staminodes subulate, less than 2 mm. Labellum white tinged with yellow, marked with red stripes at center, broadly ovate, ca. 3 cm, apex shortly 2-cleft, crisped. Stamen ca. 2 cm, with a kneelike bend. Ovary subglobose, white sericeous. Capsule vermilion, ellipsoid, wrinkled. Fl. Jul–Aug.

Taiwan [Japan].

This species was recognized as a natural hybrid between *Alpinia intermedia* and *A. zerumbet* by Yang and Wang (in Chiu & Peng, Proc. Cross-Strait Symp. Florist. Diversity Conservation, 183–197. 1998).

4. *Alpinia zerumbet* (Persoon) B. L. Burtt & R. M. Smith, Notes Roy. Bot. Gard. Edinburgh 31: 204. 1972.

艳山姜 yan shan jiang

Costus zerumbet Persoon, Syn. Pl. 1: 3. 1805; *Alpinia fluviatilis* Hayata; *A. schumanniana* Valetton; *A. speciosa* (J. C. Wendland) K. Schumann (1893), not (Blume) D. Dietrich (1839); *Languas schumanniana* (Valetton) Sasaki; *L. speciosa* (J. C. Wendland) Small; *Zerumbet speciosum* J. C. Wendland.

Pseudostems 2–3 m. Ligule 5–10 mm, abaxially hairy; petiole 1–1.5 cm; leaf blade lanceolate, 30–60 × 5–10 cm, glabrous except pubescent at margin, base attenuate, apex acuminate with a spiral mucro. Panicles drooping, to 30 cm, enclosed by 2 long sheaths when young; rachis purple-red, velvety; branches very short, 1- or 2(or 3)-flowered; bracteoles enclosing flower buds, white with pink apex, elliptic, 3–3.5 cm, glabrous. Pedicel 1–2 cm. Calyx white, subcampanulate, ca. 2 cm, split on 1 side, apex toothed. Corolla tube shorter than calyx; lobes milky white with pink apex, oblong, ca. 3 cm; central lobe larger than lateral ones. Lateral staminodes subulate, ca. 2 mm. Labellum yellow with purple-red stripes, broadly ovate-spatulate, 4–6 cm, apex crisped. Stamen ca. 2.5 cm. Ovary golden yellow hirsute. Capsule vermilion, globose, ca. 2 cm in diam., ribbed, apex with persistent calyx. Seeds angled. Fl. Apr–Jun, fr. Jul–Oct. $2n = 48^*$.

Guangdong, Guangxi, Hainan, Taiwan, Yunnan, [Bangladesh, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

Cultivated for ornament, including plants with variegated leaves.

5. *Alpinia calcarata* Roscoe, Trans. Linn. Soc. London 8: 347. 1807.

距花山姜 ju hua shan jiang

Languas calcarata (Roscoe) Merrill.

Pseudostems to 1.3 m. Leaves sessile; ligule 8–15 mm, glabrous, apex obtuse; leaf blade linear-lanceolate, 20–32 × 2–3.5 cm or narrower, glabrous, base attenuate, margin with well-spaced, short bristles, apex acuminate and caudate-mucronate.

Panicles less than 10 cm; rachis slightly velvety; proximal branches 3- or 4-flowered; bracteoles oblong, to 1.7 cm, membranous, apex obtuse. Pedicel ca. 3 mm. Calyx to 1.2 cm, split on 1 side, pubescent, apex 3-toothed. Corolla tube white, ca. 9 mm; lobes oblong, ca. 2.2 cm. Lateral staminodes red, subulate, ca. 3 mm, adnate to base of labellum. Labellum white with rose red and purple streaks, obovate, 2.7–3.5 × 1.5–2 cm, apex emarginate. Filament ca. 1.3 cm; anther 5–7 mm. Ovary 3–4 mm in diam., sericeous. Capsule red, globose. Fl. May. $2n = 48^*$.

Forests. Guangdong [India, Myanmar, Sri Lanka].

6. *Alpinia guinanensis* D. Fang & X. X. Chen in D. Fang, *Guihaia* 2: 135. 1982.

桂南山姜 *gui nan shan jiang*

Pseudostems to 3 m. Leaf sheath striate, pubescent; ligule 2-lobed or -cleft, 1–1.5 cm, abaxially pubescent, margin ciliate; petiole 2.5–6 cm, pubescent; leaf blade oblong, 18–90 × 7.5–18 cm, adaxially glabrous, abaxially sparsely pubescent, base obliquely cuneate, margin ciliate, apex caudate. Panicles suberect, 16–36 cm, densely pubescent; branches 3–14 mm, apically 1–3-flowered; involucre bracts 2, oblong, 15–24 × ca. 2.8 cm, abaxially pubescent, early deciduous; bracts oblong, 2–5 mm, deciduous; bracteoles deep red, shell-shaped, 2–3.3 cm, deciduous, margin ciliate. Pedicel 1–2 mm. Calyx pale red, ca. 1.5 cm, apex 3-toothed, ciliate. Corolla tube ca. 1 cm, densely pubescent at throat; lobes white tinged with red, oblong, ca. 2.2 cm × 7 mm, apex cucullate, central lobe wider than lateral ones. Lateral staminodes purple, linear, (2–)5–9 mm. Labellum yellow with purple stripes, ovate, ca. 4 × 3 cm, base rounded, margin undulate, apex emarginate. Filament ca. 1.6 cm; anther ca. 1 cm. Ovary densely pubescent. Capsule red, globose, smooth. Fl. Apr. $2n = 48^*$.

• Scrub. Guangxi.

7. *Alpinia menghaiensis* S. Q. Tong & Y. M. Xia in S. Q. Tong, *Bull. Bot. Res.*, Harbin 18: 142. 1998.

勐海山姜 *meng hai shan jiang*

Pseudostems 1.5–3 m. Leaf sheath striate, glabrous; ligule entire, 1.4–1.6 cm, densely brown pubescent; petiole 4–9 cm, thinly pubescent; leaf blade oblong-lanceolate, 10–120 × 16–20 cm, abaxially pubescent, base cuneate, margin densely ciliate, apex shortly acuminate. Panicles 28–34 cm, densely brown bristly; branches very short, 1- or 2-flowered; bracteoles brown, 3–4 cm, leathery. Calyx light purple-red, tubular, 2–2.3 cm, apex 4-toothed. Corolla tube white, 0.5–1.8 cm, pubescent; lobes white, central one subovate, 3.1–3.6 × 2.1–2.6 cm, lateral ones narrowly elliptic, 1.2–1.5 cm wide. Lateral staminodes red, ca. 1 cm. Labellum orange-yellow, scarlet at center, yellow at margin and at red-striped apex, broadly ovate, 3.5–4 × 3.2–3.8 cm, apex narrowed, 2-lobed. Stamen ca. 3 cm; filament ca. 1.2 cm. Ovary densely yellow-brown pubescent. Style white pubescent. Fl. Apr.

• Low forests; ca. 900 m. SW Yunnan (Menghai Xian).

8. *Alpinia shimadae* Hayata, *Icon. Pl. Formos.* 5: 219. 1915.

密穗山姜 *mi sui shan jiang*

Alpinia densespicata Hayata; *A. mediomaculata* Hayata; *Languas densespicata* (Hayata) Sasaki; *L. mediomaculata* (Hayata) Sasaki.

Pseudostems 1–2 m. Leaves subsessile or shortly petiolate; ligule oblong, margin hirsute; leaf blade linear-lanceolate, glabrous except hirsute at margin. Spikes cylindric, 12–15 cm, densely flowered; rachis sericeous-villous; bracteoles obovate, ca. 1.5 cm, early deciduous. Calyx subcylindric, ca. 1.8 cm, split on 1 side, abaxially hirsute, apex 3-toothed. Corolla tube ca. 8 mm; lobes ca. 1.5 cm, margin ciliate, central lobe suborbicular, lateral ones narrower. Labellum ovate-rhomboidal, ca. 1.6 × 1.6 cm, base with 2 callosities, margin erose. Anther ca. 8 mm, apex 2-cleft. Ovary cylindric, ca. 3.5 mm, densely villous. Capsule globose, ca. 1.3 cm in diam., sometimes slightly ribbed, hirsute, base without persistent bracteoles, apex with persistent calyx. Fl. May, fr. Jul.

• Forests, montane regions; 400–800 m. Taiwan.

9. *Alpinia sessiliflora* Kitamura, *Bot. Mag. (Tokyo)* 59: 39. 1946.

大头山姜 *da tou shan jiang*

Alpinia macrocephala Hayata, *Icon. Pl. Formos.* 5: 223. 1915, not K. Schumann (1904); *A. pricei* Hayata var. *sessiliflora* (Kitamura) J. Jung Yang & J. C. Wang.

Pseudostems 1–2 m. Leaves petiolate; ligule oblong, abaxially hirsute; leaf blade linear-lanceolate, ca. 80 × 11 cm, adaxially glabrous, abaxially glabrous except sparsely villous along veins, base attenuate, margin hirsute, apex acute or acuminate. Spikes erect, dark red or purple-red, ca. 9 × 6 cm, densely flowered; rachis densely villous, base with 2 spathe-like bracts subtending inflorescence; bracteoles ca. 3.2 cm, persistent. Pedicel absent. Calyx cylindric, ca. 1.5 cm × 8 mm, base velvety abaxially. Corolla tube ca. 1.4 cm, glabrous; lobes obovate, 1.8–2.2 cm. Lateral staminodes absent. Labellum suborbicular, ca. 2 × 2 cm, base constricted, margin crisped. Filament ca. 7 mm; anther ca. 8 mm. Ovary globose, less than 1 cm in diam., densely villous. Capsule dark red, fusiform-globose, ca. 1.5 × 1 cm, base with persistent bracteoles, apex with persistent calyx. Fl. Jan.

• Montane regions; 1300–2000 m. Taiwan.

10. *Alpinia dolichocephala* Hayata, *Icon. Pl. Formos.* 9: 119. 1920.

紫纹山姜 *zi wen shan jiang*

Languas dolichocephala (Hayata) Sasaki.

Pseudostems to 2 m. Leaves subsessile; ligule yellow, purple striped abaxially, entire or nearly 2-cleft, villous; leaf blade lanceolate, 70–90 × 10–12 cm, glabrous except shortly hirsute at margin, base abruptly attenuate, apex with caudate tip ca. 1 cm. Spikes ca. 15 cm, 20–30 cm in fruit, dark yellow sericeous-villous; bracteoles ca. 3 cm, nearly hard and brittle, base and margin hirsute, apex subrounded with hairlike arista 1–2 mm. Pedicel absent. Calyx subcylindric, ca. 2 cm, split on 1 side, abaxially very shortly hirsute. Corolla tube ca. 1 cm; lobes ca. 2 cm, central one hooklike, distal margin hirsute, apex mucronate.

Lateral staminodes absent. Labellum white, purple striped toward center, broadly ovate, ca. 4 × 4 cm, margin erose, apex 2-cleft. Filament glabrous; anther ca. 1 cm. Ovary subglobose, ca. 2 mm in diam. Capsule globose, ca. 1.5 cm in diam., shortly hirsute. Fl. Apr.

- Forests; 400–700 m. Taiwan.

11. *Alpinia kusshakuensis* Hayata, Icon. Pl. Formos. 9: 121. 1920.

菱唇山姜 ling chun shan jiang

Languas kusshakuensis (Hayata) Sasaki.

Pseudostems more than 2 m. Leaves sessile or shortly petiolate; ligule 2-lobed, ca. 8 mm, abaxially villous; leaf blade lanceolate, ca. 50 × 10 cm, glabrous except ciliate at margin, base attenuate, apex abruptly acuminate. Spikes ca. 15 cm, densely many flowered, densely villous; bracteoles shell-shaped, 2.5–3 cm, apex 2- or 3-toothed. Pedicel very short or absent. Calyx ca. 2 cm, split to middle on 1 side, abaxially hirsute, margin and apex slightly hairy. Corolla tube ca. 1 cm; lobes 3–5 cm, central one obovate-spatulate, ca. 1.5 cm wide. Lateral staminodes 4–5 mm. Labellum yellow-red toward center, yellow at margin, ovate-rhomboidal, 4–4.5 × ca. 3 cm, throat hirsute, margin erose-denticulate, apex caudate, not 2-lobed. Stamen ca. 4 cm; anther linear, ca. 1.5 cm. Ovary ca. 1 cm, densely villous. Style glabrous. Fl. May.

- Taiwan (Taibei Shi).

This species was recognized as a natural hybrid between *Alpinia shimadae* and *A. uraiensis* by Yang and Wang (loc. cit.).

12. *Alpinia tonrokuensis* Hayata, Icon. Pl. Formos. 9: 123. 1920.

台北山姜 tai bei shan jiang

Pseudostems 2–3 m. Leaves subsessile; ligule 2-lobed, ca. 8 mm, abaxially villous; leaf blade lanceolate, ca. 55 × 10 cm, glabrous except hirsute at margin, base acute, apex with linear-caudate tip ca. 2 cm. Spikes erect, 20–25 cm, densely flowered, densely yellow villous; bracteoles pink, shell-shaped, ca. 3 × 3 cm, apex subrounded. Calyx pink, obconical-cylindric, ca. 2 cm, split to middle on 1 side. Corolla tube ca. 1 cm; lobes obovate, 4–5 cm, base attenuate. Lateral staminodes very small. Labellum yellow-red toward center, yellow at margin, broadly ovate-rhomboidal, 3–4 × 2.5 cm, base densely hirsute, apex subcuspidate, shortly 2-lobed. Stamen erect or recurved; anther linear, ca. 1.5 cm; connective 2-lobed, ca. 6 mm wide, hirsute. Ovary densely tomentose. Stigma funnelform. Fl. May.

- Taiwan (Taibei Shi).

This species was recognized as a natural hybrid between *Alpinia uraiensis* and *A. zerumbet* by Yang and Wang (loc. cit.).

13. *Alpinia mesanthera* Hayata, Icon. Pl. Formos. 5: 225. 1915.

疏花山姜 shu hua shan jiang

Languas mesanthera (Hayata) Sasaki.

Pseudostems 1–2 m. Leaves sessile; ligule strigose abaxially and at margin, apex rounded; leaf blade linear-lanceolate, ca. 60 × 10 cm, glabrous except villous at margin, base cuneate, apex acuminate. Racemes erect, ca. 27 cm, lax; peduncle hir-

sute; bracteoles ca. 2.2 × 1.7 cm, split on 1 side, glabrous, apex 2- or 3-lobed. Pedicel held at right angle to rachis. Calyx cylindrical, ca. 2 cm, split on 1 side, base shortly hirsute abaxially, apex 3-lobed, ciliate. Corolla tube cylindrical, ca. 1.3 cm, abaxially glabrous; central lobe obovate, ca. 3 × 2.5 cm, apex emarginate or 2-cleft, ciliate; lateral lobes oblong-spatulate, narrower than central one. Lateral staminodes warty, hirsute. Labellum orbicular, ca. 3 cm in diam., margin denticulate, apex 2-cleft. Filament ca. 1 cm; anther oblong, ca. 1 cm. Ovary oblong, ca. 1.3 cm, densely villous. Fl. Jul.

- Taiwan.

14. *Alpinia kawakamii* Hayata, Ic. Pl. Formos. 5: 222. 1915.

密毛山姜 mi mao shan jiang

Alpinia elwesii Turrill; *A. shimadae* Hayata var. *kawakamii* (Hayata) J. Jung Yang & J. C. Wang; *Languas kawakamii* (Hayata) Sasaki.

Pseudostems 1–2 m. Leaves subsessile; leaf sheath pubescent, marked with conspicuous, vertical striations; ligule 2-cleft, ca. 4 mm, abaxially pubescent; leaf blade linear-lanceolate, ca. 45 × 5.5 cm, adaxially glabrous, abaxially densely pubescent, base attenuate, apex caudate-acuminate. Racemes erect, 12–15 cm, stout, densely flowered; rachis villous; bracteoles obovate, ca. 1.2 cm × 7 mm, abaxially pubescent, margin ciliate. Pedicel ca. 1 mm, villous. Calyx ca. 1 cm, split on 1 side, abaxially densely pubescent, margin ciliate. Corolla white; tube ca. 1 cm, glabrous; lobes ciliate at margin, lateral ones elliptic-lanceolate, ca. 1.8 cm × 7 mm, narrower than central one. Lateral staminodes very short. Labellum ovate, ca. 2.2 × 1.6 cm, apex emarginate, white tinged with red. Stamen ca. 1.7 cm; filament ca. 7 mm. Ovary ovoid, ca. 2.5 mm in diam. Seeds black; aril membranous.

- Montane regions; 400–900 m. S Taiwan.

This species was united with *Alpinia copelandii* Ridley, from the Philippines, by Moo (in Li et al., Fl. Taiwan 5: 832–833. 1978) and in FRPS.

15. *Alpinia platytilus* K. Schumann in Engler, Pflanzenr. 20(IV. 46): 334. 1904.

宽唇山姜 kuan chun shan jiang

Pseudostems ca. 2 m. Leaves subsessile; ligule ca. 1 cm, yellow villous; leaf blade lanceolate, ca. 60 × 16 cm, abaxially sericeous-velvety, base attenuate, apex acute. Racemes erect, 25 cm or more; rachis very stout, golden yellow, sericeous-velvety; bracteoles reddish, broadly elliptic, 4–5 × ca. 7.5 cm, glabrous, apex obtuse. Pedicel very short. Calyx 3–3.7 cm, split nearly to base on 1 side, apex 3-lobed, lobes subequal. Corolla white; tube short and wide, ca. 5 mm, sericeous-villous; lobes broadly elliptic, 3.5–4 cm. Lateral staminodes hooklike, ca. 7 mm. Labellum yellow tinged with red, obovate, 4.5–7 × 8–9 cm, base with very densely sericeous scab, apex 2-cleft. Filament ca. 1.5 cm, base villous; anther elliptic, ca. 1.7 cm. Ovary broadly ellipsoid, sericeous-villous.

- Wet areas in forests; 800–1600 m. S Yunnan.

16. *Alpinia ovoideicarpa* H. Dong & G. J. Xu, Guihaia 13: 328.

1993.

卵果山姜 *luan guo shan jiang*

Pseudostems 2–2.5 m. Ligule 2-lobed, ca. 1 cm, leathery; petiole 3–5 cm; leaf blade oblong-elliptic, 40–60 × 4–12.5 cm, glabrous, base obliquely cordate. Racemes erect, 18–24 cm, densely flowered; rachis densely golden hispid; bracteoles brownish, narrowly elliptic, 2.5–3.8 cm. Pedicel ca. 2.5 cm, densely golden hispid. Calyx pale red, tubular, ca. 1.6 cm, white pubescent, apex 3-toothed. Corolla white; tube ca. 1 cm, white puberulent; lobes white ciliate at margin, central one suborbicular, ca. 2.5 × 2 cm, apex mucronate, lateral ones narrowly elliptic, ca. 2 × 1.5 cm. Lateral staminodes subulate, 4–6 mm. Labellum yellow with red stripes, white at margin, ovate, 3–3.8 × ca. 1.5 cm, apex reflexed. Stamen ca. 2.4 cm; filament red, ca. 1.2 cm. Capsule red, ovoid, ca. 1.5 × 1.2 cm. Fl. Apr, fr. Sep.

• Forests. Guangxi.

17. *Alpinia blepharocalyx* K. Schumann in Engler, Pflanzenr. 20(IV. 46): 334. 1904.

云南草蔻 *yun nan cao kou*

Pseudostems 1–3 m. Ligule ca. 6 mm, apex villous; petiole to 2 cm; leaf blade adaxially dark green, abaxially pale green, lanceolate or oblanceolate, 45–60 × 4–15 cm, adaxially glabrous, abaxially densely villous or glabrous, base attenuate, apex acuminate, mucronate. Racemes drooping, 20–30 cm; rachis hirsute; bracteoles green, elliptic, 3–4 cm, dry and brittle, sparsely villous or glabrescent, 1-flowered, early deciduous at anthesis. Pedicel 4–8 mm, slightly elongate in fruit. Calyx ellipsoid, 2–2.5 cm, split on 1 side, margin ciliate, apex 3-toothed. Corolla flesh-colored; tube ca. 1 cm, pubescent at throat; central lobe suborbicular, ca. 2 cm wide; lateral lobes broadly lanceolate, 2–2.5 cm. Lateral staminodes subulate, 6–7 mm. Labellum red with yellow center, ovate, 3–3.5 × ca. 3 cm, apex acute. Filament ca. 7 mm; anther ca. 1.7 cm. Ovary oblong, tomentose. Capsule ellipsoid, ca. 3 × 2 cm, pubescent. Seeds gray-yellow to dull brown, forming globose clumps 1.2–1.6 cm in diam. Fl. Mar–Jul, fr. Apr–Dec.

Dense or sparse forests; 400–1200 m. Guangdong, Guangxi, Yunnan [Bangladesh, India, Laos, Myanmar, Thailand, Vietnam].

Medicinal.

1a. Leaf blade abaxially densely

villous 17a. var. *blepharocalyx*

1b. Leaf blade abaxially glabrous 17b. var. *glabrior*

17a. *Alpinia blepharocalyx* var. *blepharocalyx*

云南草蔻(原变种) *yun nan cao kou (yuan bian zhong)*

Alpinia bracteata Roxburgh (1820), not Roscoe (1815); *Languas blepharocalyx* (K. Schumann) Handel-Mazzetti.

Leaf blade abaxially densely villous. Fl. Apr–Jun, fr. Jul–Dec. $2n = 48^*$.

Sparse forests; 500–1000 m. Yunnan [Bangladesh, India, Laos, Myanmar, Thailand, Vietnam].

17b. *Alpinia blepharocalyx* var. *glabrior* (Handel-Mazzetti) T.

L. Wu in T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 35. 1978.

光叶云南草蔻 *guang ye yun nan cao kou*

Languas blepharocalyx var. *glabrior* Handel-Mazzetti, Symb. Sin. 7: 1322. 1936.

Leaf blade abaxially glabrous. Fl. Mar–Jul, fr. Apr–Nov.

Dense forests; 400–1200 m. Guangdong, Guangxi, Yunnan [Thailand, Vietnam].

18. *Alpinia napoensis* H. Dong & G. J. Xu, Guihaia 13: 327. 1993.

那坡山姜 *na po shan jiang*

Pseudostems purple spotted, 1.5–2 m. Ligule entire or 2-lobed, 4–8 mm, leathery; petiole 0.5–4 cm; leaf blade oblong- or elliptic-lanceolate, 40–60 × 4–12 cm, glabrous, base attenuate, slightly oblique, apex acuminate. Racemes erect, 13–27 cm; rachis densely brown hispid; bracteoles brownish when dry, narrowly elliptic, 2.5–4.5 × ca. 1.2 cm, apex mucronate, ciliate. Pedicel 4–8 mm, brown hispid. Calyx pink, tubular, 1.5–2 cm, apex 3- or 4-toothed, white ciliate. Corolla tube white, ca. 1.2 cm; lobes equal, central one broadly elliptic, ca. 3 × 2.5 cm, lateral ones white, narrower, margin ciliate. Lateral staminodes subulate, 4–8 mm. Labellum bright red with yellow or white margin and yellow apex with a few red stripes, broadly ovate, 3.8–5.5 × ca. 2 cm. Stamen ca. 2.5 cm; filament red, ca. 1.3 cm. Capsule red, globose or subglobose, ca. 1.5 cm in diam. Fl. Apr, fr. Sep.

• Forests. Guangxi.

19. *Alpinia hainanensis* K. Schumann in Engler, Pflanzenr. 20 (IV. 46): 335. 1904.

草豆蔻 *cao dou kou*

Alpinia henryi K. Schumann; *A. henryi* var. *densihispida* H. Dong & G. J. Xu; *A. kainantensis* Masamune; *A. katsumadai* Hayata; *Languas henryi* (K. Schumann) Merrill; *L. katsumadai* (Hayata) Merrill.

Pseudostems to 3 m. Ligule (3–)5–10 mm, abaxially hirsute; petiole absent to 2 cm; leaf blade linear-lanceolate, 20–65 × 2–12 cm, glabrous or rarely abaxially sparsely hirsute, base obliquely attenuate, margin hairy, apex acuminate, with spirally caudate mucro. Racemes erect, 10–30 cm, yellow hirsute; bracts 4–4.5 cm, glabrous; bracteoles milky white, broadly elliptic, 2–3.5 cm, hirsute at base and gradually becoming glabrous toward mucronate apex. Pedicel 2–4 mm. Calyx campanulate, 2–3 cm, split on 1 side, abaxially hairy, apex 2-toothed. Corolla tube 8–10 mm; lobes lanceolate, 2.5–3 cm, margin ciliate. Lateral staminodes subulate, ca. 3 mm. Labellum marked with radiate, purple stripes from center to margin, triangular-ovate, 3.5–4.5 cm, apex shallowly 2-cleft. Filament ca. 1.5 cm; anther 1.2–1.5 cm. Ovary hirsute, ca. 5 mm in diam. Capsule globose, 2–3 cm in diam., yellow hirsute. Fl. Apr–Jun, fr. May–Aug. $2n = 48^*$.

Dense or sparse forests. Guangdong, Guangxi, Hainan [Vietnam].

20. *Alpinia uraiensis* Hayata, Icon. Pl. Formos. 5: 224. 1915.

大花山姜 da hua shan jiang

Languas uraiensis (Hayata) Sasaki.

Pseudostems more than 2 m. Leaves sessile; ligule oblong-triangular, 1–1.5 cm × ca. 6 mm, abaxially hirsute, apex obtuse; leaf blade linear-lanceolate, ca. 1 m × 13 cm, glabrous, base and apex acuminate. Racemes erect, flowering part ca. 25 cm, densely flowered; rachis densely strigose-tomentose, many grooved; bracts reddish purple at apex, linear, ca. 2.5 cm × 4–5 mm, glabrous; bracteoles orbicular, ca. 5.5 cm, glabrous except strigose at base abaxially. Pedicel ca. 3 mm, moderately stout, densely tomentose. Calyx nearly white, campanulate-cylindric, ca. 3.5 × 2 cm, deeply split on 1 side, abaxially sparsely hirsute, apex finely 6-toothed. Corolla tube ca. 1.3 cm, abaxially sparsely hirsute or subglabrous; central lobe obovate-oblong, ca. 3.5 × 2.8 cm. Lateral staminodes linear, ca. 2 mm. Labellum yellow with reddish center, with radiate stripes on distal middle part disappearing at margin, oblong-triangular, ca. 5 × 4 cm, apex 2-cleft; lobes 6–7 mm, with small warts, base densely villous. Filament ca. 1 cm; anther ca. 1.8 cm. Ovary globose. Style apex cupular. Capsule pale scarlet, globose, ca. 2.5 cm in diam., densely hairy. Fl. Apr–May.

• Taiwan.

21. *Alpinia emaculata* S. Q. Tong, Acta Phytotax. Sin. 27: 285. 1989.

无斑山姜 wu ban shan jiang

Pseudostems 1.5–2.5 m. Leaf sheath finely striate; ligule entire, 1–2 cm, leathery, pubescent, soon glabrescent; petiole 2.5–4 cm; leaf blade elliptic-lanceolate or oblong-lanceolate, 40–80 × 10–18 cm, adaxially glabrous, abaxially pubescent, base cuneate, margin densely ciliate, apex shortly acuminate. Racemes 15–25 cm; rachis densely brown hispid; bracteoles red-brown, 3–4 cm, slightly hairy, soon glabrescent, apex rounded toothed, ciliate. Pedicel 2–4 mm. Calyx pale red, tubular, ca. 2.2 cm, white pubescent, apex 3-toothed. Corolla tube ca. 1.5 cm, slightly white hairy; lobes white, central one suborbicular, 3.2–3.5 × 3–3.3 cm, lateral ones narrowly elliptic. Lateral staminodes pale red, subulate, ca. 1 cm. Labellum red with yellow center and margin, broadly ovate, ca. 4 × 6 cm, apex abruptly convex, entire. Stamen ca. 2.8 cm; filament white pubescent at base. Ovary yellow-green, densely brown villous. Capsule brownish, globose, ca. 3.4 cm in diam., apex with persistent calyx. Fr. Mar.

• Forests; ca. 800 m. S Yunnan.

22. *Alpinia kwangsiensis* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 35. 1978.

长柄山姜 chang bing shan jiang

Pseudostems 1.5–3 m. Ligule 2-cleft, ca. 8 mm, hirsute; petiole 4–8 cm; leaf blade oblong-lanceolate, 40–60 × 8–16 cm, adaxially glabrous, abaxially densely pubescent, base cordate or attenuate, slightly oblique, apex with spirally rolled, sharp tip. Racemes erect, 13–30 cm, densely flowered, slightly elongate in fruit, densely yellow hirsute; bracteoles brown, oblong, ca. 3.5 cm, yellow hirsute, apex 2-cleft. Pedicel ca. 2 mm. Calyx pale purple, cylindrical, ca. 2 cm, split on 1 side, yellow hirsute,

apex 3-cleft. Corolla white; tube ca. 1.2 cm; lobes oblong, ca. 2 × 1.4 cm, margin ciliate. Labellum white, adaxially tinged with red, ovate, ca. 2.5 cm. Anther ca. 1 cm; filament ca. 1 cm. Ovary oblong, ca. 5 mm, densely yellow hirsute. Capsule globose, ca. 2 cm in diam., sparsely villous. Fl. and fr. Apr–Jun. *2n* = 48*.

• Shaded wet places in valley forests; near sea level to 700 m. Guangdong, Guangxi, Guizhou, Yunnan.

23. *Alpinia rubromaculata* S. Q. Tong, Acta Phytotax. Sin. 27: 284. 1989.

红斑山姜 hong ban shan jiang

Pseudostems 1.5–2.5 m. Leaf sheath conspicuously striate; ligule entire, 8–10 mm, leathery, pubescent, soon glabrescent; petiole 1–2.5 cm; leaf blade elliptic-lanceolate or oblong-lanceolate, 40–80 × 10–14 cm, abaxially densely pubescent, base narrow, oblique, apex shortly acuminate. Racemes 18–30 cm; rachis brown hispid; bracteoles oblong-triangular, 3.5–4 cm, apex 3-toothed, teeth rounded. Calyx red, tubular, 2.3–2.6 cm, base and apex densely white pubescent, apex 4–6-toothed, ciliate. Corolla tube white, ca. 1 cm, pubescent; lobes white, elliptic, 3.8–4.5 × 1.7–2.1 cm, base with a small appendage, margin ciliate. Lateral staminodes red, ca. 8 mm, pubescent. Labellum yellow with a few stripes, red at center, red spotted at margin, broadly ovate, 3.9–4.5 × 5–5.8 cm, apex 2-lobed. Stamen ca. 3 cm; filament ca. 1.2 cm, base white pubescent. Ovary yellow-brown villous. Fr. Apr.

• Forests; ca. 800 m. S Yunnan.

24. *Alpinia malaccensis* (N. L. Burman) Roscoe, Trans. Linn. Soc. London 8: 345. 1807.

毛瓣山姜 mao ban shan jiang

Maranta malaccensis N. L. Burman, Fl. Indica, 2. 1768.

Pseudostems ca. 3 m or more. Ligule 2-cleft, to 1 cm, slightly tomentose; petiole ca. 2 cm, grooved; leaf blade oblong-lanceolate or lanceolate, to 90 × 15 cm, abaxially pubescent, base acute, apex acuminate. Racemes erect, to 35 cm; rachis stout, densely yellow pubescent; bracteoles white, broadly elliptic, 3.5–4 cm. Pedicel ca. 7 mm, densely yellow pubescent. Calyx campanulate, ca. 1.5 cm, densely sericeous. Corolla white, sericeous; tube ca. 1 cm; lobes oblong-lanceolate, 2.5–3 cm. Lateral staminodes absent. Labellum yellow with red stripes, ovate, ca. 3.5 cm, apex emarginate. Stamen ca. 2.4 cm. Ovary villous. Capsule yellow, globose, ca. 2 cm in diam., dehiscing irregularly. Fl. Apr. *2n* = 48*.

Xizang, Yunnan; cultivated in Guangdong [Bangladesh, Bhutan, India, Indonesia (Java), W Malaysia, Myanmar, Thailand].

Cultivated as an ornamental.

25. *Alpinia officinarum* Hance, J. Linn. Soc., Bot. 13: 6. 1873.

高良姜 gao liang jiang

Languas officinarum (Hance) Farwell.

Rhizomes elongate, terete. Pseudostems 40–110 cm. Leaves sessile; ligule lanceolate, entire, 2–3(–5) cm, membra-

nous; leaf blade linear, 20–30 × 1.2–2.5 cm, glabrous, base attenuate, apex caudate. Racemes erect, 6–10 cm; rachis tomentose; bracteoles very small, less than 1 cm. Pedicel 1–2 mm. Calyx 8–10 cm, puberulent, apex 3-toothed. Corolla tube slightly shorter than calyx; lobes oblong, ca. 1.5 cm, central one hoodlike. Labellum white with red streaks, ovate, ca. 2 cm. Filament ca. 1 cm; anther ca. 6 mm. Ovary tomentose. Capsule red, globose, ca. 1 cm in diam. Fl. Apr–Sep, fr. May–Nov. $2n = 48^*$.

- Guangdong, Guangxi, Hainan.

Medicinal.

26. *Alpinia flabellata* Ridley, Philipp. J. Sci. 4: 188. 1909.

扇唇山姜 shan chun shan jiang

Languas flabellata (Ridley) Merrill.

Pseudostems to 3 m. Ligule ovate, entire, ca. 1 cm, margin minutely white hairy. Leaf blade narrowly lanceolate, 30–40 × 4–5 cm, glabrous, margin denticulate near acuminate apex. Panicles 10–20 cm, densely flowered; branches 2 or 3, 9–7 cm; bracts minute, ca. 7 mm; bracteoles absent. Pedicel 2–3 mm, pubescent. Calyx tubular, ca. 8 mm, obtusely ribbed, glabrous, apex 3-lobed. Corolla tube ca. 1 cm; central lobe oblong, ca. 7 × 3.5 mm, apex hooked, minutely mucronate; lateral lobes obovate-oblong, ca. 5 mm. Lateral staminodes 2, at base of labellum. Labellum nearly fan-shaped, ca. 1 cm; claw short; limb subreniform, 4-lobed. Filament linear, short, glabrous; anther oblong, short; connective crestless. Capsule ca. 6 mm in diam., glabrous.

Taiwan (Huoshao Dao and Lan Yu opposite SE coast) [Japan (Ryukyu Islands), Philippines].

27. *Alpinia oxyphylla* Miquel, J. Bot. Neerl. 1: 93. 1861.

益智 yi zhi

Languas oxyphylla (Miquel) Merrill.

Pseudostems 1–3 m. Ligule brownish, 2-cleft, 1–2 cm, rarely longer, membranous, sparsely puberulent; petiole short; leaf blade lanceolate, 25–35 × 3–6 cm, base subrounded, margin hispid, glabrescent, apex attenuate, caudate. Racemes enclosed in bud by a hat-shaped involucre bract deciduous at anthesis; rachis very shortly puberulent. Pedicel 1–2 mm. Calyx tubular, ca. 1.2 cm, split to middle on 1 side, abaxially pubescent, apex 3-toothed. Corolla tube 8–10 mm; lobes oblong, ca. 1.8 cm, central one white, wider than lateral ones, abaxially sparsely puberulent. Lateral staminodes subulate, ca. 2 mm. Labellum white with red stripes, obovate, ca. 2 cm, apical margin crisped. Filament ca. 1.2 cm; anther ca. 7 mm. Ovary densely tomentose. Capsule globose when fresh, fusiform when dry, 1.5–2 × ca. 1 cm, with elevated, vascular stripes, pubescent, apex with persistent calyx. Seeds irregularly obovate; aril brownish. Fl. Mar–May, fr. Apr–Sep. $2n = 48^*$.

- Fujian, Guangdong, Guangxi, Hainan, Yunnan.

Both wild and cultivated plants are used for medicine.

28. *Alpinia japonica* (Thunberg) Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 140. 1867.

山姜 shan jiang

Globba japonica Thunberg in Murray, Syst. Veg., ed. 14, 73. 1784; *Alpinia agiokuensis* Hayata; *Languas agiokuensis* (Hayata) Sasaki; *L. japonica* (Thunberg) Sasaki.

Pseudostems 35–70 cm. Ligule 2-cleft, ca. 2 mm, pubescent; petiole to 2 cm; leaf blade lanceolate, oblanceolate, or narrowly long elliptic, 25–40 × 4–7 cm, pubescent especially abaxially, base attenuate, apex acuminate, mucronate. Racemes 15–30 cm; rachis densely tomentose; involucre bracts lanceolate, ca. 9 cm, deciduous at anthesis; bracteoles very small, early deciduous. Flowers usually paired on rachis, often also with degenerate flowers; pedicel ca. 2 mm. Calyx clavate, 1–1.2 cm, pubescent, apex 3-toothed. Corolla tube ca. 1 cm, sparsely puberulent; lobes oblong, ca. 1 cm, abaxially tomentose, central one hoodlike. Lateral staminodes linear, ca. 5 mm. Labellum white marked with red stripes, ovate, ca. 6 mm wide, margin irregularly notched, apex 2-cleft. Stamen 1.2–1.4 cm. Ovary densely tomentose. Capsule salmon red, globose or ellipsoid, 1–1.5 cm in diam., pubescent, apex with persistent calyx. Seeds ca. 5 × 3 mm, many angled, with camphorlike odor. Fl. Apr–Aug, fr. Jul–Dec. $2n = 48^*$.

Forests. Fujian, Guangdong, Guangxi, Guizhou, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

Medicinal.

29. *Alpinia nanchuanensis* Z. Y. Zhu, Bull. Sichuan School Chin. Mat. Med. 8: 16. 1986.

南川山姜 nan chuan shan jiang

Pseudostems 55–65 cm. Leaf sheath pubescent; ligule obscurely 2-lobed, 1–1.5 mm; petiole absent to 2 mm; leaf blade ovate-lanceolate or lanceolate, (6–)10–18 × (1.4–)2–3 cm, pubescent especially adaxially, base subrounded or broadly cuneate, margin ciliate, apex long caudate. Racemes 4–5 cm; rachis ca. 4 mm thick; involucre bracts oblong, sparsely pubescent or glabrescent, early deciduous, apex narrowly caudate. Flowers white. Calyx tubular, 8–10 mm, pubescent, apex 3-lobed, lobes rounded. Corolla tube 1.1–1.4 cm, pubescent; lobes oblong, 8–10 mm, central one wider than lateral ones. Lateral staminodes linear, 4–5 mm. Labellum oblong-obovate or oblong, 0.8–1.6 cm, margin crisped, apex 2-lobed or 2-cleft. Stamen 1–1.3 cm. Ovary oblong, ca. 2 mm, glabrous. Fr. May.

- Scrub; ca. 800 m. SE Sichuan (Nanchuan Xian).

30. *Alpinia bambusifolia* C. F. Liang & D. Fang in D. Fang, Acta Phytotax. Sin. 16(4): 77. 1978.

竹叶山姜 zhu ye shan jiang

Pseudostems 0.5–1.5 m. Leaf sheath pubescent; ligule 2-cleft, to 3 mm; petiole absent to 3 mm; leaf blade narrowly lanceolate, 3–25 × 0.7–3.5 cm, subglabrous except shortly ciliate at margin, base cuneate, apex caudate. Spikes erect, subsessile, 1.5–6 cm; rachis pubescent; involucre bracts ovate to lanceolate, 2.5–9 × 1–1.8 cm, abaxially pubescent, apex acute, aristate, rarely caudate; bracts very small. Proximal flowers paired on rachis, distal ones solitary; pedicel less than 1 mm,

glabrous. Calyx pale purple-red, 0.9–1.1 cm, shallowly split on 1 side, abaxially densely pubescent, apex 3-toothed. Corolla abaxially pubescent; tube ca. 1.2 cm; lobes pale yellow, oblong, hoodlike, ca. 7 × 4–5 mm. Lateral staminodes ca. 3 mm, hairy. Labellum white with red stripes, obovate-oblong, ca. 9 × 6 mm, base hairy, apex 2-lobed. Stamen 1–1.2 cm; connective appendage absent. Ovary glabrous. Capsule ovoid to ellipsoid, 1–1.5 cm × 5–9 mm. Fl. Apr–May, fr. Nov–Dec. $2n = 48^*$.

- Forests in valleys; 1300–1400 m. Guangxi, Guizhou.

31. *Alpinia jianganfeng* T. L. Wu, *Novon* 7: 441. 1997.

箭杆风 jian gan feng

Pseudostems to 1 m. Ligule 2-cleft, ca. 2 mm, margin ciliate; petiole absent to 4 cm; leaf blade lanceolate or linear-lanceolate, 20–30 × 2–4(–6) cm, glabrous except hispid at subapical margin, base attenuate, apex narrowly caudate. Spikes erect, 10–20 cm; rachis tomentose; bracteoles very small. Flowers in clusters of 3 on rachis. Calyx cylindrical, abaxially pubescent, apex 3-cleft. Corolla tube subequaling or slightly longer than calyx; lobes oblong, 8–10 mm, abaxially villous. Lateral staminodes linear, ca. 2 mm. Labellum obovate, 0.7–1.3 cm, margin crisped, apex 2-cleft. Stamen longer than labellum; anther ca. 4 mm. Ovary globose, pubescent. Capsule globose, 7–8 mm in diam., pubescent, apex with persistent calyx. Seeds 5 or 6. Fl. Apr–Jun, fr. Jun–Nov. $2n = 48^*$.

- Shaded wet areas in forests. Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan.

The plants now treated as *Alpinia jianganfeng* were included in FRPS under *A. stachyodes*.

Medicinal.

32. *Alpinia pricei* Hayata, *Icon. Pl. Formos.* 5: 219. 1915.

短穗山姜 duan sui shan jiang

Alpinia sasakii Hayata; *A. tarokoensis* (Sasaki) Hayata; *Languas pricei* (Hayata) Sasaki; *L. sasakii* (Hayata) Sasaki; *L. tarokoensis* Sasaki.

Pseudostems ca. 1 m. Ligule oblong, ca. 5 mm, margin ciliate, apex obtuse; petiole ca. 1 cm; leaf blade linear-lanceolate, ca. 30 × 2–3 cm, glabrous or abaxially pubescent, base attenuate, apex acuminate. Racemes ca. 10 cm; rachis pubescent. Pedicel ca. 2 mm, hirsute. Calyx campanulate, ca. 1 cm, split on 1 side, abaxially hirsute. Corolla tube campanulate, ca. 6 mm, adaxially hirsute, abaxially glabrous, apex ca. 4 mm wide; central lobe obovate, ca. 2 × 1 cm, margin ciliate; lateral lobes narrower than central one. Lateral staminodes absent. Labellum obovate, ca. 2 × 2 cm, base cuneate, margin contracted above middle, crenate, apex shortly 2-cleft. Filament flattened, ca. 1.2 cm, glabrous; anther ca. 7 mm. Ovary globose, ca. 1.5 mm in diam., villous. Fl. Mar.

- Taiwan.

33. *Alpinia graminifolia* D. Fang & J. Y. Luo in D. Fang, *Acta Phytotax. Sin.* 16(4): 78. 1978.

狭叶山姜 xia ye shan jiang

Pseudostems 70–100 cm. Leaves usually sessile; ligule 3–5 mm, pubescent, apex concave; petiole rarely to 2 cm; leaf blade linear, 10–50 × (0.3–)0.9–1.5 cm, subglabrous, base cuneate, margin ciliate, apex long acuminate. Racemes erect, 4–10 cm; rachis densely pubescent; bracteoles very small, to 1 mm. Flowers solitary or paired on rachis, yellow. Calyx 0.9–1.2 cm, shallowly split on 1 side, abaxially puberulent, apex 3-toothed. Corolla tube subequaling calyx; lobes oblong, ca. 1 cm × 4 mm, puberulent. Lateral staminodes linear, 8–9 mm. Labellum ovate, ca. 2 cm, glandular, apex emarginate. Stamen ca. 1.5 cm; connective appendage triangular, ca. 1 mm. Ovary pubescent. Fl. May–Jun.

- Forests in valleys; 800–900 m. Guangxi.

34. *Alpinia brevis* T. L. Wu & S. J. Chen, *Acta Phytotax. Sin.* 16(3): 36. 1978.

小花山姜 xiao hua shan jiang

Pseudostems 1–2 m. Leaves sessile; leaf sheath sparsely villous at margin; ligule ca. 4 mm, densely villous, apex cuneate; leaf blade linear-lanceolate, 18–25 × 3–5 cm, glabrous or abaxially sparsely villous especially along main veins, base obtuse or attenuate, apex narrowly long caudate. Racemes 4–8(–12) cm; rachis ca. 2 mm thick, slender, glabrous or pubescent; bracteoles absent. Flowers white slightly tinged with pink; pedicel 1–1.5 cm, pubescent. Calyx tubular, 0.8–1.2 cm, glabrous or pubescent. Corolla tube subequaling calyx; lobes oblong, 5–6 × ca. 2 mm. Lateral staminodes triangular, ca. 1 mm. Labellum red striped, ovate, ca. 7 × 5 mm, margin irregularly notched. Filament ca. 4 mm; anther ca. 2.5 mm. Ovary globose, ca. 1 mm in diam., densely villous. Capsule globose, 6–8 mm in diam. Seeds 4–5 mm in diam., many angled. Fl. Aug, fr. Oct–Dec.

- Dense forests in mountains; 700–2000 m. Guangdong, Guangxi, Yunnan.

35. *Alpinia sichuanensis* Z. Y. Zhu, *Bull. Sichuan School Chin. Mat. Med.* 8: 15. 1986.

四川山姜 si chuan shan jiang

Pseudostems 70–120 cm. Ligule 2-lobed, 2–3 mm, pubescent; petiole 0.5–3 cm; leaf blade oblong-lanceolate, 15–35 × 3–7 cm, glabrous on both surfaces, base cuneate, margin entire or ciliate, apex acuminate or caudate. Racemes 9–22 cm; bracts 2, linear, 6–20 cm; bracteoles semiorbicular, early deciduous. Pedicel 1–2 mm, pubescent. Calyx tubular, 1.2–1.5(–1.7) cm, pubescent, apex 2- or 3-lobed or 3- or 4-toothed. Corolla tube subequaling calyx, glabrous; lobes oblong, 6–7 mm, apex densely pubescent. Lateral staminodes purple, linear, 3–4 mm. Labellum yellow-white with purple stripes, ovate-orbicular or broadly ovate, 5–6 × ca. 6 mm, margin rounded toothed. Filament 4–6 mm; anther 4–6 mm. Capsule red, globose, 8–9 mm in diam., apex with persistent calyx. Seeds 9–12. Fl. May–Jun, fr. Aug–Nov.

- Forests; 700–900 m. C Sichuan (Emei Shan).

36. *Alpinia oblongifolia* Hayata, *Icon. Pl. Formos.* 5: 215. 1915.

华山姜 hua shan jiang

Alpinia suishaensis Hayata; *Languas oblongifolia* (Hayata) Sasaki; *L. suishaensis* (Hayata) Sasaki.

Pseudostems ca. 1 m. Ligule 4–10 mm, membranous, margin ciliate; petiole ca. 5 mm; leaf blade oblong, ovate-lanceolate, or lanceolate, 20–30 × 3–10 cm, glabrous, base rounded or attenuate, apex acuminate or caudate-acuminate. Panicles narrow, 15–30 × 2–2.5 cm; branches 3–10 mm, 2–4-flowered; bracteoles 1–3 mm, deciduous. Pedicel to 1 mm. Calyx tubular, 5–7 mm, apex 3-toothed. Corolla tube slightly longer than calyx; lobes oblong, 6–7 mm. Lateral staminodes subulate, 1–2 mm. Labellum white with 2 red stripes from base to middle, ovate, 6–8 mm, apex 2-lobed. Filament ca. 5 mm; anther ca. 3 mm. Ovary glabrous. Capsule red, globose, 5–8 mm in diam. Seeds 5–8. Fl. May–Jul, fr. Jun–Dec. $2n = 48^*$.

Forests; 100–2500 m. Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Laos, Vietnam].

The Chinese plants named *Alpinia chinensis* (Retzius) Roscoe in FRPS are referable to *A. oblongifolia*. They were treated as *A. suishaensis* by Smith (Edinburgh J. Bot. 47: 63. 1990), who noted that the correct application of the name *A. chinensis* is uncertain. Moo (in Li et al., Fl. Taiwan 5: 836. 1978) treated *A. suishaensis* as a synonym of *A. oblongifolia*.

37. *Alpinia galanga* (Linnaeus) Willdenow, Sp. Pl. 1: 12. 1797.

红豆蔻 hong dou kou

Rhizomes tuberous. Pseudostems ca. 2 m. Ligule suborbicular, ca. 5 mm; petiole ca. 6 mm; leaf blade oblong or lanceolate, 25–35 × 6–10 cm, glabrous or abaxially pubescent, base attenuate, apex acute or acuminate. Panicles ca. 20 × 30 cm; rachis glabrous or pubescent; branches many, 2–4 cm, 3–6-flowered; bracts and bracteoles persistent; bracteoles lanceolate, 5–8 mm. Flowers green-white, fragrant. Calyx tubular, 6–10 mm, persistent. Corolla tube 6–10 mm; lobes oblong, 1.6–1.8 cm. Lateral staminodes purple, subulate or linear, 2–10 mm. Labellum white with red lines, obovate-spatulate, ca. 2 cm, apex deeply 2-cleft. Filament ca. 1 cm; anther ca. 7 mm. Capsule brown or red when dry, oblong, slightly contracted at middle, 1–1.5 cm × ca. 7 mm, thin, glabrous. Seeds 3–6. Fl. May–Aug, fr. Sep–Nov.

Forests, scrub, grasslands; 100–1300 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [India, Indonesia, Malaysia, Myanmar, Thailand, Vietnam].

- 1a. Leaf blade and panicle rachis glabrous 37a. var. *galanga*
1b. Leaf blade abaxially and panicle rachis pubescent 37b. var. *pyramidata*

37a. *Alpinia galanga* var. *galanga*

红豆蔻(原变种) hong dou kou (yuan bian zhong)

Maranta galanga Linnaeus, Sp. Pl., ed. 2, 1: 3. 1762; *Amomum galanga* (Linnaeus) Loureiro; *A. medium* Loureiro; *Languas galanga* (Linnaeus) Stuntz.

Leaf blade and panicle rachis glabrous.

Forests, scrub, grasslands; 100–1300 m. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [India, Indonesia, Malaysia, Myanmar, Thailand, Vietnam].

Cultivated throughout SE Asia; medicinal.

37b. *Alpinia galanga* var. *pyramidata* (Blume) K. Schumann in Engler, Pflanzenz. 20(IV. 46): 316. 1904.

毛红豆蔻 mao hong dou kou

Alpinia pyramidata Blume, Enum. Pl. Javae 1: 58. 1827.

Leaf blade abaxially and panicle rachis pubescent.

Forests, scrub, grasslands; 100–1300 m. Guangdong, Guangxi, Yunnan [Indonesia (Java)].

38. *Alpinia polyantha* D. Fang, Acta Phytotax. Sin. 16(4): 78. 1978.

多花山姜 duo hua shan jiang

Rhizomes creeping, thick. Pseudostems to 6 m. Leaf sheath longitudinally rough lined, densely tomentose; ligule 2-cleft, 1–2 cm, tomentose; petiole 1–9 cm, tomentose; leaf blade lanceolate or elliptic, to 1 m × 25 cm, glabrous or abaxially tomentose, base cuneate, margin long ciliate, apex acuminate. Panicles erect, 35–60 × 7–9 cm, tomentose; branches 0.5–3 cm, 5–8-flowered; involucre bracts oblong-lanceolate, ca. 27 × 5.5 cm; bracteoles oblong to oblanceolate, ca. 1.2 cm × 3–7 mm, membranous. Pedicel 1–10 mm. Calyx red, 0.9–1.4 cm, split on 1 side, apex 3-toothed. Corolla tube equaling calyx; lobes oblong, 1.3–1.7 cm × ca. 5 mm. Lateral staminodes red, horn-shaped, ca. 6 mm. Labellum suborbicular to oblong, ca. 2.3 × 1.8–2.2 cm, midvein yellowish, with a few purple lines on both sides near base, apex acute, 2-toothed. Stamen ca. 2.8 cm; anther 8–9 mm; connective appendage tongue-shaped, ca. 2 mm. Ovary densely hirsute. Capsule globose, 0.9–1.4 cm in diam., hairy, apex with persistent calyx. Fl. May–Jun, fr. Oct–Nov. $2n = 48^*$.

• Forests. Guangxi, Yunnan.

Medicinal.

39. *Alpinia maclurei* Merrill, Philipp. J. Sci. 21: 338. 1922.

假益智 jia yi zhi

Languas maclurei (Merrill) Merrill.

Pseudostems 1–2 m. Ligule 2-cleft, 1–2 cm, tomentose; petiole 1–5 cm; leaf blade lanceolate, 30–50(–80) × 8–10(–20) cm, abaxially pubescent, base attenuate, apex caudate-acuminate. Panicles erect, 30–40 cm, gray pubescent, many flowered; branches 1.5–3 cm, rarely longer, apically 3–5-flowered; bracteoles oblong, ca. 8 mm, pubescent, deciduous, apex cucullate. Pedicel very short. Calyx tubular, 6–10 mm, pubescent, apex 3-toothed, teeth subrounded. Corolla tube ca. 1.2 cm; lobes oblong, ca. 1 cm, apex cucullate. Lateral staminodes ca. 5 mm. Labellum reflexed at anthesis, oblong-ovate, 1–1.2 cm × 6–7 mm. Filament ca. 1.4 cm; anther 3–4 mm. Ovary ovoid, 1.5–1.8 mm, pubescent. Capsule globose, ca. 1 cm in diam., glabrous; pericarp fragile. Fl. Mar–Jul, fr. Apr–Oct. $2n = 48^*$.

Forests in mountains. Guangdong, Guangxi, Hainan, Yunnan [Vietnam].

40. *Alpinia intermedia* Gagnepain, Bull. Soc. Bot. France 48: lxxxiii. 1902.

光叶山姜 *guang ye shan jiang*

Alpinia hokutensis Hayata; *A. kelungensis* Hayata; *A. kumatake* Makino; *Languas hokutensis* (Hayata) Sasaki; *L. intermedia* (Gagnepain) Sasaki; *L. kelungensis* (Hayata) Sasaki.

Pseudostems ca. 1 m. Ligule 5–6 mm, dry membranous, margin ciliate; petiole to 2.5 cm; leaf blade oblong or lanceolate, 20–50 × 5–12 cm, glabrous, base attenuate, apex acuminate. Panicles erect or pendent, 10–15 × 2–4 cm, glabrous; branches 0.8–1.3 cm, apically 3–5-flowered; bracteoles oblong, 7–10 mm, deciduous. Flowers white, glabrous. Calyx tubular, 3.5–4.5 mm, apex crenate. Corolla tube shorter than calyx; lobes narrow. Lateral staminodes horn-shaped. Labellum ovate, ca. 1.8 cm, base attenuate, apex acute, 2-cleft. Anther ovate, slightly hairy. Fl. Jun. $2n = 48^*$.

Forest floors, scrub; 300–1000 m. Guangdong, Taiwan [Japan, Philippines].

41. *Alpinia guangdongensis* S. J. Chen & Z. Y. Chen, *Guihaia* 8: 317. 1988.

光叶假益智 *guang ye jia yi zhi*

Pseudostems 1.5–2.5 m. Leaf sheath pubescent; ligule 2-lobed, ca. 1 cm, densely hairy; petiole ca. 4.5 cm; leaf blade lanceolate, 20–50 × 7–12 cm, glabrous except pubescent at margin, base cuneate, apex caudate. Panicles 20–25 cm, winding, pubescent; branches ca. 1.5 cm, apically 1–3-flowered; bracteoles white, boat-shaped, early deciduous, base glabrous, apex pubescent. Pedicel ca. 1 mm. Calyx tubular, ca. 8 mm, pubescent, apex 3-toothed. Corolla tube ca. 1.4 cm; lobes oblong, 8–10 mm. Lateral staminodes red, ca. 4 mm. Labellum reflexed at anthesis, ovate, 1.5–2 × ca. 1.6 cm. Filament white, ca. 2.5 cm; anther red, ca. 4 mm. Ovary green, globose, glabrescent. Fr. Jun.

• Forests; ca. 100 m. Guangdong (Huidong Xian).

42. *Alpinia globosa* (Loureiro) Horaninow, *Prodr. Monogr. Scitam.* 34. 1862.

脆果山姜 *cui guo shan jiang*

Amomum globosum Loureiro, *Fl. Cochinch.* 1: 4. 1790.

Pseudostems ca. 1.5 m. Ligule 2-cleft, 1–2 cm, villous; petiole 5–6 cm; leaf blade oblong, 45–70 × 10–14 cm, glabrous, base attenuate, margin scabrous, ciliate, apex acuminate. Panicles cylindrical, ca. 30 × 5 cm, pubescent; branches numerous, 1.5–3.5 cm, apically 4–8-flowered; bracts very small or absent; bracteoles oblong, ca. 1 cm × 4 mm, membranous. Pedicel 2–3(–8) mm. Calyx ca. 9 mm, apex 3-toothed. Corolla tube equaling or slightly longer than calyx; lobes linear, ca. 1 cm × 2 mm. Lateral staminodes subulate. Labellum white with purple stripes, oblong or elliptic, ca. 1.2 × 1 cm, base slightly contracted, apex emarginate or entire. Filament 1.2–1.5 cm; anther ca. 6 mm. Ovary globose, pubescent. Capsule red, globose, 7–10 mm in diam.; pericarp thin, fragile. Seeds 5–7. Fl. Apr. fr. Jun.

Forests; 100–300 m. S Yunnan [Vietnam].

43. *Alpinia tonkinensis* Gagnepain, *Bull. Soc. Bot. France* 48: lxxxv. 1902.

滑叶山姜 *hua ye shan jiang*

Pseudostems stout. Leaf sheath longitudinally lined; ligule 1.5–2 cm, leathery, apex obtuse; petiole 3–6 cm; leaf blade linear-lanceolate, ca. 60 × 7 cm, leathery, glabrous, base attenuate, apex acuminate. Panicles erect, 40–50 × ca. 4 cm, proximally glabrous, distally densely villous; branches apically 3–5-flowered; bracts ovate, ca. 1.5 cm, leathery, deciduous; bracteoles similar to bracts but smaller. Pedicel very short. Calyx subcampanulate, 9–10 mm, split to middle on 1 side, apex irregularly crenate. Corolla tube 7–8 mm; lobes oblong, 1.5–1.8 cm, concave, central one ciliate at proximal margin, apex apiculate. Lateral staminodes linear, very short. Labellum orbicular or ovate, ca. 1.4 × 1–1.2 cm, base slightly contracted, apex emarginate. Filament 4–5 mm; anther ca. 6 mm. Ovary globose, sericeous. Fl. Feb. $2n = 48^*$.

Forests. Guangxi, Hainan [Vietnam].

Medicinal and used as a condiment.

44. *Alpinia strobiliformis* T. L. Wu & S. J. Chen, *Acta Phytotax. Sin.* 16(3): 33. 1978.

球穗山姜 *qiu sui shan jiang*

Pseudostems 0.8–1.2 m. Ligule 2-cleft, lobes orbicular, 1–3 mm; petiole absent to 1 cm; leaf blade linear, 25–50 × 2.5–5 cm, abaxially densely velvety or glabrous, midvein pubescent, base attenuate, apex caudate-mucronate. Spikes conelike, 4.5–9 × 3–4 cm, 5.5–6 × ca. 2.5 cm in fruit; bracts densely imbricate, brownish when dry, ovate, 1.7–2.2 × 1–1.5 cm, densely villous on both surfaces; bracteoles ovate, ca. 1.2 cm, golden sericeous abaxially. Flowers white. Calyx tubular, ca. 1 cm, apex 2-toothed, ciliate. Corolla tube ca. 1.1 cm; lobes ovate, ca. 7 × 3 mm. Lateral staminodes absent. Labellum oblong, subequaling corolla lobes, apex 2-cleft. Filament ca. 5 mm; anther ca. 4 mm. Style linear; stigma exceeding anther. Capsule concealed by persistent bracts, red, globose, ca. 8 mm in diam. Fl. May–Jun, fr. Aug–Oct.

• Forests; 1000–1700 m. Guangxi, Yunnan.

1a. Leaf blade abaxially velvety 44a. var. *strobiliformis*

1b. Leaf blade abaxially glabrous except pubescent along midvein 44b. var. *glabra*

44a. *Alpinia strobiliformis* var. *strobiliformis*

球穗山姜(原变种) *qiu sui shan jiang* (*yuan bian zhong*)

Leaf blade abaxially velvety.

• Forests; 1000–1700 m. Guangxi, Yunnan.

44b. *Alpinia strobiliformis* var. *glabra* T. L. Wu in T. L. Wu & S. J. Chen, *Acta Phytotax. Sin.* 16(3): 34. 1978.

光叶球穗山姜 *guang ye qiu sui shan jiang*

Leaf blade abaxially glabrous except pubescent along midvein.

• Forests. SW Guangxi (Shangxi Xian).

45. *Alpinia pinnanensis* T. L. Wu & S. J. Chen, *Acta Phytotax. Sin.* 16(3): 34. 1978.

柱穗山姜 *zhu sui shan jiang*

Pseudostems ca. 1.5 cm. Ligule 2-cleft, abaxially villous, lobes deltoid, 2–4 mm; petiole 2.5–4.5 cm; leaf blade lanceolate, 30–60 × 5–9 cm, glabrous except golden velvety along midvein abaxially and at margin, base attenuate, apex acuminate, caudate-mucronate. Spikes pendent, cylindrical, 7–9 × 1.5–2.5 cm; bracts ovate, less than 8 mm, densely golden velvety; bracteoles ca. 5 mm, densely golden velvety. Flowers yellow. Calyx ca. 3 mm, split to base on 1 side. Corolla tube ca. 5 mm, pubescent at throat; lobes ovate-oblong, ca. 6 mm, central one larger than lateral ones. Labellum subequaling corolla lobes, narrow, apex 2-cleft. Filament ca. 4 mm; anther ca. 3 mm. Ovary obconical, ca. 1 mm. Capsule red, globose, ca. 1.2 cm in diam., dry and brittle. Fl. Jul, fr. Sep–Nov.

- Forests. Guangxi.

46. *Alpinia pumila* J. D. Hooker, Bot. Mag. 111: t. 6832. 1885.

花叶山姜 hua ye shan jiang

Amomum vittatum Hance.

Rhizomes horizontally creeping. Pseudostems not developed. Leaves 2 or 3, erect; leaf sheath red-brown; ligule 2-lobed, short; petiole ca. 2 cm; leaf blade adaxially green with deep green stripes along veins, elliptic, oblong, or oblong-lanceolate, ca. 15 × 7 cm, glabrous, base acute, apex acuminate. Racemes with ca. 33 cm long peduncle; bracts oblong, ca. 2 cm, 2-flowered, late deciduous; bracteoles absent. Calyx purple, tubular, 1.3–1.5 cm, pubescent, apex 3-toothed. Corolla white; tube ca. 1 cm; lobes oblong, slightly longer than tube. Lateral staminodes subulate, 3–4 mm. Labellum white with red stripes, ovate, ca. 1.2 cm, margin crenate, apex reflexed, 2-cleft. Filament 5–10 mm; anther 5–8 mm. Ovary sericeous. Capsule globose, ca. 1 cm in diam., apex with persistent perianth ca. 1 cm. Fl. Apr–Jun, fr. Jun–Nov.

- Shady and humid places in mountain valleys; 500–1100 m. Guangdong, Guangxi, Hunan, Yunnan.

47. *Alpinia psilogyne* D. Fang, Acta Phytotax. Sin. 16(4): 80. 1978.

矮山姜 ai shan jiang

Pseudostems 13–24 cm. Leaves 1–4, usually 3; ligule 2-cleft, 3–5 mm, margin ciliate; petiole 0.3–4.5 cm, pubescent; leaf blade adaxially uniformly green, long elliptic or oblanceolate, 14–40 × 3–7 cm, leathery, glabrous except pubescent along midvein and at margin, base obliquely cuneate, apex acute. Spikes erect, 5–9 cm, densely pubescent; peduncle 1–5 cm; involucre bract oblong or linear-lanceolate, 3.5–14 cm, puberulent; bracts pale green, oblong-elliptic, boat-shaped, 1–2.5 cm, 2- or 3-flowered, persistent. Calyx white, ca. 1.5 cm, slightly split on 1 side, puberulent, apex 2- or 3-toothed. Corolla tube white, equaling calyx; lobes yellowish, oblong, ca. 9 × 5 mm. Lateral staminodes red, linear, ca. 4 mm. Labellum yellowish with red stripes, broadly obovate, ca. 7 mm wide, margin toothed, apex 2-cleft. Stamen ca. 1.5 cm; connective emarginate, rarely with deltoid appendage. Ovary glabrous. Capsule red, ovoid to ellipsoid, ca. 1.5 × 1 cm. Fl. May, fr. Oct–Nov.

- Forests. W Guangxi (Debao Xian).

Medicinal.

48. *Alpinia coriacea* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 31. 1978.

革叶山姜 ge ye shan jiang

Pseudostems 50–60 cm. Ligule orbicular, 2-cleft, ca. 3 mm, margin ciliate; petiole 5–7 mm; leaf blade deep green, elliptic or ovate-elliptic, 10–15 × 5–8 cm, leathery, glabrous, apex acuminate, with caudate tip ca. 1 cm. Spikes ca. 4 cm; bracts densely imbricate, lanceolate, 1–1.5 cm, 2-flowered, persistent; bracteoles pale green, ovate, ca. 1.2 cm, densely pilose. Calyx ca. 1 cm, densely pilose, apex 3-toothed. Corolla tube white, ca. 1.2 cm; lobes oblong, central one ca. 8 × 4 mm, puberulent, margin ciliate, apex slightly concave, lateral ones narrower. Lateral staminodes oblong, ca. 3.5 mm. Labellum pale green with red stripes, oblong, ca. 1 cm × 7 mm, apex emarginate. Filament ca. 5 mm; anther ca. 3 mm; connective appendage absent. Capsule ovoid, ca. 1 cm. Fl. and fr. Jun–Aug. $2n = 48^*$.

- Forests. E Hainan (Wanning Xian).

49. *Alpinia coriandriodora* D. Fang, Acta Phytotax. Sin. 16(4): 79. 1978.

香姜 xiang jiang

Plants with odor of coriander (*Coriandrum sativum* Linnaeus). Rhizomes purple-red, short. Pseudostems 0.5–2 m. Leaves 15–25, sessile; ligule shallowly 2-cleft, 3–8 mm, margin often ciliate; leaf blade elliptic-lanceolate, 8–13 × 1.2–5 cm, glabrous, base cuneate, margin shortly hispid, glabrescent, apex long caudate. Spikes 5–10 cm; rachis densely pubescent; involucre bract elliptic-lanceolate, 4.5–12 cm, puberulent, apex caudate; bracts 1.5–5 cm × 4–6 mm, early deciduous; bracteoles elliptic, 5–9 mm, flat, puberulent, deciduous. Proximal flowers in clusters of 3 on rachis, distal ones solitary; pedicel ca. 1 mm, densely pubescent. Calyx 6–9 mm, shallowly split on 1 side, apex 3-toothed. Corolla tube subequaling calyx; lobes oblong, ca. 7 × 4 mm, abaxially densely appressed pubescent. Lateral staminodes linear, ca. 4 mm, minutely glandular hairy. Labellum purple-red striped, subovate, 6–7 mm wide, velvety, apex shallowly 2-cleft. Stamen ca. 1.1 cm; connective appendage triangular or tongue-shaped, ca. 2 mm. Ovary densely pubescent. Capsule red, globose, 0.8–1.4 cm in diam., sparsely velvety, apex with persistent calyx. Fl. Apr–May, fr. Sep–Oct. $2n = 48^*$.

- Guangxi.

Medicinal and used as a condiment.

50. *Alpinia stachyodes* Hance, J. Linn. Soc., Bot. 13: 126. 1873.

密苞山姜 mi bao shan jiang

Pseudostems 1–1.5 m. Leaf sheath tomentose; ligule orbicular, 2-cleft, ca. 1 cm, tomentose, margin ciliate; petiole 0.5–2 cm, tomentose; leaf blade oblong-lanceolate, 20–40 × 4–7 cm, leathery, glabrous except tomentose at margin and apex, or abaxially tomentose especially on median veins, base attenuate, apex acuminate, with caudate tip ca. 2.5 cm. Spikes erect, sessile, cylindrical, 10–16 cm; involucre bract linear, 8–9 cm × 8–10 mm; bracts ovate or lanceolate, 1.5–2.5 cm, densely imbricate, tomentose, 3-flowered, persistent; bracteoles lanceolate,

5–10 mm, tomentose, persistent. Flowers fragrant, tomentose. Calyx tubular, 1–1.5 cm, apex 3-toothed. Corolla tube ca. 1.2 cm; lobes oblong, ca. 6 mm, concave. Lateral staminodes linear, ca. 2 mm. Labellum striped at center, rhomboidal-ovate, obscurely 3-lobed, ca. 7 × 3 mm, margin undulate, apex 2-cleft. Filament ca. 5 mm; anther ca. 4 mm. Ovary densely hirsute. Capsule globose, ca. 1 cm in diam., apex with persistent calyx. Fl. and fr. Jun–Aug. $2n = 48^*$.

• Forests, roadsides; 600–700 m. Guangdong, Guangxi, Guizhou, Jiangxi, Yunnan.

1a. Leaf blade glabrous except tomentose at margin and apex 50a. var. *stachyodes*

1b. Leaf blade abaxially tomentose especially on median veins 50b. var. *yangchunensis*

50a. *Alpinia stachyodes* var. *stachyodes*

密苞山姜(原变种) mi bao shan jiang (yuan bian zhong)

Alpinia densibracteata T. L. Wu & S. J. Chen.

Leaf blade glabrous except tomentose at margin and apex.

• Dense forests. Guangdong, Guangxi, Guizhou, Jiangxi, Yunnan.

50b. *Alpinia stachyodes* var. *yangchunensis* Z. L. Zhao & L. S. Xu in Z. L. Zhao et al., Acta Phytotax. Sin. 36: 551. 1998.

阳春山姜 yang chun shan jiang

Leaf blade abaxially tomentose especially on median veins.

• Forests, roadsides; 600–700 m. Guangdong.

51. *Alpinia jingxiensis* D. Fang, Acta Phytotax. Sin. 18: 224. 1980.

靖西山姜 jing xi shan jiang

Pseudostems 50–60 cm. Ligule 2-cleft, 3–4 mm, thick, densely pubescent; petiole 0.3–2 cm; leaf blade elliptic-lanceolate, 28–50 × 5–9 cm, adaxially glabrous, abaxially densely pubescent, base cuneate, apex caudate. Spikes sessile, 7–9 cm; rachis pubescent; involucre bracts 2, ovate-lanceolate, 4.5–13 cm; bracts red, ovate-deltoid, 2.4–3 cm, sericeous, 3-flowered; bracteoles ovate-deltoid, 1.5–1.8 cm, sericeous. Calyx pale red, slightly split on 1 side, sericeous, apex 2-toothed. Corolla tube ca. 2 cm, pubescent; lobes oblong, ca. 1 cm × 4 mm, central one larger than lateral ones, sericeous. Lateral staminodes subulate, ca. 2 mm, densely glandular hairy. Labellum red striped, ovate, ca. 7 mm wide, apex 2-cleft. Filament ca. 5 mm; anther ca. 4 mm, densely and shortly glandular hairy. Ovary glabrous. Capsule subglobose, ca. 8 mm in diam., apex with persistent calyx. Fl. Jun–Jul.

• Forests; 1400–1500 m. W Guangxi (Jingxi Xian).

The spelling of the specific epithet follows the protologue; in FRPS it was given as "*Alpinia chinghsiensis*."

4. POMMERESCHEA Wittmack, Gartenflora 44: 131. 1895.

直唇姜属 zhi chun jiang shu

Pseudostems slender. Leaves shortly petiolate; leaf blade cordate or subsagittate at base. Inflorescence a terminal spike; bracts and bracteoles present. Calyx tubular or clavate, split on 1 side, apex 2- or 3-toothed. Corolla tube cylindrical, longer than calyx; lobes lanceolate, central one larger than lateral ones. Lateral staminodes absent. Labellum erect, narrowly spatulate, base adnate to filament or not, apex 2-cleft or -lobed. Filament exerted from corolla, distally grooved. Style filiform; stigma cupular, ciliate. Ovary 3-loculed; ovules numerous, biserial; placentation axile. Capsule subglobose or ellipsoid, 3-valved, dehiscent or not; pericarp thin.

Two species: China, Myanmar, Thailand; two species in China.

1a. Leaf blade abaxially pubescent, basal lobes separate; petiole 4–8 cm 1. *P. lackneri*

1b. Leaf blade glabrous, basal lobes close together; petiole 0.5–2 cm 2. *P. spectabilis*

1. *Pommereschea lackneri* Wittmack, Gartenflora 44: 131. 1895.

直唇姜 zhi chun jiang

Pseudostems 50–70 cm. Leaves 4 or 5; ligule 2-lobed, 4–6 mm; petiole 4–8 cm; leaf blade ovate-lanceolate or oblong, 15–25 × 3.5–6 cm, abaxially pubescent, base cordate with basal lobes separate, apex acuminate. Spikes 8–12 cm; bracts lanceolate, 1.5–2.5 cm. Flowers yellow. Calyx subclavate, ca. 1.5 cm, split nearly to base on 1 side, apex 2-toothed. Corolla tube 2–2.5 cm; lobes lanceolate, 1–1.3 cm. Labellum embracing filament, cuneate, ca. 1.5 cm, apex 2-cleft. Filament narrowly linear, flexuous, 3.5–4 cm; anther 7–8 mm; connective appendage absent. Fl. Aug. $2n = 22^*$.

Calcareous rocks; ca. 1000 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [Myanmar, Thailand].

2. *Pommereschea spectabilis* (King & Prain) K. Schumann in Engler, Pflanzenr. 20(IV. 46): 280. 1904.

短柄直唇姜 duan bing zhi chun jiang

Croftia spectabilis King & Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 298. 1896.

Pseudostems 17–25 cm. Ligule 2-lobed, ca. 5 mm; petiole 0.5–2 cm; leaf blade oblong or oblong-lanceolate, 7–16 × 3–5 cm, glabrous, base cordate with basal lobes close together, apex caudate. Spikes 5–7 cm; bracts lanceolate, 1.5–2 cm; bracteoles linear, ca. 5 mm. Calyx yellow with red spots, clavate, ca. 7 mm. Corolla tube yellow, ca. 1.2 cm, abaxially pubescent; lobes ovate-lanceolate, ca. 8 mm. Labellum erect, narrowly spatulate, 8–9 mm. Filament 1.5–2.5 cm; anther ca. 5 mm. Ovary ellipsoid, ca. 4 mm, villous. Capsule ellipsoid, 8–9 × ca. 6 mm, hirsute. Fl. Jun–Aug.

Forests; ca. 1200 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [Myanmar].

5. RHYNCHANTHUS J. D. Hooker, Bot. Mag. 112: t. 6861. 1886.

喙花姜属 *hui hua jiang shu*

Rhizomes tuberous. Pseudostems leafy. Leaves sessile or shortly petiolate; leaf blade oblong-lanceolate or elliptic-oblong. Inflorescence a terminal spike, few flowered; bracts colored; bracteoles small. Calyx tubular, split to above middle on 1 side, apex minutely toothed. Corolla tube subcylindric; lobes erect, ovate-lanceolate or lanceolate, central one larger than lateral ones. Lateral staminodes absent. Labellum reduced to a tooth at base of filament or absent. Filament exerted above corolla, long, boat-shaped, margin incurved; anther locules parallel; connective without appendage or spur. Ovary 3-loculed; ovules many per locule, superposed. Stylodes 2, subfusiform. Capsule unknown.

Seven species: China, Indonesia (Borneo, Sumatra), ?Myanmar, Papua New Guinea; one species (endemic) in China.

1. *Rhynchanthus beesianus* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 189. 1918.

喙花姜 *hui hua jiang*

Rhizomes with stout, hairy roots. Pseudostems 0.5–1.5 m. Leaves 3–6; ligule membranous; petiole red adaxially, ca. 4 mm; leaf blade elliptic-oblong, 15–30 × 4.5–9 cm, glabrous, base rounded or acute, margin brown when dry, apex caudate-acuminate. Spikes erect, 10–15 cm, ca. 12-flowered; peduncle short; bracts red, purple when dry, linear-lanceolate, 3–7 cm, membranous. Calyx red, ca. 3 cm, apex with 2 green points.

Corolla tube red, 2–4.5 cm, slightly widened distally; lobes pale red at base, yellowish distally, ovate-lanceolate, 1.5–3 cm. Lateral staminodes and labellum absent. Filament yellow, lanceolate, ca. 4.5 cm, base widened and folded; anther ca. 8 mm. Ovary ca. 5 mm, pubescent. Style linear. Fl. Jul. $2n = 44^*$.

• Forests, scrub, grasslands, epiphytic on trees; 1500–1900 m. Yunnan [?Myanmar].

The presence of this species in Myanmar requires confirmation.

6. *AMOMUM* Roxburgh, Pl. Coromandel 3: 75. 1820, nom. cons.

豆蔻属 *dou kou shu*

Meistera Giseke, nom. rej.; *Paludana* Giseke, nom. rej.; *Paramomum* S. Q. Tong; *Wurfbainia* Giseke, nom. rej.

Rhizomes widely creeping. Pseudostems elongate. Leaf sheath long; ligule entire or 2-lobed; leaf blade usually oblong-lanceolate, oblong, or linear. Inflorescence arising from rhizomes, a densely flowered spike or spikelike raceme or panicle; peduncle short or rather long, clothed with imbricate, scalelike sheaths; involucre absent; bracts imbricate, persistent, sometimes soon disintegrating; bracteoles usually tubular. Calyx usually tubular, apex 3-toothed. Corolla tube cylindrical; lobes oblong or linear-oblong, central one erect, usually wider and more convex than lateral ones. Lateral staminodes subulate, small, or absent. Labellum conspicuous, usually yellow or orange at center, with some red veins or marks, often white at margin, usually obovate, broadly concave. Filament well developed; anther locules parallel or diverging; connective appendage extending beyond apex of anther, entire or 3-lobed. Ovary 3-loculed; ovules many per locule, superposed. Style filiform; stigma usually funnellform, small, ciliate. Capsule irregularly dehiscent or indehiscent, smooth, prickly, or winged. Seeds oblong or many angled; aril fleshy or membranous, apex laciniate.

About 150 species: tropical Asia and Australia; 39 species (29 endemic, one introduced) in China.

Amomum krervanh Gagnepain (in FRPS, as “*A. kravanh*”) is locally cultivated in China and is also imported for medicinal use; however, it is not known to be naturalized. It may be conspecific with *A. testaceum* Ridley, in which case the latter name would have priority.

1a. Capsule smooth, neither prickly nor winged.

2a. Leaf blade abaxially pubescent.

3a. Leaves subsessile, leaf blade pubescent only along sides of midvein abaxially, ligule 2–4 mm 1. *A. kwangsiense*

3b. Leaves sessile or petiolate (petiole to 12 cm), leaf blade uniformly pubescent abaxially, ligule 5–20 mm.

4a. Ligule ca. 2 cm; petiole 2.5–12 cm; anther connective appendage 3-lobed 2. *A. longipetiolatum*

4b. Ligule 0.5–1.5 cm; petiole absent to 11 cm; anther connective appendage entire.

5a. Leaf blade abaxially silvery pubescent; petiole 4–8(–11) cm 3. *A. sericeum*

5b. Leaf blade abaxially brownish pubescent; petiole absent to 2.5 cm 4. *A. yingjiangense*

2b. Leaf blade glabrous on both surfaces.

6a. Anther connective appendage 3-lobed.

7a. Ligule 2-cleft.

8a. Corolla lobes white, oblong, ca. 0.8 cm; labellum yellowish with orange midvein and purple margin, 1.5–1.8 × 1–1.5 cm 5. *A. compactum*

8b. Corolla lobes rose, elliptic, ca. 3 cm; labellum with yellow midvein and purple stripes on each side, ca. 3.2 × 1.6 cm 6. *A. scarlatinum*

7b. Ligule entire.

9a. Labellum 3.5–4 cm.

10a. Plants 1–1.7 m tall, with odor of coriander (*Coriandrum sativum*); petiole absent; ligule 0.4–1 cm 7. *A. coriandriodorum*

- 10b. Plants 0.5–1 m tall, without odor of coriander; petiole 2.5–12 cm; ligule ca. 2 cm 8. *A. dolichanthum*
- 9b. Labellum 1.5–3.2 cm.
- 11a. Ligule 8–12 mm; corolla orange-red 9. *A. tsaoko*
- 11b. Ligule 2–5 mm; corolla yellow with purple or white markings.
- 12a. Petiole to 3 cm; corolla lobes oblong, ca. 3 cm; labellum obovate, 2.8–3.2 × 1.5–1.7 cm, base adnate to filament forming a tube ca. 3 mm 10. *A. tuberculatum*
- 12b. Petiole absent; corolla lobes narrowly elliptic, ca. 1.4 cm; labellum suborbicular, ca. 1.5 × 1.8 cm, base not adnate to filament 11. *A. quadratolaminare*
- 6b. Anther connective appendage entire.
- 13a. Ligule 1–3 cm.
- 14a. Ligule 1–1.5 cm; labellum yellow, with 2 red stripes from center to base, obovate, distal margin fimbriate 12. *A. thysanochilum*
- 14b. Ligule 2.5–3 cm; labellum white, densely red dotted at center, with radiate, red veins at margin, narrowly elliptic 13. *A. paratsaoko*
- 13b. Ligule 2–6 mm.
- 15a. Petiole absent.
- 16a. Ligule entire; leaf blade with lateral veins prominent adaxially 14. *A. capsiciforme*
- 16b. Ligule emarginate at apex; leaf blade with lateral veins not prominent adaxially 15. *A. menglaense*
- 15b. Petiole 0.5–5 cm.
- 17a. Ligule entire, 2–4 mm; labellum ca. 3.2 × 1.5 cm, base adnate to filament forming a tube ca. 3 mm, margin crisped 16. *A. jingxiense*
- 17b. Ligule 2-cleft, 3–6 mm; labellum 1–1.3 × 0.6–0.9 cm, base not adnate to filament, apex 2-cleft.
- 18a. Plants ca. 0.5 m tall; leaves 1–3; peduncle 4–16 cm; bracts 1.2–1.5 cm 17. *A. austrosinense*
- 18b. Plants 1–3 m tall; leaves more than 3; peduncle 30–35 cm; bracts 2–2.7 cm 18. *A. koenigii*
- 1b. Capsule prickly or winged.
- 19a. Capsule prickly.
- 20a. Leaf blade hairy at least abaxially.
- 21a. Leaf blade abaxially hairy 19. *A. verrucosum*
- 21b. Leaf blade hairy on both surfaces.
- 22a. Ligule entire, rarely emarginate at apex, 4–10 mm; bracts brown, ovate to lanceolate, ca. 3 cm; lateral staminodes 5–6 mm, apex entire 20. *A. microcarpum*
- 22b. Ligule 2-cleft, 6–7 mm; bracts purple, oblong, ca. 1.2 cm; lateral staminodes ca. 1 cm, apex emarginate 21. *A. neoaurantiacum*
- 20b. Leaf blade glabrous.
- 23a. Anther connective appendage 3-lobed.
- 24a. Ligule lanceolate, 2–2.2 cm 22. *A. longiligulare*
- 24b. Ligule semiorbicular, 0.3–0.5 cm 23. *A. villosum*
- 23b. Anther connective appendage entire.
- 25a. Petiole 4–5 mm; peduncle 13–32 cm.
- 26a. Flowers white; calyx 1.5–2 cm; labellum broadly orbicular; lateral staminodes absent 24. *A. yunnanense*
- 26b. Flowers yellow; calyx ca. 1 cm; labellum fan-shaped-spatulate; lateral staminodes toothlike, ca. 1 mm 25. *A. gagnepainii*
- 25b. Petiole 5–10 mm; peduncle 0.5–1 cm.
- 27a. Corolla white, lobes ca. 1.5 cm; labellum deltoid-ovate, ca. 1.5 cm; ligule ca. 3 mm 26. *A. chinense*
- 27b. Corolla yellow, lobes 2–3 cm; labellum obovate, 2.5–3 cm; ligule 7–9 mm 27. *A. muricarpum*
- 19b. Capsule winged.
- 28a. Leaf blade abaxially hairy.
- 29a. Petiole absent to 8 cm.
- 30a. Leaf blade abaxially white pubescent; capsule ovoid, pedicel 0.7–1 cm 28. *A. maximum*
- 30b. Leaf blade abaxially brownish villous; capsule ellipsoid, pedicel 1–2 cm 29. *A. dealbatum*
- 29b. Petiole 12–35 cm.
- 31a. Inflorescences paniculate; fruiting peduncle 3–4 cm 30. *A. mengtzense*
- 31b. Inflorescences subcapitate; fruiting peduncle 5–12 cm 31. *A. subcapitatum*
- 28b. Leaf blade glabrous.
- 32a. Filament broad, anther attached to middle of filament; lateral staminodes absent 32. *A. petaloideum*
- 32b. Filament slender, anther attached to apex of filament; lateral staminodes present.
- 33a. Ligule entire, 3–5 cm.
- 34a. Spikes narrowly ellipsoid, 7–8 × 2.8–3.2 cm; peduncle 2.5–10 cm; bracts elliptic; corolla lobes and labellum entire at apex 33. *A. fragile*
- 34b. Spikes capitate, 5.5–7 × 6–8 cm; peduncle 2–3 cm; bracts ovate-orbicular or broadly ovate; central lobe of corolla mucronate at apex; labellum 2-cleft at apex 34. *A. purpureorubrum*

- 33b. Ligule entire or 2-cleft, 0.3–3 cm.
 35a. Ligule 3–4 mm; central lobe of corolla apiculate at apex.
 36a. Bract with horny cusp at apex; anther connective appendage entire 35. *A. subulatum*
 36b. Bract without horny cusp at apex; anther connective appendage 3-lobed 36. *A. glabrum*
 35b. Ligule 0.7–3 cm; central lobe of corolla not apiculate at apex.
 37a. Petiole absent; ligule 1.5–3 cm; bracteoles absent 37. *A. odontocarpum*
 37b. Petiole 5–26 cm; ligule 0.7–1.5 cm; bracteoles present.
 38a. Flowers yellow; labellum cuneate; peduncle 12–32 cm 38. *A. putrescens*
 38b. Flowers white; labellum slightly 3-lobed; peduncle ca. 7 cm 39. *A. repoeense*

1. *Amomum kwangsiense* D. Fang & X. X. Chen in D. Fang, Acta Phytotax. Sin. 16(3): 48. 1978.

广西豆蔻 *guang xi dou kou*

Plants ca. 1 m tall. Leaves subsessile; ligule 2–4 mm; leaf blade lanceolate, 11–75 × 1.5–8.5 cm, abaxially densely appressed pubescent along sides of midvein, base usually cuneate, margin bristly, apex long acuminate. Spikes with peduncle embedded in ground, 1.5–33 cm; bracts white, lanceolate, 3.5–6 × 0.5–1.5 cm; bracteoles deltoid-lanceolate, not tubular, 0.5–3.5 cm. Calyx 3.3–4.5 cm, apex 3-toothed; teeth ca. 8 mm. Corolla white, 3–4.5 cm, adaxially hairy; lobes lanceolate, hoodlike, 3.5–4 × 0.8–1.2 cm, central one apiculate at apex. Lateral staminodes subulate, ca. 4 mm. Labellum purple at claw, yellowish at apex, fan-shaped or spatulate, 3.5–4 × 2.5–3 cm, base adnate to filament forming a tube 0.7–1.3 cm. Filament ca. 7 mm; anther 1.1–1.4 cm; connective appendage entire, ca. 5 mm. Ovary pubescent. Capsule pale purple, subglobose, 1–2 cm, with 12 sometimes obscure lines. Fl. May–Jun, fr. Aug–Sep. $2n = 48^*$.

- Forests; 600–700 m. Guangxi, Guizhou.

Medicinal.

2. *Amomum longipetiolatum* Merrill, Lingnan Sci. J. 11: 40. 1932.

长柄豆蔻 *chang bing dou kou*

Elettariopsis longipetiolata (Merrill) D. Fang.

Plants 50–100 cm tall. Ligule orbicular, ca. 2 cm; petiole 2.5–12 cm; leaf blade adaxially green when fresh, becoming blue gray, abaxially pale green, oblong-lanceolate, 35–75 × 7–11 cm, adaxially glabrous, abaxially yellowish sericeous, base acute, apex acuminate. Spikes ellipsoid; peduncle short or absent; bracts 2–3 cm, submembranous. Flowers ca. 9 cm. Calyx ca. 3.5 cm, pubescent, apex 3-toothed; teeth oblong, ca. 3 mm. Corolla tube ca. 5.5 cm; lobes linear, ca. 2.5 cm × 4 mm, punctate. Lateral staminodes linear, 4–6 mm. Labellum white with yellowish middle and purple base, obovate, ca. 3.5 cm. Anther linear, 1.2–1.5 cm; connective appendage 3-lobed, lobes 3–4 × ca. 1 mm, central one erect, lateral ones falcate, expanding. Ovary oblong-ellipsoid, 3–4 mm, densely appressed pubescent. Capsule subglobose, ca. 2 cm in diam., brown pubescent; pedicel 1.5–2 cm. Fl. Apr–May. $2n = 48^*$.

- Forests; 400–600 m. Guangxi, Hainan.

3. *Amomum sericeum* Roxburgh, Fl. Ind. 1: 45. 1820.

银叶砂仁 *yin ye sha ren*

Amomum dealbatum Roxburgh var. *sericeum* (Roxburgh) Baker.

Plants 1–3 m tall. Ligule entire or slightly 2-cleft, 0.5–1.5 cm, membranous, pubescent, apex acute; petiole 4–8(–11) cm; leaf blade lanceolate, 50–65 × 7–15 cm, abaxially silvery pubescent, base cuneate, apex acuminate. Spikes subglobose, 3.5–5 cm in diam.; peduncle 2.5–4 cm, scalelike sheaths ovate, subleathery, apex emarginate; bracts oblong, ca. 3.5 cm, membranous, early deciduous; bracteoles absent. Calyx white, clavate, 2.2–3 cm, villous, apex 3-toothed. Corolla tube white; lobes 2.5–3 cm × 8–10 mm. Lateral staminodes subulate, ca. 5 mm. Labellum with yellow midvein striped red, oblong, 2–3 cm, white pubescent. Filament ca. 4 mm; anther ca. 9 mm; connective appendage semi-orbicular, rarely obscurely 3-lobed. Capsule pale brown, obovoid-globose or obconical, ca. 2.5 × 1.5–2 cm, 3–5-angled, glabrous, apex with persistent calyx; pedicel ca. 3 mm. Seeds not fragrant. Fl. May–Jun, fr. Jul–Sep. $2n = 48^*$.

Wet places in dense forests; 600–1200 m. S Yunnan [India, Myanmar, ?Nepal, ?Sikkim].

4. *Amomum yingjiangense* S. Q. Tong & Y. M. Xia, Acta Bot. Yunnan. 10: 210. 1988.

盈江砂仁 *ying jiang sha ren*

Plants 1–1.2 m tall. Leaf sheath green, longitudinally striate, glabrous; ligule entire, 5–7 mm, densely brownish pubescent; petiole absent to 2.5 cm, densely brownish pubescent; leaf blade adaxially dark green, abaxially green, ovate-lanceolate, elliptic, or narrowly elliptic, 33–50 × 7–11 cm, abaxially densely brownish pubescent, adaxially glabrous except pubescent along veins, base obliquely cuneate or attenuate, apex caudate. Flowers unknown. Fruiting spikes subcapitate, ca. 4 × 5.5 cm; peduncle 3–4 cm, scalelike sheaths densely pubescent. Capsule subglobose, ca. 2.1 cm in diam., with 3 longitudinal grooves, densely pubescent, apex with persistent calyx; pedicel 8–11 mm. Seeds conical, ca. 4 mm, 3-angled; aril white. Fr. Aug.

- Forests, ca. 1700 m. W Yunnan (Yingjiang Xian).

5. *Amomum compactum* Solander ex Maton, Trans. Linn. Soc. London 10: 251. 1811.

爪哇白豆蔻 *zhao wa bai dou kou*

Amomum kepulaga Sprague & Burkill.

Plants 1–1.5 m tall. Leaves sessile; ligule orbicular, 2-cleft, 5–7 mm, initially pubescent, later ciliate at margin; leaf blade lanceolate, 25–50 × 4–9 cm, glabrous except ciliate at margin, apex caudate, with tip 2.5–3 cm. Spikes cylindrical, ca. 5 × 2.5 cm, elongate after anthesis; peduncle to 8 cm; bracts yellow,

ovate-oblong, 2–2.5 cm × 7–10 mm, longitudinally striate, persistent, margin ciliate; bracteoles tubular. Calyx 1–1.2 cm, pubescent, apex 3-toothed. Corolla white or yellowish; tube 1–1.2 cm; lobes oblong, ca. 8 mm. Lateral staminodes absent. Labellum yellowish with orange midvein and purple margin, elliptic, 1.5–1.8 × 1–1.5 cm, slightly concave, pubescent. Filament hairy at base; anther elliptic, ca. 2 mm; connective appendage 3-lobed, ca. 4 mm. Ovary pilose. Capsule yellowish, oblate, 1–1.5 cm in diam., slightly 9-grooved when dry, pilose. Seeds irregularly polyhedral, ca. 4 mm in diam. Fl. Feb–May, fr. Jun–Aug. $2n = 48^*$.

Cultivated. Hainan, S Yunnan [native to Indonesia (Java)].

Medicinal.

6. *Amomum scarlatinum* H. T. Tsai & P. S. Chen, Acta Phytotax. Sin. 17(4): 90. 1979.

红花砂仁 hong hua sha ren

Rhizomes strongly aromatic. Plants 1.5–3 m tall. Leaves sessile or subsessile; ligule 2-cleft, 5–8 mm, membranous, glabrous, lobes obtuse at apex; leaf blade narrowly elliptic, 35–40 × 4–11 cm, glabrous, base cuneate, apex acuminate. Spikes ellipsoid, ca. 4 cm in diam.; peduncle ca. 2.5 cm, scalelike sheaths dense, leathery; bracts purple, lanceolate, mostly acuminate, lacerate when dry; bracteoles rose with pale brown apex, tubular, ca. 4 cm × 8 mm, split nearly to base on 1 side. Calyx rose with pale brown apex, 2.7–3.2 cm × ca. 5 mm, pubescent, apex truncate or obscurely 3-lobed. Corolla tube white, equaling or slightly longer than calyx; lobes rose, narrowly elliptic, ca. 3 cm × 6–9 mm. Labellum with yellow midvein and purple stripes on each side, pale at apex, elliptic, ca. 3.2 × 1.6 cm, base white villous, margin crisped, apex toothed. Anther 1–1.5 cm; connective appendage pale brown, 3-lobed, lateral lobes linear, 5–7 mm. Ovary white pubescent. Fr. May.

• Wet places, roadsides; ca. 900 m. Yunnan.

7. *Amomum coriandriodorum* S. Q. Tong & Y. M. Xia, Acta Bot. Yunnan. 10: 208. 1988.

菱味砂仁 sui wei sha ren

Plants 1–1.7 m tall. Rhizomes, leaves, and capsules with odor of coriander (*Coriandrum sativum* Linnaeus). Leaves sessile; ligule brownish, entire, 4–10 mm, glabrous; leaf blade elliptic or narrowly so, 20–40 × 5–12 cm, glabrous, base cuneate or attenuate, apex acuminate or caudate. Spikes subobovoid, ca. 7 × 4.5 cm, subcapitate and 5–5.5 × 7.5–8 cm in fruit; peduncle 2–3 cm; bracts red, ca. 4 × 1 cm; bracteoles red, tubular, ca. 2.8 cm. Calyx red, ca. 2 cm, apex obtusely 3-toothed. Corolla tube pale yellowish green, ca. 2 cm; lobes red, central one ca. 2.4 cm × 8 mm, lateral ones narrower. Lateral staminodes absent. Labellum ca. 4 × 2.5 cm, margin crisped; central lobe pale orange, broadly ovate; lateral lobes yellowish, auriculate, small. Filament ca. 7 mm; anther ca. 1 cm; connective appendage 3-lobed, ca. 3 × 11 mm, margin yellowish brown. Ovary subellipsoid, ca. 7 × 4 mm. Capsule purplish red, ellipsoid, 3.8–4.2 × 2.3–2.5 cm. Seeds brown, ca. 6 × 4 mm, 3-angled. Fl. May, fr. Jul.

• Forests; 1300–1500 m. S Yunnan.

8. *Amomum dolichanthum* D. Fang, Acta Phytotax. Sin. 16(3): 48. 1978.

长花豆蔻 chang hua dou kou

Plants 50–100 cm tall. Leaf sheath pubescent distally; ligule orbicular, ca. 2 cm, pubescent; petiole absent or rarely to 1.5 cm; leaf blade obovate or elliptic, 20–50 × 7–15 cm, glabrous, base acute, apex acuminate. Spikes ellipsoid; peduncle short or absent; bracts submembranous, 2–3 cm. Flowers ca. 9 cm. Corolla tube ca. 5.5 cm; lobes linear, ca. 2.5 cm × 4 mm, punctate. Lateral staminodes linear, 4–6 mm. Labellum white, yellowish at middle, purple at base, obovate, ca. 3.5 cm. Anther linear, 1.2–1.5 cm; connective appendage 3-lobed, lobes 3–4 × ca. 1 mm, central one erect, lateral ones falcate, expanded. Ovary oblong-ellipsoid, 3–4 mm, densely appressed pubescent. Capsule subglobose, ca. 2 cm in diam., brown pubescent, 1.5–2 cm. Fl. Apr–May.

• Forests. SW Guangxi (Longzhou Xian).

Medicinal.

9. *Amomum tsaoko* Crevost & Lemarie, Cat. Prod. Indo-Chine 300. 1917.

草果 cao guo

Amomum hongtsaoko C. F. Liang & D. Fang.

Plants to 3 m tall, aromatic. Rhizomes gingerlike. Ligule entire, 0.8–1.2 cm, apex obtuse; petiole absent or short; leaf blade narrowly elliptic or oblong, 40–70 × 10–20 cm, glabrous, base attenuate, margin drying membranous, apex acuminate. Spikes 13–18 × ca. 5 cm, 5–30-flowered; peduncle at least 10 cm, scalelike sheaths dense, brown when dry, oblong or narrowly elliptic, 5.5–7 × 2.3–3.5 cm, leathery, apex rounded; bracts lanceolate, ca. 4 cm × 6 mm, apex acuminate; bracteoles tubular, ca. 3 cm, apex 2- or 3-toothed. Calyx equaling bracteoles, apex obtusely 3-toothed. Corolla orange-red; tube ca. 2.5 cm; lobes oblong, ca. 2 cm × 4 mm. Labellum elliptic, ca. 2.7 × 1.4 cm, apex slightly toothed. Anther ca. 1.3 cm; connective appendage 3-lobed, ca. 4 × 11 mm, central lobe quadrilateral, lateral ones narrower. Capsule red, drying brown and longitudinally striate, oblong or elliptic, 2.5–4.5 × ca. 2 cm, glabrous. Seeds 4–6 mm in diam., many angled, strongly aromatic. Fl. Apr–Jun, fr. Sep–Dec. $2n = 48^*$.

• Sparse forests; 1100–1800 m. Yunnan.

Both wild and cultivated plants are used for medicine.

10. *Amomum tuberculatum* D. Fang, Acta Phytotax. Sin. 16(3): 47. 1978.

德保豆蔻 de bao dou kou

Plants 70–80 cm tall. Ligule entire, 2–5 mm; petiole to 3 cm; leaf blade ovate or lanceolate, 5–45 × 2.5–8 cm, glabrous, base rounded or cuneate, apex caudate. Spikes obovoid, ca. 30-flowered; peduncle embedded in ground, 1.5–7.5 cm; bracts red, lanceolate, 3.3–3.9 × 0.8–1.2 cm; bracteoles red with yellowish apex, tubular, ca. 2 cm. Calyx red with yellowish apex, 2.7–3 cm, split on 1 side, apex 2- or 3-toothed. Corolla tube 2.3–2.5 cm; lobes oblong, ca. 3 cm × 6–7 mm, central one yellow with purple markings, 1–1.2 cm wide. Lateral staminodes absent.

Labellum red veined each side of midvein, obovate, 2.8–3.2 × 1.5–1.7 cm, densely tuberculate toward throat, base adnate to filament forming a tube ca. 3 mm, distal margin crisped, apex entire. Filament ca. 1.1 cm; connective appendage yellowish, 3-lobed, central lobe 6–7 × 5–7 mm. Capsule subglobose, 1.2–1.7 cm in diam., obscurely 3-angled. Fl. May, fr. Sep.

- Forests; 1500–1600 m. Guangxi.

11. *Amomum quadratolaminare* S. Q. Tong, Acta Phytotax. Sin. 27: 279. 1989.

方片砂仁 fang pian sha ren

Plants 0.8–1.5 m tall. Leaves sessile; leaf sheath green, conspicuously longitudinally striate; ligule entire, 2–3 mm, densely pubescent; leaf blade narrowly lanceolate or narrowly elliptic, 14–35 × 4–4.5 cm, glabrous, base narrowly cuneate, apex caudate-acuminate. Spikes 1–3, capitate or oblong, 1.2–3 cm in diam.; peduncle 0.8–4 cm, scalelike sheaths red, subleathery, margin ciliate; bracts red, ovate or oblong, 1.5–3.1 × 0.8–1.5 cm, subleathery, margin ciliate; bracteoles pale red, ca. 8 mm. Calyx pale red with white base, equaling bracteoles, apex 2-cleft. Corolla tube white, spotted red at apex, equaling calyx, pale white pubescent; lobes narrowly elliptic, ca. 1.4 cm × 4 mm. Lateral staminodes laminar, square, ca. 2 mm. Labellum white with yellow band at center and red spots at base, suborbicular, ca. 1.5 × 1.8 cm, glabrous, margin crisped. Filament white, ca. 5 mm; anther elliptic, ca. 6 mm; connective appendage 3-lobed, ca. 4 × 8 mm, central lobe emarginate at apex. Ovary densely brown pubescent. Style white; stigma ciliate. Fl. Mar.

- Forests; ca. 800 m. S Yunnan.

12. *Amomum thysanochililum* S. Q. Tong & Y. M. Xia, Acta Bot. Yunnan. 10: 205. 1988.

梳唇砂仁 shu chun sha ren

Plants 1.5–3 m tall. Leaves sessile; leaf sheath conspicuously striate, red on basal leaf; ligule brownish, entire, 1–1.5 cm, membranous, glabrous; leaf blade oblong-lanceolate, 50–60 × 7–10 cm, glabrous, base cuneate, apex long caudate. Spikes subcapitate, 4.5–5 × 5–6 cm; peduncle 2–7 cm, scalelike sheaths pale red; bracts ovate-orbicular or ovate, 4.5–5 × 3.5–4 cm; bracteoles purplish red with brownish apex, tubular, ca. 3 cm. Calyx pale purplish red, ca. 3.2 cm, slightly hairy, apex 3-toothed. Corolla tube yellowish, ca. 2.5 cm, glabrous; lobes pale purplish red, linear, 2.5–3 cm. Lateral staminodes absent. Labellum yellow with 2 red stripes from center to base, obovate, 3.8–4.2 × 2–2.1 cm, base attenuate, distal margin fimbriate. Filament ca. 8 mm; anther white, linear, ca. 1.4 cm; connective appendage white, entire. Ovary slightly hairy. Fl. Apr.

- Forests; ca. 800 m. S Yunnan.

13. *Amomum paratsaoko* S. Q. Tong & Y. M. Xia, Acta Bot. Yunnan. 10: 207. 1988.

拟草果 ni cao guo

Plants 1.5–3 m tall. Leaves sessile; leaf sheath green, conspicuously longitudinally striate; ligule brownish, entire, 2.5–3 cm, membranous, glabrous; leaf blade adaxially green, abaxi-

ally pale green, narrowly oblong-lanceolate or narrowly elliptic-lanceolate, 40–85 × 13–18 cm, glabrous, base cuneate or attenuate, apex acuminate. Spikes 1 or 2, capitate or ovoid-globose, 4.5–6.5(–10) × 5–6 cm; peduncle 2–4 cm, scalelike sheaths leathery, glabrous; bracts ovate or elliptic, 4.5–6 × 5–5.5 cm, apex rounded; bracteoles white, tubular, 3–3.2 cm, membranous, glabrous, apex 2-toothed. Calyx white, clavate, 4–4.5 cm, membranous, glabrous, apex 3-toothed. Corolla white, glabrous; tube 3–3.5 cm; lobes lanceolate, subequal, central one 2.5–3.3 × 0.9–1.1 cm, apex not mucronate. Lateral staminodes absent. Labellum white, densely red dotted at center, with radiate, red veins at margin, narrowly elliptic, 3.2–4 × 2–2.3 cm, margin crisped. Stamen white; filament ca. 1 cm; anther linear, ca. 1.4 cm; connective appendage entire. Ovary white, glabrous. Style white, linear, pubescent; stigma pale green, ciliate. Capsule subglobose. Fl. May.

- Forests; ca. 1600 m. Guangxi, Guizhou, Yunnan.

14. *Amomum capsiciforme* S. Q. Tong, Acta Phytotax. Sin. 27: 282. 1989.

辣椒砂仁 la jiao sha ren

Plants 1–1.5 m tall. Leaves sessile; leaf sheath conspicuously longitudinally striate; ligule entire, 3–6 mm, subleathery, glabrous; leaf blade elliptic or oblong, 18–35 × 5.5–10 cm, glabrous, lateral veins prominent, base cuneate, apex caudate-acuminate. Flowers unknown. Fruiting spikes 6–7 cm; peduncle 3–5 cm, scalelike sheaths broadly ovate, subleathery. Capsule red, 4.8–5.2 × 1.8–2.2 cm, apex obtuse, with persistent calyx. Seeds subcapitate, ca. 5 × 3 mm, warty, wholly enclosed by white aril. Fr. Aug.

- Forests; ca. 1400 m. W Yunnan (Yingjiang Xian).

15. *Amomum menglaense* S. Q. Tong, Acta Bot. Yunnan. 13: 277. 1991.

勐腊砂仁 meng la sha ren

Plants 1–1.5 m tall. Leaves sessile; ligule ca. 5 mm, membranous, glabrous, apex emarginate; leaf blade elliptic or oblong-lanceolate, 35–40 × 7.5–9.5 cm, glabrous, base cuneate or narrowly so, apex acuminate. Spikes subcapitate, ca. 5 × 3.5 cm; peduncle 3–12 cm; bracts brown or greenish brown, ovate or narrowly so, 2–3 × 1.2–1.5 cm; bracteoles reddish, tubular, ca. 3.5 cm. Calyx ca. 3 cm, apex 3-toothed, teeth reddish at apex. Corolla tube white, ca. 3.2 cm; central lobe suboblong, ca. 3 × 1.3 cm, apex mucronate; lateral lobes subelliptic, ca. 1.1 cm. Lateral staminodes red, subulate, ca. 4 mm. Labellum red at center, with radiate lines and yellow apex, suboblong, ca. 3.5 × 1.8 cm, margin crisped, apex entire. Stamen white; filament ca. 5 mm; anther linear, ca. 1.5 cm; connective appendage entire, ca. 4 × 8 mm. Ovary yellowish green, ca. 6 mm, glabrous. Fl. May.

- Forests; ca. 1800 m. S Yunnan (Mengla Xian).

16. *Amomum jingxiense* D. Fang & D. H. Qin in D. Fang, Acta Phytotax. Sin. 27: 461. 1989.

狭叶豆蔻 xia ye dou kou

Plants ca. 1.3 m tall. Ligule entire, 2–4 mm; petiole absent on proximal leaves, 5–10 mm on distal ones; leaf blade linear-lanceolate, 13–50 × 1.5–3(–3.5) cm, glabrous, base cuneate, apex long acuminate. Spikes 5–6 × 2.5–4 cm, 10–20-flowered; peduncle 1.5–4.5 cm; bracts elliptic, 2–3.5 × 1–1.5 cm, apex obtuse; bracteoles purple, tubular, ca. 2.5 cm, split on 1 side, apex 2-lobed. Flowers yellow. Calyx purplish red, ca. 3 cm, apex 3-toothed. Corolla tube ca. 1.7 cm; lobes oblong, ca. 3 cm × 8 mm, central one hoodlike, wider than lateral ones. Lateral staminodes ca. 1 mm. Labellum purple lined, obovate, ca. 3.2 × 1.5 cm, papillose toward throat, base adnate to filament forming a tube ca. 3 mm, margin crisped. Filament ca. 5 mm; anther ca. 1.3 cm; connective appendage ca. 5 × 8 mm, margin crenulate. Ovary glabrous. Capsule ellipsoid, 1.7–1.9 × 1.1–1.2 cm, striate. Fl. Apr, fr. Sep–Oct.

- Forests; ca. 1300 m. W Guangxi (Jingxi Xian).

17. *Amomum austrosinense* D. Fang, Guihaia 2: 136. 1982.

三叶豆蔻 san ye dou kou

Plants ca. 50 cm tall. Leaves 1–3, usually 2; leaf sheath striate; ligule 2-lobed, 3–6 mm, puberulent; petiole 0.5–5 cm, puberulent; leaf blade narrowly elliptic or oblong, rarely ovate to oblanceolate, 10–40 × 3.5–11 cm, glabrous except puberulent along midvein, base cuneate to broadly so, sometimes oblique, margin densely ciliate, apex acuminate. Spikes 3–6 cm; peduncle 4–6 cm; bracts obovate or oblong, 1.2–1.5 cm × 5–8 mm, 1- or 2-flowered; bracteoles absent. Calyx white basally, purple distally, ca. 1.6 cm, puberulent, apex 3- or 4-toothed. Corolla tube ca. 1.8 cm, puberulent; lobes white tinged reddish, oblong, ca. 1.5 cm × 5 mm. Lateral staminodes red, linear, 5–6 mm. Labellum white with red lines, obovate, ca. 1.3 cm × 9 mm, margin coarsely serrate, apex 2-lobed. Anther red, 8–9 mm; connective appendage 2-lobed, small. Ovary densely pubescent. Capsule globose, 0.8–1.4 cm in diam., red pubescent, apex with persistent calyx. Fl. Jun. $2n = 48^*$.

- Forests; 700–1000 m. Guangdong, Guangxi.

Medicinal.

18. *Amomum koenigii* J. F. Gmelin, Syst. Nat. 2: 6. 1791.

野草果 ye cao guo

Plants 1–3 m tall. Ligule 2-cleft, ca. 6 mm, papery, lobes rounded at apex; petiole 5–10 mm; leaf blade lanceolate or linear-lanceolate, 30–45 × 4–11 cm, glabrous, base cuneate, apex caudate. Spikes narrowly ellipsoid, 4–5 cm; peduncle 30–35 cm in fruit; bracts oblong, 2–2.7 cm × 6–8 mm; bracteoles tubular, 1.1–1.3 cm, pubescent, apex 2-cleft. Calyx ca. 1.4 cm, base white villous, apex 2- or 3-lobed. Corolla tube equaling calyx, base white pilose; lobes oblong-lanceolate, 1–1.3 cm. Labellum subrhombic, ca. 1 cm × 6–8 mm, apex 2-cleft; claw white pubescent. Anther linear-oblong, ca. 3 cm; connective appendage semiorbicular. Ovary densely brownish pubescent. Capsule ovoid, rarely oblong-ellipsoid, 2–2.5 × 1–1.5 cm, longitudinally striate when dry. Fl. May–Jul, fr. Sep–Nov.

- Forests; 200–1500 m. Guangxi, Yunnan [India, Thailand].

19. *Amomum verrucosum* S. Q. Tong, Acta Phytotax. Sin. 27:

280. 1989.

疣子砂仁 you zi sha ren

Plants 3–3.5 m tall. Leaf sheath striate; ligule 1–1.5 cm, densely brown villous, apex truncate; petiole 1–1.5 cm; leaf blade narrowly elliptic or narrowly lanceolate, 40–50 × 9–12 cm, abaxially sparsely hairy except densely white pubescent along midvein, base cuneate, margin densely ciliate, apex acuminate or caudate-acuminate. Spikes capitate or ovoid, ca. 9.5 × 8.5 cm; peduncle densely brown villous, elongate after anthesis; bracts subelliptic, 3.5–4 × 2.3–2.5 cm; bracteoles tubular, 1.7–2.5 cm, pubescent. Calyx whitish, 2.5–3 cm, pubescent, apex 3-toothed. Corolla tube 2–2.2 cm, apex orange with red veins; lobes yellowish, central one red veined, suborbicular, 2.5–2.8 × 2.2–2.5 cm, lateral ones not red veined, narrower than central one. Lateral staminodes yellowish, subulate, ca. 6 mm. Labellum yellow with red spots and veins, semiorbicular, 3–3.5 × 3.5–4 cm. Stamen ca. 2.5 cm; anther linear, ca. 1.5 cm; connective appendage yellow, slightly 3-lobed. Capsule purple-black, globose, ca. 3.5 cm in diam., with branched, soft spines 3–5 mm. Seeds brown-black, broadly ellipsoid, ca. 4 × 3 mm; aril white. Fl. Jun.

- Forests; ca. 800 m. S Yunnan.

20. *Amomum microcarpum* C. F. Liang & D. Fang in D. Fang, Acta Phytotax. Sin. 16(3): 49. 1978.

细砂仁 xi sha ren

Plants ca. 2.5 m tall. Leaves sessile; ligule entire, 4–10 mm, hairy, apex rounded, rarely emarginate; leaf blade oblong-lanceolate, 20–60 × 2.5–9 cm, sparsely pilose, base cuneate, apex with caudate tip 1.5–3 cm. Spikes with densely appressed hairy peduncle and rachis; bracts brown, lanceolate to ovate, ca. 3 cm, subglabrous except hairy at base; bracteoles reddish with brownish apex, ca. 1.7 cm, apex 2- or 3-toothed. Calyx reddish with whitish apex, ca. 1.7 cm, glabrous, apex slightly 3-toothed. Corolla reddish; corolla tube nearly as long as calyx; central lobe oblong-ovate, ca. 1.1 cm × 8 mm, apex cucullate; lateral lobes narrower than central one. Lateral staminodes linear, 5–6 mm, apex entire. Labellum white with yellow midvein and red-dotted base, orbicular, ca. 1.8 × 1.5 cm, base attenuate, pubescent, apex 2-cleft. Anther ca. 5 mm; connective appendage slightly 3-lobed, 2–3 mm, central lobe wider than lateral ones. Ovary appressed villous. Capsule purplish, ovoid, 1–1.5 × 0.8–1.2 cm, sparsely appressed villous, with soft spines. Seeds black. Fl. Apr–May, fr. Aug–Sep.

- Dense forests; 300–500 m. S Guangxi (Dongxing Xian).

Medicinal.

21. *Amomum neoaurantiacum* T. L. Wu et al., Novon 10: 90. 2000.

红壳砂仁 hong ke sha ren

Amomum aurantiacum H. T. Tsai & S. W. Zhao in H. T. Tsai & P. S. Chen, Acta Phytotax. Sin. 17(4): 91. 1979, not Ridley (1920).

Plants 2–2.5 m tall. Pseudostems brown pubescent. Ligule 2-cleft, 6–7 mm, densely yellow villous; petiole very short; leaf

blade abaxially light green, narrowly lanceolate, ca. 30 × 5–6.5 cm, adaxially sparsely and shortly appressed brown hairy, abaxially densely villous, base cuneate, apex caudate. Spikes oblong; peduncle ca. 3 cm, villous, scalelike sheaths purple, deltoid, villous; bracts purple, oblong, ca. 1.2 cm × 5 mm. Calyx ca. 1.5 cm, apex 3-toothed. Corolla tube yellow-red, ca. 1 cm. Lateral staminodes linear, ca. 1 cm, apex emarginate. Labellum white, yellow with purple spots at center, orbicular, ca. 1.8 cm in diam., apex acute, 2-cleft. Filament ca. 1 cm; anther oblong, ca. 8 mm; connective appendage 3-lobed, central lobe semi-orbicular, lateral ones linear. Capsule orange, subglobose or ovoid, 1.3–1.8 × 0.7–1.1 cm, appressed rusty hairy, with sparse, fleshy spines. Seeds red-brown, 4- to many angled. Fl. May–Jun, fr. Aug–Sep.

- Forests; ca. 600 m. Yunnan.

Medicinal.

22. *Amomum longiligulare* T. L. Wu, Fl. Hainan. 4: 533. 1977.

海南砂仁 hai nan sha ren

Plants 1–1.5 m tall. Ligule lanceolate, 2–4.5 cm, membranous, glabrous; petiole ca. 5 mm; leaf blade linear-lanceolate or linear, 20–30 × 2.5–3 cm, glabrous, base attenuate, apex caudate-apiculate. Spikes with 1–3 cm long peduncle; bracts brown, lanceolate, 2–2.5 cm; bracteoles tubular, ca. 2 cm. Calyx white, 2–2.2 cm, apex 3-toothed. Corolla slightly longer than calyx; lobes oblong, ca. 1.5 cm. Labellum white with purple midvein and yellow apex, orbicular-spatulate, ca. 2 × 2 cm, midvein convex, apex with 2-lobed point. Stamen ca. 1 cm; connective appendage 3-lobed, central lobe orbicular, lateral ones suborbicular. Capsule ovoid, 1.5–2.2 × 0.8–1.2 cm, obtusely 3-angled, with branched, soft, flaky spines to 1 mm. Seeds purple-brown, enclosed in a brown, membranous aril. Fl. Apr–May, fr. Jun–Sep.

- Forests. Hainan.

Cultivated for medicine.

23. *Amomum villosum* Loureiro, Fl. Cochinch. 1: 4. 1790.

砂仁 sha ren

Plants (1–)1.5–3 m tall. Rhizomes procumbent above ground, clothed with brown, scalelike sheaths. Leaves sessile or subsessile; leaf sheath with netlike, depressed squares; ligule semi-orbicular, 3–5 mm; leaf blade lanceolate to linear, 25–35 × 3–7 cm, glabrous, base subrounded, apex caudate. Spikes ellipsoid; peduncle 4–8 cm, scalelike sheaths brown or green, elliptic; bracts lanceolate, ca. 1.8 cm × 5 mm; bracteoles tubular, ca. 1 cm. Calyx white, ca. 1.7 cm, slightly pubescent, apex 3-toothed. Corolla tube ca. 1.8 cm; lobes white, obovate-oblong, 1.6–2 cm × 5–7 mm. Labellum white with yellow, purple-tinged midvein, 2 purple spots at base, and yellow apex, orbicular-spatulate, 1.6–2 cm wide, midvein convex, base contracted into claw, apex reflexed, 2-cleft. Filament 5–6 mm; anther ca. 6 mm; connective appendage 3-lobed, central lobe semi-orbicular, ca. 3 × 4 mm, lateral ones auriculate. Ovary white pubescent. Capsule purple, green, or brownish when mature and fresh, brown when dry, ellipsoid, 1.5–2 × 1.2–2 cm, with branched or simple, soft spines. Seeds many angled, strongly aromatic. Fl. May–

Jun, fr. Aug–Sep.

Forests, cultivated in wet and shady places in sparse forests; 100–800 m. Fujian, Guangdong, Guangxi, Yunnan [Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

- 1a. Capsule purple when mature and fresh 23a. var. *villosum*
- 1b. Capsule green or brownish when mature and fresh 23b. var. *xanthioides*

23a. *Amomum villosum* var. *villosum*

砂仁(原变种) sha ren (yuan bian zhong)

Capsule purple when mature and fresh. Fl. May–Jun, fr. Aug–Sep. $2n = 48^*$.

- Cultivated in wet and shady places in sparse forests; 100–600 m. Fujian, Guangdong, Guangxi, Yunnan.

23b. *Amomum villosum* var. *xanthioides* (Wallich ex Baker) T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 38. 1978.

缩砂仁 suo sha ren

Amomum xanthioides Wallich ex Baker in J. D. Hooker, Fl. Brit. India 6: 239. 1892; *A. villosum* var. *nanum* H. T. Tsai & S. W. Zhao.

Capsule green or brownish when mature and fresh. Fl. May–Jun. $2n = 48^*$.

Forests; 600–800 m. Guangxi, Yunnan [Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

24. *Amomum yunnanense* S. Q. Tong, Acta Bot. Yunnan. 12: 151. 1990.

云南砂仁 yun nan sha ren

Plants 1–1.5 m tall, base with light red sheaths. Leaf sheath green, longitudinally striate, glabrous; ligule green, entire, ca. 4 mm, leathery, margin ciliate; petiole ca. 4 mm; leaf blade obovate-oblong or elliptic-lanceolate, 18–30 × 6–9 cm, glabrous, base rounded, apex acuminate or caudate. Spikes suboblong, ca. 8 × 3.5 cm; peduncle 13–15 cm, scalelike sheaths light red, white pubescent; outer bracts decayed at anthesis, inner bracts narrowly oblanceolate, 3.5–4.5 cm × 7–8 mm; bracteoles light red, tubular, ca. 1 cm, glabrous, apex emarginate. Flowers white. Calyx 1.5–2 cm, apex obtusely 3-toothed; teeth red, ciliate. Corolla tube equaling calyx, glabrous; central lobe elliptic, lateral lobes oblong, 1.4–1.6 cm × 6–9 mm. Lateral staminodes absent. Labellum broadly orbicular, 1.4–1.6 cm, base contracted into claw, apex emarginate. Filament ca. 5 mm; anther ca. 8 mm; connective appendage entire. Ovary densely white pubescent. Capsule (immature) red, globose, ca. 1.2 cm in diam., with soft spines 1–2 mm. Fr. Jul.

- Forests; ca. 1200 m. W Yunnan (Yingjiang Xian).

25. *Amomum gagnepainii* T. L. Wu et al., Novon 10: 90. 2000.

长序砂仁 chang xu sha ren

Amomum thyrsoides Gagnepain, Bull. Soc. Bot. France 49: 256. 1903, not Ruiz & Pavón (1798).

Roots tuberous. Leaf sheath striate, glabrous; ligule orbicular, 4–5 mm; petiole ca. 5 mm; leaf blade oblong-lanceolate, 20–25 × ca. 6 cm, glabrous, midvein becoming obscure toward apex, base rounded, apex acuminate. Spikes cylindrical, 8–13 cm; peduncle ca. 30 cm, scalelike sheaths ovate-lanceolate, ca. 3 cm; bracts imbricate, purple, lanceolate, 2–2.3 cm; bracteoles tubular, 0.9–1.2 cm, split on 1 side, apex 2-cleft. Calyx subcylindrical, ca. 1 cm, abaxially villous, apex 3-toothed. Corolla tube equaling calyx, villous; lobes yellow, ca. 1.4 cm × 6 mm, central one ca. 9 mm wide. Lateral staminodes toothlike, ca. 1 mm. Labellum yellow at midvein with purple veins, spatulate-fan-shaped, ca. 1.5 × 1.2 cm, base attenuate, apex 2-cleft. Stamen ca. 1.1 cm; filament ca. 5 mm; connective appendage semiorbicular, ca. 1.5 mm. Ovary hirsute. Capsule subglobose or ovoid, ca. 2.5 × 1.2–1.8 cm, with dense, curved spines. Seeds 3–4 mm in diam., angled. Fl. May, fr. Jul. $2n = 48^*$.

Dense forests. Guangxi [Vietnam].

26. *Amomum chinense* Chun, Fl. Hainan. 4: 533. 1977.

海南假砂仁 hai nan jia sha ren

Plants 1–1.5 m tall. Leaf sheath conspicuously concave veined; ligule purple, 2-cleft, ca. 3 mm; petiole 5–10 mm; leaf blade oblong or elliptic, 16–30 × 4–8 cm, glabrous, base acute, apex caudate-acuminate. Spikes turbinate, ca. 3 cm in diam., ca. 20-flowered; peduncle 5–10 cm; bracts purple, ovate, 1–2 cm; bracteoles tubular, ca. 2 cm. Calyx tinged red at base, ca. 1.7 cm, base villous, apex 3-toothed. Corolla tube slightly longer than calyx; lobes oblanceolate, ca. 1.5 cm, apex concave. Labellum white with purple midvein and veins, deltoid-ovate, ca. 1.5 × 1 cm; claw 5–6 mm. Anther ca. 6 mm; connective appendage semiorbicular, ca. 8 × 4 mm, margin shallowly crenate. Ovary yellow villous. Capsule ellipsoid, with branched, soft spines 2–3 mm. Fl. Apr–May, fr. Jun–Aug. $2n = 48^*$.

• Forests. Hainan.

27. *Amomum muricarpum* Elmer, Leafl. Philipp. Bot. 8: 2896. 1915.

疣果豆蔻 you guo dou kou

Plants 2–3 m tall. Rhizomes robust. Ligule 7–9 mm; petiole 5–10 mm; leaf blade lanceolate or oblong-lanceolate, 25–35 × 6–8 cm, glabrous, base cuneate, apex caudate-acuminate. Spikes ovoid, 6–8 cm; peduncle 5–7 cm, scalelike sheaths imbricate, proximal ones smaller than distal ones; rachis yellow tomentose; bracteoles brown, tubular, 2–2.5 cm, split nearly to base on 1 side. Calyx red, ca. 2.5 cm, apex 2-cleft. Corolla tube equaling calyx; lobes apricot yellow, conspicuously red veined, 2–3 cm. Lateral staminodes subulate. Labellum apricot yellow with purple veins and spots, obovate, 2.5–3 cm, margin cristate, apex 2-cleft. Connective appendage semiorbicular, spreading laterally, ca. 5 mm × 1 cm. Capsule red, globose or ellipsoid, ca. 2.5 cm in diam., yellow tomentose, with branched, fleshy spines 3–6 mm. Fl. May–Sep, fr. Jun–Dec. $2n = 48^*$.

Dense forests; 300–1000 m. Guangdong, Guangxi [Philippines].

Medicinal.

28. *Amomum maximum* Roxburgh, Fl. Ind. 1: 41. 1820.

九翅豆蔻 jiu chi dou kou

Plants 2–3 m tall. Ligule pale yellow-green, oblong, 2-cleft, 1.2–2 cm, sparsely white pubescent; petiole absent to 8 cm; leaf blade oblong or long elliptic, 30–90 × 10–20 cm, adaxially glabrous, abaxially white villous, base attenuate, decurrent, apex caudate. Spikes subglobose, ca. 5 cm in diam.; bracts brownish, 2–2.5 cm, pubescent, deciduous. Calyx pale purple spotted adaxially, ca. 2.3 cm, apex 3-toothed; teeth lanceolate, ca. 5 mm. Corolla tube slightly longer than calyx; lobes white, oblong. Labellum white, yellow on each side of midvein, red striate at base, ovate, ca. 3.5 cm, apex slightly revolute, entire. Filament short; anther linear, 1–1.2 cm; connective appendage yellowish, crescent-shaped, apex slightly revolute. Capsule purple-green, ovoid, 2.5–3 × 1.8–2.4 cm, 9-winged, white pubescent; pedicel 7–10 mm. Fl. May–Jun, fr. Jun–Aug. $2n = 48^*$.

Forests; 400–800 m. Guangdong, Guangxi, S Xizang, Yunnan [Indonesia].

Medicinal.

29. *Amomum dealbatum* Roxburgh, Fl. Ind. 1: 42. 1820.

长果砂仁 chang guo sha ren

Plants 1–3.5 m tall. Ligule orbicular, 2-cleft, 0.4–1.6 cm, rusty villous; petiole 0.5–3 cm; leaf blade adaxially bright green, abaxially whitish, oblong-lanceolate, 50–70 × 5.5–14 cm, adaxially glabrous, abaxially brownish pubescent, base cuneate, apex acuminate. Spikes subglobose, 3–5 cm in diam.; peduncle 2–8 cm; bracts reddish, ovate, ca. 2.5 cm. Calyx 3-lobed at apex; lobes 2-lobed. Corolla tube white, ca. 2.5 cm; lobes white, lanceolate, equaling tube. Lateral staminodes subulate, ca. 2 mm. Labellum white with yellow line along center and radiate, red veins, elliptic, ca. 2.5 cm, apex emarginate. Filament ca. 5 mm; anther ca. 2 mm; connective appendage elliptic, ca. 3 mm. Capsule purple-green, ellipsoid, 2.5–3 × 1–1.2 cm, with 9 crenulate-winged ribs, indehiscent; pedicel 1–2 cm. Fl. May–Jun, fr. Jun–Sep.

Shady forests, hill slopes; 600–800 m. Yunnan [Bangladesh, India, ?Nepal, Sikkim, Thailand].

30. *Amomum mengtense* H. T. Tsai & P. S. Chen, Acta Phytotax. Sin. 17(4): 91. 1979.

蒙自砂仁 meng zi sha ren

Ligule 2-cleft, ca. 1.1 cm, membranous, glabrous, lobes rounded at apex; petiole ca. 16 cm; leaf blade adaxially green, abaxially pale green, oblong, 70–100 × 12–15 cm, adaxially glabrous, abaxially densely pubescent, lateral veins white when dry, base cuneate, apex acuminate. Flowers unknown. Inflorescence paniculate; peduncle 30–40 cm, scalelike sheaths oblong, ca. 2.7 × 1 cm, apex mucronate. Capsule ellipsoid, 2.5–3.2 × 1.5–1.7 cm, 9-winged, sparsely villous, apex with persistent calyx; pedicel ca. 5 mm. Fr. May.

• S Yunnan.

31. *Amomum subcapitatum* Y. M. Xia, Acta Phytotax. Sin. 35: 259. 1997.

头花砂仁 tou hua sha ren

Plants 1.5–2 m tall. Leaf sheath green, glabrous; ligule 2-lobed, 1–1.4 cm, leathery, pubescent; petiole 12–35 cm, glabrous; leaf blade lanceolate, 60–100 × 16–18 cm, adaxially glabrous, abaxially densely silvery sericeous, base attenuate, apex shortly acuminate. Spikes 1 or 2, subcapitate, 5.5–7 × 4–6 cm; peduncle 5–12 cm, scalelike sheaths glabrous; bracts 2- or 3-flowered, early deciduous together with bracteoles. Calyx red, ca. 2.4 cm × 5 mm, pubescent, apex 3-toothed. Corolla tube red, ca. 2.2 cm × 3–4 mm, glabrous; lobes striped with purple-red, lanceolate, central one ca. 3.2 cm × 7 mm, apex corniculate, lateral ones obtuse at apex. Lateral staminodes yellow, linear, 4–6 mm. Labellum yellow with purple-red stripes at center, elliptic, 4–4.4 × 2.2–2.5 cm, margin crisped. Filament yellow, ca. 1.5 cm; anther light red, ca. 1.2 cm; connective appendage light red, 2-lobed, ca. 2 × 7 mm. Ovary ca. 6 mm, densely pubescent. Capsule purple-red, ellipsoid, 2.5–2.8 × 1.5–1.8 cm, 9-winged, apex with persistent calyx; wings crisped. Fr. Oct.

• Forests; ca. 900 m. W Yunnan (Yingjiang Xian).

32. *Amomum petaloideum* (S. Q. Tong) T. L. Wu, Novon 7: 441. 1997.

宽丝豆蔻 kuan si dou kou

Paramomum petaloideum S. Q. Tong, Acta Bot. Yunnan. 7: 310. 1985.

Plants 1–1.5 m tall, base with red sheaths. Leaf sheath longitudinally striate; ligule oblong, ca. 1 cm, apex emarginate; petiole 2–9 cm; leaf blade abaxially green, adaxially purple-red or light green, elliptic or lanceolate, 40–60 × 9–14 cm, glabrous, base cuneate or narrowly so, apex acuminate or shortly so. Spikes with 5–6 cm long peduncle, scalelike sheaths red with yellow-green margin; bracts ovate-orbicular, 3.4–3.6 × 3–3.2 cm; bracteoles red, tubular, ca. 2.2 cm, apex 3-toothed. Corolla tube equaling calyx, densely white pubescent; lobes narrowly elliptic, 1.4–1.5 cm × 4–8 mm. Lateral staminodes absent. Labellum yellow at apex, obovate, margin crisped. Filament red at base, bright red at middle, orange distally, broad, apex acuminate; anther attached to middle of filament. Ovary pale red, 3-loculed. Style white, linear. Stylodes clavate. Capsule red, hemispheric, 1.9–2 cm in diam., apex prolonged into wings, with persistent calyx. Seeds black, arillate. Fl. May–Jun.

• Forests; 500–600 m. S Yunnan (Mengla Xian).

33. *Amomum fragile* S. Q. Tong, Acta Phytotax. Sin. 27: 277. 1989.

脆舌砂仁 cui she sha ren

Plants ca. 2 m tall. Leaves sessile; leaf sheath purple-red; ligule light purple, entire, ca. 4 cm, fragile; leaf blade lanceolate or narrowly so, 55–80 × 5–9 cm, glabrous, base cuneate or narrowly so, apex acuminate or caudate-acuminate. Spikes narrowly ellipsoid, 7–8 × 2.8–3.2 cm; peduncle 2.5–10 cm; bracts elliptic, 3.5–5 × 2–3 cm; bracteoles narrowly lanceolate, ca. 4.5 cm × 7 mm, plicate. Calyx purple-red spotted, ca. 3 cm, pubescent, apex 3-toothed. Corolla tube white, ca. 2.5 cm; lobes narrowly elliptic, ca. 3 cm. Lateral staminodes ca. 2 mm. Labellum ovate, ca. 3.5 × 2.3 cm, margin crisped, apex entire. Filament ca. 5 mm; anther linear, ca. 1.2 cm; connective appendage entire, ca. 4 mm × 1 cm. Ovary brownish, densely white pubes-

cent. Capsule narrowly oblong, winged, densely pubescent. Fl. Jun.

• Forests. SW Yunnan (Menghai Xian).

34. *Amomum purpureorubrum* S. Q. Tong & Y. M. Xia, Acta Bot. Yunnan. 10: 207. 1988.

紫红砂仁 zi hong sha ren

Plants 1–2 m tall. Leaves sessile; leaf sheath purple-red, glabrous; ligule entire, 3–5 cm, membranous, glabrous; leaf blade abaxially pale green, adaxially green, lanceolate or narrowly so, 30–60 × 7–10 cm, glabrous, base cuneate or attenuate, apex acuminate or caudate. Spikes 1 or 2, capitate, 5.5–7 × 6–8 cm; peduncle 2–3 cm, scalelike sheaths red, glabrous; bracts dark red, ovate-orbicular or broadly ovate, 3–3.5 × 2.3–2.7 cm, glabrous, apex mucronate; bracteoles dark red, narrowly lanceolate, 4.3–5 cm × 8–11 mm, glabrous. Flowers white. Calyx red spotted, 2.5–3 cm, minutely pubescent, apex 3-toothed; teeth with red line from apex to calyx base. Corolla tube 1.8–2.2 cm; lobes narrowly elliptic, subequal, central one white with minute, red dots, 2.3–2.6 × 1.1–1.2 cm, apex mucronate, lateral lobes narrower than central one. Lateral staminodes subulate, ca. 3 mm. Labellum white with yellow center and radiate, red veins to margin, ovate-orbicular, 3.2–3.4 × 2.1–2.3 cm, base attenuate, margin crisped, apex 2-cleft. Stamen white; filament ca. 4 mm; anther ca. 1.1 cm; connective appendage entire, glabrous. Ovary yellow-green, densely white pubescent. Capsule purple-red, subovoid, ca. 2.8 × 2 cm, crisped winged. Fl. Apr.

• Forests; 1600–1700 m. SW Yunnan (Menghai Xian).

35. *Amomum subulatum* Roxburgh, Pl. Coromandel 3: 75. 1820.

香豆蔻 xiang dou kou

Plants 1–2 m tall. Ligule 3–4 mm, membranous, apex rounded, emarginate; petiole absent or nearly so on proximal leaves, 1–3 cm on distal ones; leaf blade oblong-lanceolate, 25–60 × 3.5–11 cm, glabrous, base rounded or cuneate, apex long cuspidate. Spikes subturbinate, ca. 5 cm in diam.; peduncle 0.5–4.5 cm, scalelike sheaths brown; bracts pale red, ovate, ca. 3 cm, apex obtuse with horny cusp; bracteoles tubular, ca. 3 cm, apex acute, emarginate. Calyx glabrous, 3-cleft to middle; lobes subulate. Corolla tube equaling calyx; lobes yellow, central one subulate at apex. Lateral staminodes red, subulate, ca. 2 mm. Labellum with yellow midvein, oblong, ca. 3 cm, white pubescent, veins conspicuous, apex involute. Filament ca. 5 mm; anther ca. 1 cm; connective appendage elliptic, entire, ca. 4 mm. Capsule purple or red-brown, globose, 2–2.5 cm in diam., with 10 undulate wings, apex with persistent calyx. Fl. May–Jun, fr. Jun–Sep. $2n = 48$.

Dense forests; 300–1300 m. Guangxi, Xizang, Yunnan [Bangladesh, Bhutan, N India, Myanmar, Nepal, Sikkim].

Tong (Bull. Bot. Res., Harbin 18: 140. 1998) referred the plants treated in FRPS as *Amomum subulatum* to *A. glabrum*. However, one of us (Wu) notes that the species was correctly identified in FRPS, except for the illustration (pl. 46, f. 1–7), which depicts *A. glabrum*.

36. *Amomum glabrum* S. Q. Tong, Acta Phytotax. Sin. 27:

282. 1989.

无毛砂仁 wu mao sha ren

Plants 0.8–1.5 m tall. Leaf sheath green, longitudinally striate; ligule 2-cleft, 3–4 mm, membranous; petiole absent on proximal leaves, 1–3 cm on distal ones; leaf blade narrowly elliptic-lanceolate, 25–55 × 4–5 cm, glabrous, base cuneate, apex acuminate or caudate. Spikes subovoid, ca. 4.5 × 3 cm; bracts reddish, subovate, ca. 3.5 × 2 cm, apex obtuse; bracteoles white, tubular, ca. 3 cm, apex entire. Calyx ca. 3.5 cm, split to middle on 1 side, apex 3-toothed. Corolla tube ca. 3 cm; lobes lanceolate, central one ca. 3.3 × 1.1 cm, apex apiculate, lateral ones narrower. Lateral staminodes red at base, white distally, subulate. Labellum broadly ovate, ca. 3.5 × 2.8 cm, margin crisped. Filament ca. 1 cm; anther ca. 1.5 cm; connective appendage 3-lobed, ca. 3 mm × 1.2 cm. Ovary greenish, glabrous. Capsule globose, 1.5–2 cm in diam., crisped winged. Fl. May.

• Forests; ca. 700 m. S Yunnan (Mengla Xian).

37. *Amomum odontocarpum* D. Fang, Acta Phytotax. Sin. 18: 224. 1980.

波翅豆蔻 bo chi dou kou

Plants 50–120 m tall. Leaves sessile; ligule 2-cleft, 1.5–3 cm; leaf blade lanceolate, 40–60 × 7–12 cm, glabrous except shortly hispid at margin, base cuneate, apex acuminate. Spikes subovoid, ca. 4 cm, 15–20-flowered; peduncle 2–4.5 cm; bracts purple, oblong to linear, 3.3–4 cm × 5–7 mm, margin and apex ciliate; bracteoles absent. Calyx purple, 2.5–3 cm, slightly split on 1 side, pubescent abaxially, apex 3-toothed. Corolla white; tube slightly shorter than calyx, distally sparsely pubescent; lobes oblong, ca. 2.4 cm × 8 mm. Lateral staminodes ca. 1 mm, fleshy. Labellum white with orange midvein, obovate, ca. 3 × 1.5–2 cm, pubescent toward throat, base adnate to filament forming a tube 2–4 mm. Stamen ca. 1.4 cm; anther ca. 1.2 cm; connective appendage entire, ca. 4 mm. Ovary 9-angled, densely pubescent. Capsule purplish, ovoid-globose, ca. 3 × 2.5–2.7 cm, glabrescent, with 9 sparsely toothed wings, apex with persistent calyx; pedicel 1–1.5 cm, Fl. May, fr. Aug–Sep.

• Sparse forests; ca. 1500 m. Guangxi.

38. *Amomum putrescens* D. Fang, Acta Phytotax. Sin. 16(3):

7. Elettariopsis Baker in J. D. Hooker, Fl. Brit. India 6: 251. 1892.

拟豆蔻属 ni dou kou shu

Herbs perennial, to 1 m tall. Rhizomes creeping, slender, bearing pseudostems at intervals. Leaves 1–8; ligule entire or 2-lobed; petiole erect, long; leaf blade ovate, lanceolate, elliptic, or oblong. Inflorescences arising from base of pseudostems, with flowers spaced along rachis or sometimes in an erect, dense head; rachis prostrate or erect, simple or branched; bracts 1- or 2-flowered; bracteoles open, not tubular. Calyx white or pinkish, tubular, apex 2- or 3-toothed. Corolla tube longer than calyx, slender; lobes 3, ovate-oblong or elliptic. Lateral staminodes absent or very short. Filament short and broad; connective appendage ± quadrate, lateral lobes not spreading. Ovary 3-loculed; ovules numerous per locule. Stigma obconical, ciliate. Stylodes 2, slender. Capsule globose, glabrous.

About 12 species: China, Indonesia, Laos, Malaysia, Thailand, Vietnam; one species in China.

1. *Elettariopsis monophylla* (Gagnepain) Loesener in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 603. 1930.

单叶拟豆蔻 dan ye ni dou kou

Amomum monophyllum Gagnepain, Bull. Soc. Bot. France 54: 163. 1907.

51. 1978.

腐花豆蔻 fu hua dou kou

Plants 70–120 cm tall. Leaves 5 or 6; ligule entire, 0.7–1.5 cm; petiole 5–23 cm, adaxially grooved; leaf blade ovate on proximal leaves, oblong to lanceolate on distal ones, 25–100 × 10–20 cm, glabrous, base obliquely cuneate, apex acute. Spikes ovoid, 50–60-flowered; peduncle 12–32 cm, scalelike sheaths ovate-deltoid or ovate-oblong, 0.5–8 cm; bracts ovate-deltoid, ca. 5 × 3.5 cm, 3- or 4-flowered, soon decaying, apex mucronate; bracteoles 2.5–3 cm, split to base, soon decaying. Flowers yellow. Calyx ca. 2 cm, slightly split on 1 side, apex 3-toothed. Corolla tube ca. 1.6 cm; lobes oblong, 1.7–2 cm. Lateral staminodes red, toothlike, ca. 3 mm. Labellum cuneate, ca. 2.8 × 2.2 cm, apex emarginate, mucronate. Anther ca. 1.7 cm; connective appendage slightly 3-lobed, 4–5 mm × ca. 1.5 cm, apex toothed. Ovary glabrous. Capsule oblong-ovoid, ca. 2.9 × 2.5 cm, glabrous, 9-winged, apex with persistent calyx. Seeds ca. 3 mm, enclosed by white aril. $2n = 48^*$.

• Forests; ca. 300 m. S Guangxi (Dongxing Xian).

39. *Amomum repoeense* Pierre ex Gagnepain, Bull. Soc. Bot. France 53: 144. 1906.

云南豆蔻 yun nan dou kou

Plants ca. 1 m tall. Leaves 2 or 3; leaf sheath glabrous, roughly striate and reticulate; ligule 2-lobed, ca. 1.2 cm, fragile; petiole 7–25 cm; leaf blade oblong or lanceolate, 20–40 × 7–15 cm, glabrous, base attenuate, apex acuminate. Spikes ca. 3 cm in diam.; peduncle ca. 7 cm, scalelike sheaths imbricate, ca. 1.2 cm; bracts lanceolate, ca. 1.4 cm × 5–7 mm, whitish pubescent, 2-flowered; bracteoles enclosing calyx, tubular, pubescent. Flowers white. Calyx 3-toothed at apex. Corolla tube glabrous; lobes lanceolate. Lateral staminodes conical, very small. Labellum slightly 3-lobed, 2.5–3 × 1.7–2.5 cm, base contracted into claw, middle lobe emarginate at apex. Anther 7–8 mm; connective appendage entire or equally 3-lobed. Ovary cylindrical, villous, 9-ribbed. Capsule globose, ca. 1.3 mm in diam., 9-ribbed. Fr. May. $2n = 48^*$.

S Yunnan [Cambodia, Thailand].

lobes ovate-oblong, 1.2–1.5 cm, central one wider than lateral ones, apex cucullate. Lateral staminodes absent. Labellum white with reddish base and yellow middle, orbicular, ca. 1.7 cm in diam., concave, base shortly clawed, apex entire. Filament basally and abaxially pilose; connective appendage subquadrate,

entire, ca. 4 mm, concave. Ovary slightly pilose, inconspicuously 6-angled. Fl. May.

Forest floors; near sea level to 100 m. Hainan [Laos].

8. ETLINGERA Giseke, Prael. Ord. Nat. Pl. 209. 1792.

茴香砂仁属 hui xiang sha ren shu

Achasma Griffith; *Diracodes* Blume, nom. rej.; *Geanthus* Reinwardt (1828), not Rafinesque (1814) nor Philippi (1884); *Nicolaia* Horaninow, nom. cons.

Rhizomes creeping. Pseudostems robust. Leaves petiolate, lanceolate, large. Inflorescence arising from rhizomes, a spike or head with flowers arranged in 3 or 4 concentric circles on a flat receptacle, base surrounded by numerous sterile, involucre bracts; peduncle raised well above ground and long, or embedded in ground and short; bracts 1-flowered; bracteoles long tubular. Calyx tubular, membranous, split on 1 side, apex 3-toothed. Corolla tube equaling or longer than calyx; lobes 3, much shorter than tube. Lateral staminodes absent. Labellum tongue-shaped, \pm 3-lobed, much longer than corolla lobes, base adnate to filament forming a distinct tube; central lobe colored, apex entire or 2-lobed; lateral lobes basally folded over stamen. Stamen shorter than labellum; free part of filament very short and rather broad; anther bent forward; connective appendage absent. Ovary 3-loculed; ovules numerous per locule. Capsule fleshy, indehiscent, smooth, longitudinally ridged, or with obtuse warts in rows.

About 70 species: China, India, Indonesia, Malaysia, Thailand; N Australia; three species (one endemic, one introduced) in China.

1a. Peduncle raised well above ground, long, 0.8–1(–1.5) m 1. *E. elatior*

1b. Peduncle embedded in ground, short.

2a. Calyx 3.5–4 cm; labellum yellow at margin, free part 2.5–3 cm 2. *E. yunnanensis*

2b. Calyx 6.5–7 cm; labellum bright red at margin, free part 4.5–5.5 cm 3. *E. littoralis*

1. *Etilingera elatior* (Jack) R. M. Smith, Notes Roy. Bot. Gard. Edinburgh 43: 244. 1986.

火炬姜 huo ju jiang

Alpinia elatior Jack, Malayan Misc. 2(7): 2. 1822; *A. speciosa* (Blume) D. Dietrich (1839), not (J. C. Wendland) K. Schumann (1893); *Elettaria speciosa* Blume; *Nicolaia elatior* (Jack) Horaninow; *N. speciosa* (Blume) Horaninow; *Phaenomeria speciosa* (Blume) Koorders.

Pseudostems closely grouped, to 5 m. Ligule 2-lobed, to 1.5 cm, glabrous; petiole 3–4 cm; leaf blade lanceolate, to 80 \times 18 cm, glabrous. Inflorescence surrounded by involucre bracts; peduncle raised well above ground, long, 0.8–1(–1.5) m, robust; involucre bracts red, tapering toward apex, 2–3 \times ca. 1 cm, glabrous; floral bracts similar to involucre bracts but pinkish, smaller; bracteoles tubular, ca. 2 cm, deeply split on 1 side. Calyx 3–4 cm, apex 3-toothed. Corolla pink to red, sometimes white. Labellum deep red with yellow margin. Filament short, flat, whitish pubescent; anther red, longer than filament. Fruiting head greenish or reddish, globose, ca. 2.5 cm in diam. Seeds many, black.

Cultivated for ornament, possibly naturalized in forests at lower elevations. Yunnan [native to Indonesia, Malaysia, and S Thailand; widely cultivated and naturalized in SE Asia].

2. *Etilingera yunnanensis* (T. L. Wu & S. J. Chen) R. M. Smith, Notes Roy. Bot. Gard. Edinburgh 43: 251. 1986.

茴香砂仁 hui xiang sha ren

Achasma yunnanense T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 40. 1978.

Pseudostems tufted, 2–3 m. Ligule ovate, entire, 1–1.5 cm; petiole ca. 5 mm; leaf blade lanceolate, 50–60 \times 7–5.5 cm, glabrous. Inflorescence a head borne on surface of ground (re-

sembling a capitulum of *Chrysanthemum* Linnaeus); peduncle embedded in ground, short; bracts red, ovate, 2.5–3 \times 2–3 cm; bracteoles tubular, ca. 2.7 cm \times 7 mm. Flowers numerous, 6 opening together in a circle, red. Calyx 3.5–4 cm, apex 3-toothed. Corolla shorter than calyx. Labellum exerted from corolla, purple at center, yellow at margin, free part 2.5–3 cm, apex 2-cleft. Free part of filament ca. 5 mm; anther 6–8 mm. Ovary ca. 5 mm, pubescent. Style flat. Capsule turbinate, 2.5–3 cm, densely pubescent. Fl. Jun. $2n = 48^*$.

• Forests; ca. 600 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou).

3. *Etilingera littoralis* (J. König) Giseke, Prael. Ord. Nat. Pl. 209. 1792.

红茴砂 hong hui sha

Amomum littorale J. König in Retzius, Observ. Bot. 3: 52. 1783; *Achasma megalochilos* Griffith; *Amomum megalochilos* (Griffith) Baker; *Hornstedtia megalochilos* (Griffith) Ridley.

Pseudostems 2–3 m. Ligule oblong, 6–13 mm, apex acuminate; petiole 0.5–3 cm; leaf blade abaxially light brown when dry, oblong to oblong-lanceolate, 50–70 \times 9–15 cm, glabrous except hairy along midvein and at margin abaxially, base subrounded or attenuate, oblique, apex shortly acuminate. Inflorescence a head, ca. 10 cm in diam. at anthesis; peduncle embedded in ground, short, 1–3 cm; bracts ovate or oblong, 3–5 \times 1.5–2 cm; bracteoles tubular, ca. 4.5 cm. Flowers 4–12 opening together, red. Calyx 6.5–7 cm, split to middle on 1 side, apex 3-toothed. Corolla tube 3–5 cm; lobes oblong, 2.2–2.6 cm \times 5–7 mm. Labellum bright red at margin, obovate-oblong, free part 4.5–5.5 \times 1.5–2 cm, base expanded, middle slightly narrowed, margin incurved, apex entire or emarginate. Filament ca. 1 cm; anther ca. 1 cm, apex emarginate. Ovary densely pilose. Style

5–6.5 cm; stigma rhombic, ciliate. Capsule globose, ca. 3 cm in diam., pubescent. Fl. Apr–May. $2n = 48^*$.

Forest floors; 200–300 m. Hainan [Indonesia (Borneo, Java, Sumatra), Malaysia, Thailand].

9. HORNSTEDTIA Retzius, Observ. Bot. 6: 18. 1791.

大豆蔻属 da dou kou shu

Rhizomes creeping, branched, woody. Pseudostems robust. Leaves sessile or petiolate; ligule conspicuous; leaf blade lanceolate. Inflorescence arising from rhizomes near base of pseudostems, often ca. 1/2 embedded in ground, an ovoid or fusiform spike; peduncle usually short, clothed with 2-ranked, scalelike sheaths; bracts densely imbricate, outer ones leathery, sterile, inner ones membranous, slimy, 1-flowered; bracteoles open, not tubular. Calyx tubular, widened distally, split on 1 side, apex 3-toothed or 2-lobed. Corolla tube slender, apex usually incurved at a right angle; lobes 3, central one erect, hooded, lateral ones spreading, partly adnate to labellum. Lateral staminodes reduced to small teeth at base of labellum or absent. Labellum equaling corolla lobes, narrow, concave, and fleshy, triangular, ovate, or hastate when flattened, base auriculate, apex oblong-rounded. Filament short or absent; connective appendage orbicular or absent. Ovary oblong, 3-loculed. Style slender; stigma funnelform. Stylodes 2–8, united or free. Capsule subcylindric or nearly 3-angled, smooth; pericarp tough, splitting irregularly near base. Seeds black, many angled, base covered with white aril.

About 60 species: tropical Asia; two species (endemic) in China.

Hornstedtia arunachalensis S. Tripathi & V. Prakash (Nordic J. Bot. 19: 329. 1999) was recently described from extreme SE Xizang. It was compared with the Malasian species, *H. scyphifera* (J. König) Steudel, from which it differs in having fusiform, closed-mouthed inflorescences, white corolla lobes, and a whitish labellum without lateral auricles. No specimens have been seen by the present authors. From the description and illustration, *H. arunachalensis* seems similar to *H. tibetica*, and the two may perhaps be conspecific.

- 1a. Leaf blade glabrous; spikes ovoid, 6–8 cm 1. *H. hainanensis*
1b. Leaf blade pilose abaxially; spikes ovoid-oblong, 10–14 cm 2. *H. tibetica*

1. *Hornstedtia hainanensis* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 38. 1978.

大豆蔻 da dou kou

Rhizomes creeping, clothed with brown, villous, scalelike sheaths. Pseudostems 1–2 m. Ligule ovate, ca. 1 cm; petiole 5–10 mm; leaf blade linear, 40–50 × 6–7 cm, glabrous. Spikes ovoid, 6–8 × 3–4 cm; peduncle very short, clothed with 2-ranked, scalelike sheaths; outer bracts imbricate, ovate-deltoid, 3–5 × 3–4 cm, leathery, densely brown villous, inner ones lanceolate, membranous; bracteoles linear, ca. 2.5 cm. Flowers unknown. Capsule oblong or ellipsoid, 2–2.5 × 1.2–1.6 cm, with conspicuous, fibrous lines when dry, apex with persistent, villous calyx 4–4.5 cm; pericarp thin. Seeds numerous. Fr. Apr–Jul.

- Dense forests. Guangdong, Hainan.

2. *Hornstedtia tibetica* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 39. 1978.

西藏大豆蔻 xi zang da dou kou

Ligule oblong, entire, ca. 1 cm, membranous, margin ciliate; petiole 1–1.5 cm; leaf blade lanceolate, 30–70 × 7–10 cm, adaxially glabrous, abaxially pilose, base cuneate, oblique, apex caudate-acuminate. Spikes ovoid-oblong, 10–14 cm; peduncle absent; outer bracts ovate or ovate-oblong, 3.5–9 × ca. 3 cm, abaxially densely tomentose; bracteoles linear, 6.5–10 cm, abaxially densely pilose. Flowers unknown. Capsule oblong, ca. 4 × 1.2 cm, apex with persistent calyx ca. 4.5 cm. Seeds numerous, ca. 2.5 × 1.5 mm.

- Broad-leaved forests; 800–1000 m. SE Xizang (Mêdog Xian).

10. GLOBBIA Linnaeus, Mant. Pl. 2: 143, 170. 1771.

舞花姜属 wu hua jiang shu

Rhizomes creeping, slender. Pseudostems erect, usually to 1.5 m, leafy. Leaves sessile or very shortly petiolate; ligule entire; leaf blade oblong, elliptic, or lanceolate. Inflorescence terminal, a thyrses or raceme, often lax; bracts each subtending a cincinnus of flowers, or flowers replaced by bulblets; bracteoles free to base. Calyx campanulate or turbinate, apex obtusely 3-lobed. Corolla tube slender; lobes ovate or oblong, subequal, concave. Lateral staminodes petaloid. Labellum reflexed, adnate to filament to form a slender tube above lateral staminodes and corolla lobes. Filament long, curved; anther with or without appendages on each side. Ovary 1-loculed. Capsule globose or ellipsoid, apex irregularly dehiscent. Seeds small; aril white, lacerate.

About 100 species: tropical Asia, one species in Australia; five species (two endemic) in China.

- 1a. Anther without appendages; bracts caducous.
2a. Inflorescences with cylindric bulblets; capsule tumescent, rugulose 1. *G. emeiensis*
2b. Inflorescences without bulblets; capsule smooth 2. *G. racemosa*
1b. Anther with 2 appendages on each side; bracts persistent.
3a. Leaf blade glabrous 3. *G. schomburgkii*
3b. Leaf blade hairy.
4a. Thyrses 4–7 cm, with bulblets; flowers orange; lateral staminodes 6–7 mm 4. *G. barthei*
4b. Thyrses 7.5–20 cm, without bulblets; flowers yellow; lateral staminodes 10–13 mm 5. *G. lancangensis*

1. *Globba emeiensis* Z. Y. Zhu, Acta Bot. Yunnan. 6: 391. 1984.

峨眉舞花姜 e mei wu hua jiang

Pseudostems 0.8–1.2 m. Ligule ca. 5 mm, densely pilose; petiole ca. 5 mm; leaf blade elliptic or oblong-lanceolate, 10–25 × 1.5–4.5 cm, slightly pilose along veins on both surfaces or glabrescent, base cuneate or broadly so, apex caudate. Inflorescence a thyrses, 20–40 cm; bracts yellowish white, caducous; cincinni 0.5–2 cm, 1–3-flowered; bulblets present, cylindrical, 1–3 (–5) cm × 2–4 (–5) mm, with 3–5 nodes. Flowers yellow. Calyx purple or yellowish, campanulate, 4–5 mm. Corolla curved, ca. 1.2 cm; lobes reflexed, broadly ovate, 4–6 mm. Lateral staminodes linear-lanceolate, 7–12 × ca. 2 mm. Labellum reflexed, oblong-obovate, 1–1.5 (–2) cm × 4–5 mm, apex 2-lobed. Filament orange, curved, 1.2–2.5 cm; anther 3–4 mm, without appendages. Capsule ellipsoid or oblong-ovoid, 1–2 (–3) cm, tumescent, rugulose. Fl. Jun–Aug, fr. Jul–Oct. $2n = 24^*$.

- Mountains; 600–1100 m. C Sichuan (Emei Shan).

2. *Globba racemosa* Smith, Exot. Bot. 2: 115. 1808.

舞花姜 wu hua jiang

Globba bulbosa Gagnepain; *G. mairei* H. Léveillé; *G. oriensis* Roxburgh var. *racemosa* (Smith) Gagnepain; *G. simaoensis* Y. Y. Qian; *G. strigulosa* K. Schumann.

Pseudostems 60–100 cm, base expanded. Leaves subsessile; ligule and mouth of leaf sheath ciliate; leaf blade oblong or ovate-lanceolate, 12–20 × 4–5 cm, glabrous or hairy along veins on both surfaces, base acute, apex caudate. Inflorescence a thyrses, 15–20 cm; bracts caducous; bracteoles ca. 2 mm. Flowers yellow, with orange, glandular spots. Calyx turbinate, 4–5 mm. Corolla tube 1–1.5 cm; lobes reflexed, ca. 5 mm. Lateral staminodes lanceolate, equaling corolla lobes. Labellum reflexed, obcuneate, ca. 7 mm, apex 2-cleft. Filament 1–1.2 cm; anther ca. 4 mm, without appendages. Capsule ellipsoid, ca. 1 cm in diam., smooth. Fl. Jun–Sep. $2n = 24^*$.

Forests; 400–1300 m. Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal, ?Sikkim, Thailand].

3. *Globba schomburgkii* J. D. Hooker, Bot. Mag. 103: t. 6298. 1877.

双翅舞花姜 shuang chi wu hua jiang

Pseudostems 30–50 cm. Leaves 5 or 6; ligule short; petiole ca. 5 mm; leaf blade elliptic-lanceolate, 15–20 × 3–4.5 cm, glabrous, base obtuse, apex caudate. Inflorescence a pendulous raceme or thyrses, 3–11 cm; bracts lanceolate, 6–12 mm; cincinni (if present) 1–2.5 cm, laxly 2- to many flowered; bulblets present, globose or ovoid, 2–4 mm in diam., tuberculate. Flowers yellow or wholly reduced. Calyx campanulate, 4–5 mm. Corolla tube 8–10 mm, pubescent; lobes ovate. Lateral staminodes lanceolate, curved. Labellum yellow, orange spotted at base, narrowly cuneate, apex 2-cleft. Filament curved, ca. 1 cm; anther with 2 winglike appendages on each side. Ovary tuberculate. Fl. Aug–Sep.

Forests; ca. 1300 m. S Yunnan [Myanmar, Thailand, Vietnam].

- 1a. Inflorescence branched and thyrsoid distally, 5–11 cm; bulblets ovoid; flowers not reduced 3a. var. *schomburgkii*
- 1b. Inflorescence simple and racemose throughout, 3–4 cm; bulblets globose; flowers wholly reduced 3b. var. *angustata*

3a. *Globba schomburgkii* var. *schomburgkii*

双翅舞花姜(原变种) shuang chi wu hua jiang (yuan bian zhong)

Globba chinensis K. Schumann.

Inflorescence branched and thyrsoid distally, 5–11 cm; bulblets ovoid. Flowers not reduced. Fl. Aug–Sep. $2n = 48$.

Forests; ca. 1300 m. S Yunnan [Myanmar, Thailand, Vietnam].

3b. *Globba schomburgkii* var. *angustata* Gagnepain in Lecomte, Fl. Indo-Chine 6: 38. 1908.

小珠舞花姜 xiao zhu wu hua jiang

Inflorescence simple and racemose throughout, 3–4 cm; bulblets globose. Flowers wholly reduced. $2n = 48, 64$.

Forests; ca. 1300 m. S Yunnan [Thailand, Vietnam].

4. *Globba barthei* Gagnepain, Bull. Soc. Bot. France 48: 208. 1901.

毛舞花姜 mao wu hua jiang

Pseudostems 30–60 cm, hairy. Leaf blade elliptic or oblong, 12–16 × 3.5–5 cm, hairy on both surfaces. Inflorescence branched and thyrsoid distally, 4–7 cm, densely flowered; bracts ovate or lanceolate, 1.7–2 cm × 7–10 mm; bulblets present in axils of proximal bracts, ovoid or oblong, 0.5–1.5 cm. Flowers orange, hairy. Calyx ca. 5 mm. Corolla tube ca. 2 cm; lobes linear, 6–7 mm. Lateral staminodes oblong, equaling corolla lobes. Labellum placed ca. 6 mm above corolla lobes, oblong, ca. 1 cm, apex expanded, 2-cleft. Filament curved, ca. 1.6 cm; anther ca. 2 mm, with 2 winglike appendages on each side. Fl. Aug. $2n = 48$.

Dense forests; 200–1000 m. S Yunnan [Cambodia, Laos, Philippines, Thailand].

5. *Globba lancangensis* Y. Y. Qian, Acta Bot. Austro Sin. 9: 51. 1994.

澜沧舞花姜 lan cang wu hua jiang

Plants glandular throughout. Pseudostems 20–60 cm. Ligule ciliate; petiole absent to 2 mm; leaf blade oblong-lanceolate, rarely elliptic or oblong, 1.3–11.5 (–13.5) × 0.7–2.7 (–4) cm, pubescent on both surfaces, base rounded or cuneate, apex acuminate. Thyrses 7.5–20 cm, laxly flowered; bracts ovate, 1.5–2.2 mm; bulblets absent. Flowers yellow. Calyx 3–5 mm, ciliate. Corolla tube 1.2–1.6 cm; lobes boat-shaped, 4–6 mm, glabrous or sparsely ciliate. Lateral staminodes oblong, 1–1.3 cm × 5–7 mm, ciliate. Labellum obovate-oblong, 7–8 mm, apex 2-lobed; lobes 3–4 × ca. 1 mm. Filament curved, 1.2–1.5 cm; anther ca. 2 mm, with 2 winglike appendages on each side. Capsule ellipsoid, 7–10 × 5–7 mm. Seeds obovoid, 2–3 mm, many angled. Fl. Jul–Oct, fr. Sep–Nov.

- Forests; 100–1200 m. SW Yunnan (Lancang Lahu Zu Zizhi-

xian).

11. CURCUMA Linnaeus, Sp. Pl. 1: 2. 1753, nom. cons.

姜黄属 *jiang huang shu*

Rhizomes branched, fleshy, aromatic, often with tuber-bearing roots. Leaves basal; leaf blade broadly lanceolate or oblong, rarely narrowly linear. Inflorescence a terminal spike on pseudostems or on separate shoots arising from rhizomes, sometimes appearing before leaves; peduncle erect; bracts connate for ca. 1/2 their length and forming pouches, spreading at free ends, each subtending a cincinnus of 2–7 flowers, apical bracts often differently colored, large, sterile, forming a coma; bracteoles free to base. Calyx usually shortly tubular, split on 1 side, apex 2- or 3-lobed or -toothed. Corolla funnelform; lobes ovate or oblong, subequal or central lobe longer, apex mucronate. Lateral staminodes petaloid, basally adnate to filament and labellum. Labellum with a thickened, central portion and thinner, lateral lobes overlapping with lateral staminodes. Filament short, broad; anther versatile, base usually spurred; connective appendage absent. Ovary 3-loculed. Capsule ellipsoid, 3-valved, dehiscent.

About 50 species: SE Asia, one species in Australia; 12 species (six endemic, one introduced) in China.

- 1a. Inflorescences terminal on pseudostems; plants flowering in autumn.
 - 2a. Leaf blade pubescent on both surfaces 11. *C. kwangsiensis*
 - 2b. Leaf blade glabrous on both surfaces.
 - 3a. Leaf blade with a purple band along center.
 - 4a. Rhizomes yellow inside; leaf blade 13–15 cm wide, midvein green; coma bracts deep purple except for white base 1. *C. yunnanensis*
 - 4b. Rhizomes green inside; leaf blade 5–7 cm wide, midvein red; coma bracts white with purple apex 2. *C. exigua*
 - 3b. Leaf blade without a purple band along center.
 - 5a. Rhizomes and coma bracts white; labellum white with central, yellow band 3. *C. sichuanensis*
 - 5b. Rhizomes orange or yellow; coma bracts white and green, sometimes tinged reddish purple; labellum yellow or yellowish.
 - 6a. Rhizomes orange and bright yellow; coma bracts white and green, sometimes tinged reddish purple; labellum yellowish with central, yellow band 4. *C. longa*
 - 6b. Rhizomes pale yellow; coma bracts white, partly with green stripe; labellum yellow with small, brown stripe on central band 5. *C. viridiflora*
- 1b. Inflorescences on separate shoots arising from rhizomes; plants flowering in summer.
 - 7a. Leaf blade glabrous on both surfaces.
 - 8a. Leaf blade with purple midvein 6. *C. zanthorrhiza*
 - 8b. Leaf blade without purple midvein.
 - 9a. Rhizomes yellow inside, bluish green outside; coma bracts whitish, apex red and pink; corolla red 7. *C. amarissima*
 - 9b. Rhizomes yellowish inside, whitish outside; coma bracts rose; corolla white 8. *C. wenyujin*
 - 7b. Leaf blade pubescent on both surfaces or abaxially only.
 - 10a. Leaf blade with purple cloud at center; rhizomes pale blue, pale green, yellowish green, or yellow 9. *C. phaeocalis*
 - 10b. Leaf blade without purple cloud at center; rhizomes white to yellow.
 - 11a. Coma bracts absent 10. *C. flaviflora*
 - 11b. Coma bracts pale red, or white tinged with red.
 - 12a. Leaf blade pubescent on both surfaces; rhizomes white or creamy white 11. *C. kwangsiensis*
 - 12b. Leaf blade pubescent abaxially only; rhizomes yellow 12. *C. aromatica*

1. *Curcuma yunnanensis* N. Liu & S. J. Chen, *Guihaia* 7: 16. 1987.

顶花莪术 *ding hua e zhu*

Rhizomes green inside; roots tuberous at tip. Leaf sheath rusty; petiole 4.5–15 cm; leaf blade with ca. 2 cm purple cloud at center, oblong or broadly lanceolate, 45–50 × 13–15 cm, glabrous, midvein green, base attenuate, apex caudate. Inflorescences terminal on pseudostems; peduncle ca. 3.2 cm; spike cylindrical, 13–16 × 7–8.5 cm; fertile bracts green, pale purple at margin and apex, ovate-elliptic, ca. 5 × 2.3 cm; coma bracts deep purple except for white base, oblong, ca. 6 × 1.8 cm. Calyx white with pink apex, ca. 1.9 cm. Corolla tube pink, ca. 3.8 cm, villous at throat; lobes purple, suborbicular, ca. 1.1 × 1 cm. Lateral staminodes yellow, subovate. Labellum yellow, obo-

vate, ca. 1.5 × 1.7 cm, apex emarginate. Filament flattened; anther white, ca. 5 mm. Ovary villous. Fl. Jul. $2n = 63^*$.

• Shrubby or grassy areas. W Yunnan (Wanding Zhen).

2. *Curcuma exigua* N. Liu in N. Liu & S. J. Chen, *Guihaia* 7: 15. 1987.

细莪术 *xi e zhu*

Plants 40–80 cm tall. Rhizomes many branched, yellow inside, fleshy; roots bearing tubers. Leaf sheath pale green; petiole 5–8 cm; leaf blade green with purple, narrow band along red midvein, lanceolate to broadly so, ca. 20 × 5–7 cm, glabrous, base cuneate, apex caudate. Inflorescences terminal on pseudostems; peduncle ca. 3.6 cm; spike cylindrical, ca. 9 × 2.5 cm; fertile bracts ovate-elliptic; coma bracts white with purple

apex, oblong, ca. 4.2 × 1 cm, glabrous. Calyx ca. 1.3 cm, apex 2-toothed. Corolla pale purple; tube ca. 1.4 cm, villous at throat; lobes yellow, elliptic, ca. 1.5 cm. Lateral staminodes yellow, obovate, ca. 1 cm × 5 mm. Labellum suborbicular, ca. 1.2 × 1.1 cm, apex yellow with deeply colored center, emarginate. Ovary pilose. Capsule subglobose. Fl. Aug–Oct.

• SW Sichuan (Miyi Xian).

3. *Curcuma sichuanensis* X. X. Chen, Guihaia 4: 133. 1984.

川郁金 chuan yu jin

Curcuma albicoma S. Q. Tong.

Plants 0.7–1.5 m tall. Rhizomes white or yellowish inside, fragrant; roots tuberous at tip. Petiole 12–30 cm; leaf blade elliptic or elliptic oblong, 35–85 × 13–21 cm, glabrous, base attenuate, oblique, apex caudate. Inflorescences terminal on pseudostems; peduncle 15–22 cm; spike cylindrical, 14–20 × 5–8 cm; fertile bracts ovate, 3.5–4.5 × 2–3.2 cm, apex obtuse; coma bracts white, sometimes slightly purple-red apically, ovate or elliptic oblong, apex acute. Calyx clavate, ca. 1 cm, apex irregularly 3-toothed. Corolla tube pale yellow, funnelliform, 2.5–3.2 cm; lobes yellowish, oblong, central one ca. 2 × 1.3 cm, apex mucronate. Lateral staminodes pale yellow, obovate, ca. 2 × 1.1 cm, apex 2-cleft. Labellum white with a yellow band at center, ovate, ca. 2 × 1.6 cm, apex convex, emarginate. Ovary villous. Capsule globose. Seeds small. Fl. Jul.

• Riversides; ca. 900 m. Sichuan, SW Yunnan (Jinghong Xian).

4. *Curcuma longa* Linnaeus, Sp. Pl. 1: 2. 1753.

姜黄 jiang huang

Curcuma domestica Valetou.

Plants ca. 1 m tall. Rhizomes many branched, orange or bright yellow, cylindrical, aromatic; roots tuberous at tip. Petiole 20–45 cm; leaf blade green, oblong or elliptic, 30–45(–90) × 15–18 cm, glabrous, base attenuate, apex shortly acuminate. Inflorescences terminal on pseudostems; peduncle 12–20 cm; spike cylindrical, 12–18 × 4–9 cm; fertile bracts pale green, ovate or oblong, 3–5 cm, apex obtuse; coma bracts spreading, white and green, sometimes tinged reddish purple, apex acute. Calyx white, 0.8–1.2 cm, puberulent, apex unequally 3-toothed. Corolla pale yellow; tube to 3 cm; lobes deltoid, 1–1.5 cm, central one larger, apex mucronate. Lateral staminodes shorter than labellum. Labellum yellowish with central, yellow band, obovate, 1.2–2 cm. Anther spurred at base. Ovary sparsely hairy. Fl. Aug.

Cultivated. Fujian, Guangdong, Guangxi, Sichuan, Taiwan, Xizang, Yunnan [native origin unknown; cultivated throughout tropical Asia].

Used medicinally and for spice.

5. *Curcuma viridiflora* Roxburgh, Fl. Ind. 1: 34. 1820.

二黄 er huang

Plants 50–70 cm tall. Rhizomes many branched, pale yellow inside; roots bearing tubers. Leaf blade dark green, ovate, ca. 30 × 7–8 cm. Inflorescences terminal on pseudostems; ped-

uncle ca. 10 cm; spike 10–15 × 5–7 cm; fertile bracts pale green, elliptic-lanceolate; coma bracts white, partly with green stripe, 6–7.5 cm. Calyx white, ca. 1 cm. Corolla tube much longer than calyx; lobes pale pink. Lateral staminodes elliptic, ca. 1.4 cm × 9 mm. Labellum yellow with a central, brown, narrow stripe, transversely oblong, ca. 1.6 × 1.8 cm. Filament ca. 4 mm; anther with spreading spurs at base. Fl. Jul.

SW Taiwan (Gaoxiong Shi) [Indonesia, Malaysia, Thailand].

Specimens from Taiwan have not been seen by the present authors.

6. *Curcuma zanthorrhiza* Roxburgh, Fl. Ind. 1: 25. 1820.

印尼莪术 yin ni e zhu

Plants to 2 m tall. Rhizomes few, few branched, orange or orange-red inside, paler on younger parts, short; roots with large tubers. Ligule small; petiole ca. 10 cm; leaf blade green with purple midvein, oblong, 40–80 × 15–20 cm, glabrous. Inflorescences on separate shoots arising from rhizomes; peduncle 15–25 cm; spike 16–25 × 8–10 cm; fertile bracts pale green, ca. 3 × 3.5 cm; coma bracts purple, ca. 7 × 3 cm, apical ones much narrower; bracteoles ca. 2.5 cm. Calyx white-green, ca. 1.4 cm, pubescent, apex 3-toothed. Corolla tube ca. 3.5 cm; lobes pale purple, ovate, ca. 1.7 × 1.5 cm. Lateral staminodes yellowish tinged with purple, oblong, ca. 1.7 × 1 cm. Labellum yellowish with deeply colored, median band, square, ca. 2 × 2 cm. Anther ca. 4 mm, base with spurs ca. 3 mm. Fl. Apr. $2n = 63^*$.

Riversides; ca. 800 m. S Yunnan [Indonesia, Malaysia, Thailand].

7. *Curcuma amarissima* Roscoe, Monandr. Pl. Scitam. t. 101. 1826.

味极苦姜黄 wei ji ku jiang huang

Plants ca. 1 m tall. Rhizomes yellow inside, bluish green outside, large, bitter; root tubers white inside. Petiole reddish brown, long; leaf blade green, oblong, ca. 45 × 14 cm, glabrous. Inflorescences on separate shoots arising from rhizomes; spike cylindrical, ca. 14 × 9 cm; fertile bracts ovate, ca. 5 cm; coma bracts whitish, apex red and pink. Calyx ca. 1 cm, apex 3-lobed. Corolla red; tube ca. 2 cm; lobes oblong, ca. 1 cm, apex acute. Lateral staminodes and labellum yellow. Labellum semielliptic, 3-lobed; central lobe with central, deep yellow band, apex emarginate. Ovary puberulent. Fl. May.

Forest floors; ca. 800 m. S Yunnan (Mengla Xian) [Bangladesh].

8. *Curcuma wenyujin* Y.H. Chen & C. Ling, Acta Pharm. Sin. 16(5): 387. 1981.

温郁金 wen yu jin

Plants 0.8–1.6 m tall. Rhizomes yellowish inside, whitish outside, ovoid, robust, fleshy; roots fusiform tuberous at tip. Petiole ca. 30 cm; leaf blade oblong or ovate-oblong, 35–75 × 14–22 cm, glabrous, base subrounded or broadly cuneate, apex acute or shortly caudate. Inflorescences on separate shoots arising from rhizomes; peduncle 15–20 cm; spike 20–30 cm; coma bracts tinged with red, oblong, 5–8 cm, apex acute; fertile bracts green, ovate, 3–5 cm. Calyx white, 1–1.2 cm. Corolla

white; tube ca. 2.8 cm, white villous at throat; lobes ca. 1.5 × 1.2 cm. Lateral staminodes yellow, petaloid, oblong, ca. 1.7 cm. Labellum reflexed, yellow with deeply colored center, obovate, ca. 2.2 cm, apex emarginate. Filament very short; anther with 2 spurs at base. Ovary densely hirsute. Fl. May–Jun. $2n = 63^*$.

- Guangdong, Guangxi, Zhejiang.

This species was described in FRPS as *Curcuma aromatica* 'Wenyujin' (i.e., a cultivar).

Cultivated for medicine.

9. *Curcuma phaeocaulis* Valetton, Bull. Jard. Bot. Buitenzorg, sér. 2, 27: 69. 1918.

莪术 e zhu

Plants ca. 1 m tall. Rhizomes pale blue, pale green, yellowish green, or yellow; roots tuberous at tip. Leaf sheaths dark brown; petiole longer than leaf blade; leaf blade with purple cloud at center and green midvein, oblong-lanceolate, 25–60 × 10–15 cm, adaxially glabrous, abaxially sparsely pubescent. Inflorescences on separate shoots arising from rhizomes; spike 10–18 × 5–8 cm; fertile bracts white-green, pink at apex, broadly lanceolate, apex acuminate or acute; coma bracts white, apex deep red. Calyx ca. 1.5 cm. Corolla tube white, ca. 3 cm; lobes red, ca. 1.5 cm. Lateral staminodes petaloid. Labellum subobovate, ca. 2 × 1.2–1.5 cm, yellowish with deep yellow center; central lobe emarginate at apex. Ovary hairy. $2n = 63$.

Yunnan; cultivated in Fujian, Guangdong, Guangxi, and Sichuan [Indonesia, Vietnam].

Curcuma phaeocaulis has been misidentified as *C. aeruginosa* Roxburgh, *C. caesia* Roxburgh, and *C. zedoaria* (Christmann) Roscoe in the Chinese literature.

10. *Curcuma flaviflora* S. Q. Tong, Acta Bot. Yunnan. 8: 37. 1986.

黄花姜黄 huang hua jiang huang

Plants 30–40 cm tall. Rhizomes small, aromatic; roots fusiform tuberous at tip. Petiole 4–7 cm; leaf blade 20–24 × 7–8 cm, adaxially glabrous, abaxially densely pubescent, base cuneate, apex acuminate. Inflorescences on separate shoots arising from rhizomes; peduncle 5–9 cm, scalelike sheaths purplish red; spike 4.5–6 × 2.5–3 cm; fertile bracts pale purplish red, ovate-orbicular to ovate, 4–4.5 × 2.6–3 cm, densely pubescent, apex acuminate; coma bracts absent. Calyx ca. 2 cm, apex 3-toothed, ciliate. Corolla tube white, ca. 4 cm, densely white pubescent, throat glabrous; lobes pale yellow, narrowly lanceolate, 1.8–2.4 cm × 7–9 mm. Lateral staminodes pale yellow with deep yell-

ow center, elliptic, ca. 2.2 × 1.2 cm. Labellum pale yellow with deep yellow center, obovate, 2.5–2 cm, glabrous, base with 2 longitudinal, red stripes, apex 2-cleft. Ovary white pubescent. Fl. Jun.

- Forests; ca. 1400 m. SW Yunnan (Menghai Xian).

11. *Curcuma kwangsiensis* S. G. Lee & C. F. Liang, Acta Phytotax. Sin. 15(2): 110. 1977.

广西莪术 guang xi e zhu

Curcuma chuanyujin C. K. Hsieh & H. Zhang.

Rhizomes white or pale creamy inside, ovate-globose, 4–5 × 2.5–3.5 cm; roots bearing tubers. Ligule ca. 1.5 mm; petiole 2–11 cm; leaf blade elliptic-lanceolate, 14–40 × 4.5–9.5 cm, pubescent, base attenuate, apex acuminate. Inflorescences terminal on pseudostems or on separate shoots arising from rhizomes; peduncle 7–14 cm; spike ca. 15 × 7 cm; fertile bracts greenish, broadly ovate, ca. 4 cm; coma bracts pale red, oblong. Calyx white, ca. 1 cm. Corolla tube ca. 2 cm, villous at throat; lobes red, ovate, ca. 1 cm. Lateral staminodes oblong. Labellum yellowish, suborbicular; central lobe 2-cleft at apex. Filament broad; anther ca. 4 mm, base spurred. Ovary villous. Fl. May–Jul. $2n = 84^*$.

- Shrubby and grassy areas. Guangdong, Guangxi, Sichuan, Yunnan.

Medicinal.

12. *Curcuma aromatica* Salisbury, Parad. Lond. 1: t. 96. 1807.

郁金 yu jin

Plants ca. 1 m tall. Rhizomes yellow inside, elliptic or narrowly so, fleshy, aromatic; roots with fusiform tubers. Petiole equaling leaf blade; leaf blade oblong, 30–60 × 10–20 cm, adaxially glabrous, abaxially pubescent, base attenuate, apex narrowly caudate. Inflorescences on separate shoots arising from rhizomes, usually appearing before leaves; spike cylindrical, ca. 15 × 8 cm; fertile bracts pale green, ovate, 4–5 cm; coma bracts white, tinged with red, narrowly oblong, pubescent, apex mucronate. Calyx sparsely hairy, 0.8–1.5 cm. Corolla tube funnelform, 2.3–2.5 cm, villous at throat; lobes pinkish white, oblong, ca. 1.5 cm. Lateral staminodes yellowish, obovate-oblong, ca. 1.5 cm. Labellum yellow, obovate, ca. 2.5 cm, apex emarginate. Ovary villous. Fl. Apr–Jun. $2n = 42$.

Wild and cultivated. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India, Myanmar, Nepal, ?Sikkim, Sri Lanka].

Medicinal.

12. ROSCOEA Smith, Exot. Bot. 2: 97. 1806.

象牙参属 xiang ya shen shu

Herbs small, with annual pseudostems from erect, reduced rhizome; roots fascicled, tuberous, fusiform. Ligule a curved line at junction of tubular leaf sheath and leaf blade; petiole absent; leaf blade oblong or lanceolate. Inflorescence terminal on pseudostems, a spike; peduncle short and enclosed by leaf sheaths to long and exserted; bracts persistent, 1-flowered; bracteoles absent. Calyx tubular, split on 1 side, apex 2- or 3-toothed. Corolla tube usually exserted from calyx, slender, wider at throat; central lobe erect, usually cucullate; lateral lobes spreading, narrower than central one, usually free. Lateral staminodes erect, petaloid. Labellum reflexed or not, cuneate, large, apex emarginate to 2-lobed. Filament short; anther linear; connective extended at base into a spur. Ovary cylin-

dric or oblong, 3-loculed; ovules numerous per locule, superposed. Style filiform; stigma funnellform, margin ciliate. Capsule oblong, cylindric, or clavate, 3-valved. Seeds small, arillate.

About 18 species: Bhutan, China, India, Kashmir, Myanmar, Nepal, Sikkim, Vietnam; 13 species (eight endemic) in China.

- 1a. Corolla tube 1.6–4(–5) cm; labellum usually less than 2.5 cm.
 - 2a. Plants usually less than 15 cm tall when mature.
 - 3a. Central lobe of corolla orbicular; labellum not reflexed 1. *R. alpina*
 - 3b. Central lobe of corolla oblong; labellum slightly to conspicuously reflexed.
 - 4a. Leaves obscurely to densely hairy especially when young; bracts elliptic; lateral staminodes oblong, 1–1.3 cm 2. *R. tibetica*
 - 4b. Leaves glabrous; bracts tubular; lateral staminodes narrowly obovate-cuneate, ca. 1.4 cm 3. *R. kunmingensis*
 - 2b. Plants usually more than 15 cm tall when mature.
 - 5a. Leaves appearing after anthesis, 3–6 cm wide; bracts much shorter than calyx 4. *R. humeana*
 - 5b. Leaves appearing before anthesis, 1–2.8 cm wide; bracts longer than calyx.
 - 6a. Lateral staminodes elliptic to obliquely obovate, 1–1.4 cm; labellum 1.3–2 × 0.8–1.2 cm, with white lines at throat 5. *R. scillifolia*
 - 6b. Lateral staminodes obliquely spatulate, ca. 2 cm; labellum ca. 2.5 × 1.4 cm, without white lines at throat 6. *R. capitata*
- 1b. Corolla tube (3–)4–12.5 cm; labellum usually more than 2.5 cm.
 - 7a. Bracts obtuse or truncate at apex.
 - 8a. Leaves glaucous abaxially 7. *R. wardii*
 - 8b. Leaves not glaucous abaxially.
 - 9a. Leaves distinctly narrowed and petiolelike between sheath and blade; ligule prominent 8. *R. debilis*
 - 9b. Leaves not narrowed and petiolelike between sheath and blade; ligule obscure 9. *R. forrestii*
 - 7b. Bracts acute at apex.
 - 10a. Leaves auriculate 10. *R. auriculata*
 - 10b. Leaves not auriculate.
 - 11a. Leaves absent at anthesis 11. *R. praecox*
 - 11b. Leaves present at anthesis.
 - 12a. Leaves forming a rosette at apex of pseudostem; labellum not reflexed, lobes usually emarginate; stigma hooked 12. *R. schneideriana*
 - 12b. Leaves not forming a rosette at apex of pseudostem; labellum reflexed, lobes usually not emarginate; stigma not hooked 13. *R. cautleoides*

1. *Roscoea alpina* Royle, Ill. Bot. Himal. Mts. 1: 361. 1839.

高山象牙参 gao shan xiang ya shen

Roscoea intermedia Gagnepain.

Plants 10–20 cm tall. Bladeless leaves 2 or 3. Normal leaves 2 or 3; ligule ca. 0.5 mm; leaf blade oblong-lanceolate or linear-lanceolate, 3–12 × 1.2–2 cm, glabrous, base subrounded, apex acuminate. Inflorescence with peduncle enclosed by leaf sheaths; bracts 3–10 mm. Flowers purple or lilac, opening one at a time. Calyx 4–5 cm, apex 2-toothed. Corolla tube exerted from calyx, long, slender; central lobe erect, orbicular, ca. 1.5 cm in diam., apex apiculate; lateral lobes reflexed, linear-oblong. Lateral staminodes erect, similar to corolla lobes but shorter. Labellum not reflexed, cuneate-obovate, ca. 1.5 cm, apex 2-lobed. Anther white to cream, locules 5–6 mm; connective spur 1.5–2 mm. Capsule 2.5–3.5 cm. Seeds subcubic, slightly constricted near middle. Fl. May–Aug.

Coniferous forests; 3000–3600 m. Xizang [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim].

2. *Roscoea tibetica* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 14: 183. 1895.

藏象牙参 zang xiang ya shen

Roscoea intermedia Gagnepain var. *minuta* Gagnepain; *R. intermedia* var. *plurifolia* Loesener; *R. tibetica* var. *emarginata*

S. Q. Tong.

Plants 5–15 cm tall. Leaves 1–3, forming a rosette; ligule obscure, ca. 0.5 mm; leaf blade elliptic, widest near base, 2–6 × 1–2.5 cm, obscurely to densely hairy especially when young, apex obtuse to acute. Inflorescence enclosed by leaf sheaths; bracts elliptic, 2.2–4 cm. Flowers purple or violet, held just above leaf rosette. Calyx brown spotted, 3–4 cm, apex 3-toothed. Corolla tube 4–5 cm; central lobe oblong, cucullate, 1.5–1.7 cm × ca. 8 mm, apex apiculate; lateral lobes lanceolate, 1.5–1.8 cm × 4–5 mm. Lateral staminodes oblong, 1–1.3 cm. Labellum slightly reflexed, obovate 1.4–2.5 × 0.8–1.8 cm including claw, usually deeply lobed for more than 1/2 its length. Anther cream; connective spur 3–7 mm. Ovary cylindric, ca. 1.5 cm. Fl. Jun–Jul.

Pinus forests, scrub, alpine meadows; 2400–3800 m. Sichuan, Xizang, Yunnan [Bhutan, India].

3. *Roscoea kunmingensis* S. Q. Tong, Bull. Bot. Res., Harbin 12: 248. 1992.

昆明象牙参 kun ming xiang ya shen

Plants 8–12 cm tall. Bladeless leaves ca. 4. Ligule ca. 3 mm; leaf blade lanceolate or narrowly so, 8–20 × 2.5–3(–4.2) cm, glabrous, apex acuminate or shortly so. Inflorescence 1- or 2-flowered; peduncle enclosed by leaf sheaths; bracts tubular,

0.5–0.7(–3.5) cm, rarely to 8 cm after anthesis, apex acuminate, 2-toothed. Corolla tube 3.5–4 cm; central lobe oblong, 1.5–2 cm × 6–8 mm; lateral lobes linear-oblong, narrower than central one. Lateral staminodes narrowly obovate-cuneate, ca. 1.4 cm. Labellum reflexed, with white lines on claw, obovate-cuneate, 1.6–2.1 × 1–1.5 cm, apex deeply 2-lobed. Anther locules ca. 4 mm; connective spur ca. 3 mm. Ovary cylindrical, 3–3.5 cm × 6–7 mm. Seeds obovoid, ca. 3.5 mm. Fl. May–Jun.

- Forests; 2100–2200 m. Yunnan.

- 1a. Leaf blade 2.5–3 cm wide; bracts 0.5–0.7 cm 3a. var. *kunmingensis*
1b. Leaf blade to 4.2 cm wide; bracts 2.5–3.5 cm, to 8 cm after anthesis 3b. var. *elongatobracteata*

3a. *Roscoea kunmingensis* var. *kunmingensis*

昆明象牙参(原变种) kun ming xiang ya shen (yuan bian zhong)

Leaves 2.5–3 cm wide. Bracts 0.5–0.7 cm. Fl. May.

- *Pinus* forests; ca. 2200 m. Yunnan (Kunming Shi).

3b. *Roscoea kunmingensis* var. *elongatobracteata* S. Q. Tong, Bull. Bot. Res., Harbin 12: 249. 1992.

延苞象牙参 yan bao xiang ya shen

Leaves to 4.2 cm wide. Bracts 2.5–3.5 cm, to 8 cm after anthesis. Fl. Jun.

- Forests; ca. 2100 m. Yunnan (Kunming Shi).

4. *Roscoea humeana* I. B. Balfour & W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 122. 1916.

大花象牙参 da hua xiang ya shen

Roscoea sichuanensis R. H. Miao.

Plants 13–25 cm tall. Leaves 4–6, appearing after anthesis; ligule ca. 2 mm; leaf blade broadly lanceolate or ovate-lanceolate, 10–30 × 3–6 cm, glabrous, apex acute. Inflorescence with peduncle enclosed by leaf sheaths; bracts lanceolate, usually much shorter than calyx. Flowers 1 to many opening together, violet, purple, pink, white, or yellow. Calyx narrowly tubular, 10–14 cm, apex oblique, 2-lobed. Corolla tube slightly longer than calyx; central lobe broadly ovate, 3–4 × 2.5–3 cm, base erect, narrow, cucullate, apex rounded, apiculate; lateral lobes oblanceolate, 3–3.5 × ca. 1.5 cm. Lateral staminodes white tinged with purple, oblanceolate, 1.5–1.7 cm. Labellum reflexed, obovate, usually smaller than central lobe of corolla, 2–2.5 × ca. 3 cm, apically 2-cleft to near base, margin cristate; claw hard. Filament ca. 5 mm; anther white, ca. 1.2 cm; connective spur yellowish green, 6–8 mm. Style ca. 10 cm; stigma turbinate, pilose. Ovary cylindrical, ca. 1 cm. Capsule oblong, ca. 2.5 cm × 5 mm. Fl. Apr–Jul. $2n = 24^*$.

- *Pinus* forests, scrub at forest margins, alpine meadows, grassy and rocky hillsides, screens, ledges and crevices of limestone cliffs; 2900–3800 m. Sichuan, Yunnan.

Chinese records of *Roscoea purpurea* Smith and *R. purpurea* var. *procera* Wallich (e.g., in FRPS) are based on misidentifications, mostly of *R. humeana*.

Ornamental.

5. *Roscoea scillifolia* (Gagnepain) Cowley, Kew Bull. 36: 765. 1982.

绵枣象牙参 mian zao xiang ya shen

Roscoea capitata Smith var. *scillifolia* Gagnepain, Bull. Soc. Bot. France 48: lxxiv. 1902; *R. yunnanensis* Loesener var. *scillifolia* (Gagnepain) Loesener.

Plants 10–25 cm tall. Leaves 1–5; ligule 2–3 mm; leaf blade lanceolate to linear, 11–21 × 1.5–2 cm, proximal ones sometimes falcate, apex obtuse to acute. Inflorescence with peduncle enclosed by or exerted from leaf sheaths; bracts green, 2.6–5 × 1.2–3 cm, basal one tubular and enclosing inflorescence, soon splitting. Flowers blackish purple, pink, white, or occasionally mauve, opening one at a time. Calyx whitish brown, 1.5–2.1 cm, apex 2(or 3)-toothed. Corolla tube 1.6–3 cm; central lobe elliptic, 1.4–2 cm × 6–10 mm; lateral lobes linear-oblong, 1.1–2 cm × 4–6 mm. Lateral staminodes elliptic to obliquely obovate, 1–1.4 cm × 3–5 mm. Labellum with white lines at throat, obovate, 1.3–2 × 0.8–1.2 cm, scarcely to deeply lobed; lobes sometimes emarginate at apex. Anther white; connective spur 5–6 mm. Ovary 1–1.5 cm × 3–4 mm, 3-angled. Seeds ellipsoid to 3-angled. Fl. Jun–Aug.

- Moist open mountain pastures; 2700–3400 m. Yunnan.

6. *Roscoea capitata* Smith, Trans. Linn. Soc. London 13: 461. 1822.

头花象牙参 tou hua xiang ya shen

Plants 30–50 cm tall. Leaves several; leaf blade linear, rarely lanceolate, 15–25 × 1–2.8 cm, strongly keeled, base narrowed, apex acuminate. Inflorescence capitata, densely flowered; peduncle 5–10 cm; bracts green, lanceolate, 4–4.5 × ca. 1 cm. Flowers blue. Calyx ca. 2.5 cm, strongly pubescent especially along veins, split on 1 side, apex 2-toothed. Corolla tube shorter than calyx; central lobe oblong-cuneate, cucullate, ca. 2 cm, apex apiculate; lateral lobes longer than central one. Lateral staminodes obliquely spatulate, ca. 2 cm. Labellum not reflexed, oblong-cuneate, ca. 2.5 × 1.4 cm, lobed for ca. 1/4 its length; lobes conspicuously emarginate at apex. Anther creamy white, locules ca. 5 mm; connective spur ca. 1 cm. Ovary pink. Capsule clavate, ca. 2.5 cm. Fl. Jul–Aug.

- Forests; 2300–2400 m. Xizang [Nepal].

7. *Roscoea wardii* Cowley, Kew Bull. 36: 768. 1982.

苍白象牙参 cang bai xiang ya shen

Roscoea blanda K. Schumann var. *pumila* Handel-Mazzetti.

Plants 14–30 cm tall. Bladeless leaves 3 or 4, with pink veins. Normal leaves 2(or 3); ligule 1–2 mm; leaf blade abaxially glaucous, elliptic, 7–8 × 1.7–4.5 cm, sparsely scaly-hairy on both surfaces, margin hyaline, minutely papillose, apex acute to acuminate. Inflorescence enclosed by or very shortly exerted from leaf sheaths; peduncle smooth; bracts pale, 3.5–5 cm, apex obtuse, basal 2 initially fused, splitting when second flower opens. Flowers deep purple. Calyx 3.3–4.5 cm,

apex 2-lobed; lobes rounded at apex. Corolla tube usually exerted from calyx at anthesis, 4–8 cm; central lobe obovate or broadly elliptic, 2–3.2 × 1.3–2.5 cm; lateral lobes oblong to linear-oblong, 1.7–3.4 cm. Lateral staminodes elliptic, 1.6–2 cm; claw short. Labellum reflexed, obovate, 2.2–4.5 × 1.6–4.5 cm including 8–10 mm long claw, deeply lobed; lobes with 3 white, raised stripes at base, apex emarginate. Anther white, locules 6–9 mm; connective spur 5–8 mm. Ovary 1–1.2 cm. Style purple; stigma white. Capsule ca. 3 × 1 cm. Seeds ellipsoid to 3-angled. Fl. Jun–Aug.

Scrub, meadows, open grassy places; 2400–3500 m. Xizang, Yunnan [India, Myanmar].

8. *Roscoea debilis* Gagnepain, Bull. Soc. Bot. France 48: lxxvi. 1902.

长柄象牙参 chang bing xiang ya shen

Plants (10–)25–50(–60) cm tall. Bladeless leaves 2 or 3, marked pinkish brown. Normal leaves 3 or 4; ligule pinkish brown, 1–2 mm; leaf blade oblong, elliptic, or lanceolate, 9–2.2 × 1.5–4 cm, abaxially glabrous or pubescent, base narrowed and petiolelike, apex acute to acuminate. Inflorescence sometimes with peduncle shortly exerted from leaf sheaths; bracts lanceolate, 3.5–5.5 cm apex obtuse. Flowers 1–3 opening together, purple, red, or white. Calyx 2.7–3.5 cm, apex 2-toothed. Corolla tube 3.5–7.5 cm; central lobe elliptic to narrowly so, 2.2–3.5 cm, apex strongly apiculate; lateral lobes elliptic to linear-oblong, 2.2–3.5 cm. Lateral staminodes obliquely oblanceolate, ca. 2.5 cm, clawed. Labellum slightly reflexed, with white lines at throat, obovate, 2.3–3.5 × 1.4–3 cm including 5–6 mm claw, apex narrowly 2-lobed. Anther curved, locules 6–9 mm; connective spur 7–9 mm. Ovary 1–1.5 cm. Fl. Jun–Aug.

• Grasslands; 1600–2400 m. Yunnan.

1a. Leaves abaxially glabrous 8a. var. *debilis*
1b. Leaves abaxially pubescent 8b. var. *limprichtii*

8a. *Roscoea debilis* var. *debilis*

长柄象牙参(原变种) chang bing xiang ya shen (yuan bian zhong)

Roscoea blanda K. Schumann.

Leaves abaxially glabrous.

• Grasslands; 1600–2400 m. Yunnan.

8b. *Roscoea debilis* var. *limprichtii* (Loesener) Cowley, Kew Bull. 36: 775. 1982.

白象牙参 bai xiang ya shen

Roscoea blanda K. Schumann var. *limprichtii* Loesener, Notizbl. Bot. Gart. Berlin-Dahlem 8: 600. 1923.

Leaves abaxially pubescent.

• Grasslands; 1900–2000 m. W Yunnan (Dali Xian).

9. *Roscoea forrestii* Cowley, Kew Bull. 36: 775. 1982.

大理象牙参 da li xiang ya shen

Plants 17–30(–35) cm tall. Bladeless leaves 3–5, tinged or dotted pink. Normal leaves 1–3; ligule 2–3 mm; leaf blade ob-

long-ovate to lanceolate, 6.5–13 × 2–5 cm, glabrous or rarely pubescent, apex obtuse to acute. Inflorescence with peduncle enclosed by leaf sheaths; bracts pale green, shorter than or equaling calyx, sometimes very reduced or fused together, apex obtuse. Calyx tinged pink, 5–13 cm, apex 2- or 3-toothed. Corolla tube usually well exerted from calyx, 5–12.5 cm; central lobe dark veined, broadly elliptic, 2.5–4 × 1.5–2.5 cm, apex apiculate; lateral lobes linear-oblong to elliptic, 2.6–4 cm × 5–10 mm. Lateral staminodes obliquely obovate to rhombic, 1.1–2.5 × 7–11 mm, shortly clawed. Labellum reflexed, obovate, 3–4.1 × 2.1–3 cm including claw, usually lobed to below middle; lobes emarginate at apex. Anther cream, locules 5–8 cm; connective spur 5–9 mm. Ovary 1–5 cm. Style white. Seeds globose or cubic. Fl. May–Jul.

• Among shrubs and dwarf bamboo, crevices and ledges of cliffs; 2000–3400 m. W Yunnan.

10. *Roscoea auriculata* K. Schumann in Engler, Pflanzenr. 20(IV. 46): 118. 1904.

耳叶象牙参 er ye xiang ya shen

Roscoea purpurea Smith var. *auriculata* (K. Schumann) H. Hara.

Plants erect, 20–40 cm tall. Leaves 3–7; leaf sheath purple, tubular, wholly closed; leaf blade lanceolate, 7.5–20 × 2–2.5 cm, glabrous, base auriculate and clasping, apex acuminate. Inflorescence several flowered; peduncle enclosed by leaf sheaths; bracts linear-lanceolate, 2–2.5 cm, membranous. Flowers usually bright purple or white. Calyx ca. 3.5 cm. Corolla tube longer than calyx; lobes lanceolate, ca. 3.5 cm. Lateral staminodes erect, white, falcate, ca. 2 cm, shortly clawed. Labellum reflexed, obovate, ca. 4.5 × 3 cm, apex 2-cleft. Stamen ca. 2 cm; anther ca. 1 cm; connective spur short. Capsule 2–3 cm. Seeds brown. Fl. Jun–Aug.

Grasslands; 2400–2700 m. SC Xizang (Nyêmo Xian) [Bhutan, Nepal, Sikkim].

11. *Roscoea praecox* K. Schumann in Engler, Pflanzenr. 20(IV. 46): 122. 1904.

先花象牙参 xian hua xiang ya shen

Roscoea intermedia Gagnepain var. *anomala* Gagnepain; *R. intermedia* var. *macrorrhiza* Gagnepain.

Plants 7–30 cm tall. Bladeless leaves 4 or 5, pinkish brown veined, margin hyaline, apex obtuse. Normal leaves absent at anthesis, sometimes 1 or 2 short, underdeveloped leaves present; ligule apparently not raised. Inflorescence exerted from leaf sheaths; peduncle enclosed or exerted; bracts greenish, lanceolate, 4–6.5 cm. Flowers 1–3 opening together, violet, purple, or white. Calyx 3–4.5 cm, apex 2-toothed. Corolla tube scarcely exerted from calyx; lobes lanceolate, equal, ca. 3 cm. Lateral staminodes rhombic, 1.7–2.5 cm, midvein weak, base narrowed into a claw. Labellum reflexed, white marked at junction of limb and claw, obovate, 2.5–4 × 1.5–2 cm including ca. 7 mm long claw, apically 2-cleft for more than 1/2 length of limb; lobes sometimes emarginate at apex. Anther cream; connective spur ca. 7 mm. Fl. Apr–Jun.

• Shrubby hillsides, grassy mountains; 2200–2300 m. Yunnan.

12. *Roscoea schneideriana* (Loesener) Cowley, Kew Bull. 36: 762. 1982.

无柄象牙参 wu bing xiang ya shen

Roscoea yunnanensis Loesener var. *schneideriana* Loesener, Notizbl. Bot. Gart. Berlin-Dahlem 8: 600. 1923; *R. brevisbracteata* Z. Y. Zhu; *R. yunnanensis* var. *dielsiana* Loesener.

Plants 9–45 cm tall. Leaves (2–)4–6, ± forming a rosette at apex of pseudostem; ligule ca. 0.5 mm; leaf blade narrowly lanceolate to linear, usually falcate, (5–)10–22 × 0.4–2 cm, glabrous, apex acute to acuminate. Inflorescence with peduncle enclosed by or shortly exerted from leaf sheaths; bracts elliptic, 3.3–7 cm, basal one tubular. Flowers purple or white, usually opening one at a time. Calyx 3–4 cm, apex 2-toothed. Corolla tube 4–4.5 cm; central lobe elliptic, 1.7–3.5 cm, apex apiculate; lateral lobes linear-oblong, 2–3.5 cm. Lateral staminodes obovate to rhombic, 1.5–2.5 cm. Labellum not reflexed, obovate, 1.8–3.5 × 1–2.5 cm, apically 2-cleft for ca. 1/2 its length; lobes emarginate at apex. Anther yellow, locules 6–9 mm; connective spur 8–9 mm. Stigma funnelliform, abruptly hooked. Fl. Jul–Aug.

• Mixed forests, moist stony pastures, rocky mountain cliffs; 2600–3500 m. Sichuan, Xizang, Yunnan.

13. *Roscoea cautleoides* Gagnepain, Bull. Soc. Bot. France 48: lxxv. 1902.

早花象牙参 zao hua xiang ya shen

Plants 15–40(–60) cm tall. Leaves 3 or 4; leaf sheath glabrous or densely subappressed pubescent; ligule ca. 1 mm; leaf blade lanceolate or linear, 5–15(–40) × 1.5–3 cm, strongly keeled, scabrous, adaxially with scaly pustules, abaxially glabrous or densely subappressed pubescent, base narrowed, apex obtuse to acute. Inflorescence shortly to long exerted from leaf sheaths; peduncle ridged; bracts green with brownish veins, tubular, 4–6 cm. Flowers 1 to several opening together, purple, yellow, white, or rarely pale pink, sometimes appearing before leaves develop. Calyx 3–5.6 cm, split to middle on 1 side, apex

2-toothed. Corolla tube 3–3.5 cm, slender; lobes lanceolate, 2.5–2 cm. Labellum reflexed, obovate, 2.5–3 cm, external margin crisped, apex 2-lobed. Anther linear, 1–1.5 cm including spur. Capsule oblong, 1.5–3.5 cm. Seeds ellipsoid to 3-angled. Fl. May–Aug.

• *Pinus* forests, dwarf scrub, meadows, grasslands; 2000–3500 m. Sichuan, Yunnan.

- 1a. Leaf sheath and blade abaxially glabrous; capsule ca. 1.5 cm 13a. var. *cautleoides*
1b. Leaf sheath and blade abaxially densely subappressed pubescent; capsule 2–3.5 cm 13b. var. *pubescens*

13a. *Roscoea cautleoides* var. *cautleoides*

早花象牙参(原变种) zao hua xiang ya shen (yuan bian zhong)

Roscoea capitata Smith var. *purpurata* Gagnepain; *R. chamaeleon* Gagnepain; *R. sinopurpurea* Stapf; *R. yunnanensis* Loesener; *R. yunnanensis* var. *purpurata* (Gagnepain) Loesener.

Leaf sheath and blade abaxially glabrous. Capsule ca. 1.5 cm. Fl. May–Aug. $2n = 24^*$.

• *Pinus* forests, dwarf scrub, meadows; 2000–3500 m. Sichuan, Yunnan.

13b. *Roscoea cautleoides* var. *pubescens* (Z. Y. Zhu) T. L. Wu, Novon 7: 441. 1997.

毛早花象牙参 mao zao hua xiang ya shen

Roscoea pubescens Z. Y. Zhu, Acta Phytotax. Sin. 26: 315. 1988.

Leaf sheath and blade abaxially densely subappressed pubescent. Capsule 2–3.5 cm.

• Grasslands; ca. 2000 m. SW Sichuan (Xichang Xian).

13. CAUTLEYA J. D. Hooker, Bot. Mag. 114: t. 6991. 1888.

距药姜属 ju yao jiang shu

Rhizomes very short; roots fascicled, thick, fleshy. Leaves petiolate or ± sessile; ligule at base of petiole; leaf blade oblong or lanceolate. Inflorescence a terminal spike; bracts colored, persistent, 1-flowered. Flowers yellow or orange. Calyx long tubular, split on 1 side. Corolla tube equaling or longer than calyx; lobes subequal; central one erect, narrow, concave; lateral ones connate to claw of labellum for about 1/2 their length. Lateral staminodes erect, petaloid. Labellum reflexed, broadly cuneate, apex emarginate to 2-cleft. Filament erect, short; anther locules linear, contiguous; connective forming a basal, forked appendage. Ovary globose, 3-loculed; ovules numerous per locule; placentation axile. Style linear; stigma turbinate, margin ciliate. Capsule globose, soon dehiscent to base with recurved valves exposing seeds on a columnar mass. Seeds red, gray, or black, angled; aril small or absent.

Five species: Bhutan, China, India, Kashmir, Myanmar, Nepal, Sikkim, Thailand, Vietnam; three species in China.

- 1a. Bracts red, longer than calyx; leaves petiolate 1. *C. spicata*
1b. Bracts green, shorter than calyx; leaves ± sessile.
2a. Spikes 2–10-flowered 2. *C. gracilis*
2b. Spikes 15–20- or more flowered 3. *C. cathcartii*

1. *Cautleya spicata* (Smith) Baker in J. D. Hooker, Fl. Brit. India 6: 209. 1890.

红苞距药姜 hong bao ju yao jiang

Roscoea spicata Smith, Trans. Linn. Soc. London 13: 461. 1822.

Pseudostems 30–60 cm. Leaves 4–7, petiolate; ligule 5–10 mm, membranous, apex obtuse or acute; petiole 1.5–2 cm; leaf

blade oblong-lanceolate to linear, 12–30 × 1.6–4 cm, base rounded or obtuse, apex caudate-acuminate. Spikes 7–12 cm, densely many flowered; bracts red, oblong, 2.5–3 cm, longer than calyx. Flowers yellow. Calyx 1.5–2.5 cm, split on 1 side, apex 2-toothed. Corolla 2–2.5 cm; lobes lanceolate, 2–2.5 cm. Lateral staminodes oblanceolate-oblong, subequaling central lobe of corolla. Labellum ca. 2.5 cm, apex 2-cleft. Anther linear, ca. 1.5 cm. Capsule red, globose, ca. 1 cm in diam. Seeds black, ovoid, enclosed in white, scarious aril. Fl. Jul, fr. Sep–Oct. $2n = 34$.

Forest floors or epiphytic on trees; 1100–2600 m. Guizhou, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal, Sikkim].

2. *Cautleya gracilis* (Smith) Dandy, J. Bot. 70: 328. 1932.

距药姜 *ju yao jiang*

Roscoeia gracilis Smith, Trans. Linn. Soc. London 13: 460. 1822; *Cautleya lutea* (Royle) J. D. Hooker; *R. lutea* Royle.

Pseudostems 25–80 cm, slender, base with bladeless leaves. Leaves 4–6, ± sessile; leaf sheath greenish white or with purple-red spot; ligule ca. 2 mm, membranous, apex rounded; leaf blade adaxially green, abaxially usually purple or green, lanceolate or oblong-lanceolate, 6–18 × 1.5–6 cm, glabrous, base rounded or attenuate, apex caudate-acuminate. Spikes laxly 2–10-flowered; rachis red, slightly flexuous; bracts green, lanceolate, shorter than calyx. Calyx purple-red, 1.5–2 cm, deeply split on 1 side, apex minutely toothed. Corolla tube slightly ex-

serted from calyx; lobes bright yellow, lanceolate, 1.5–2 cm. Lateral staminodes erect, petaloid. Labellum obovate, equaling corolla lobes, apically 2-cleft to below middle. Filament curved, ca. 2 cm. Ovary glabrous. Capsule red, globose, ca. 8 mm in diam.; valves reflexed, red inside. Seeds black, angled; aril absent. Fl. Aug–Sep, fr. Sep–Nov.

Moist valleys or epiphytic on trees; 900–3100 m. Sichuan, Xizang, Yunnan [Bhutan, India, Kashmir, Myanmar, Nepal, Sikkim, Thailand, Vietnam].

3. *Cautleya cathcartii* Baker in J. D. Hooker, Fl. Brit. India 6: 208. 1890.

多花距药姜 *duo hua ju yao jiang*

Pseudostems purplish, 45–55 cm. Leaves ± sessile; ligule 5–6 mm, membranous, apex rounded or truncate; leaf blade lanceolate or oblong-lanceolate, 10–20 × 1.5–4 cm, glabrous, base subrounded or attenuate, apex caudate. Spikes 15–20- or more flowered; bracts green, oblong, shorter than calyx. Flowers orange. Calyx clavate, to 2 cm, apex 2-toothed, glabrous. Corolla tube ca. 2.5 cm; lobes ca. 1.2 cm. Lateral staminodes petaloid. Labellum ca. 2.5 cm, margin crisped, apex 2-cleft. Capsule red, ca. 6 mm in diam. Seeds angled; aril white, small. Fl. Jun.

Forest floors; 1700–2500 m. S Xizang (Nyalam Xian) [N India, ?Nepal, Sikkim].

14. BOESENBERGIA Kuntze, Revis. Gen. Pl. 2: 685. 1891.

凹唇姜属 *ao chun jiang shu*

Gastrochilus Wallich, Pl. Asiat. Rar. 1: 22. 1829, not D. Don (1825).

Rhizomes tuberous or elongate. Leaves basal or cauline, petiolate; ligule 2-lobed; leaf blade ovate, oblong, or lanceolate. Inflorescences terminal on pseudostems or on separate shoots arising from rhizomes; bracts 2-ranked, apical one developing first, each subtending 1 bracteole and 1 flower. Calyx tubular. Corolla tube exerted from calyx, slender; lobes subequal. Lateral staminodes petaloid, usually wider than corolla lobes. Labellum obovate or broadly oblong, larger than corolla lobes and lateral staminodes, strongly concave, base narrow, grooved, margin crisped, apex entire or 2-cleft. Filament erect; anther locules parallel, dehiscing by slits or apical pores, base without spur; connective with or without appendage. Ovary 3-loculed or incompletely so; placentation basal or axile. Capsule oblong, 3-valved. Seeds black; aril lacinate.

About 50 species: tropical Asia; three species (one endemic) in China.

1a. Inflorescences on separate shoots arising from rhizomes; leaf blade cordate at base 1. *B. longiflora*

1b. Inflorescences terminal on pseudostems, appearing from within apical leaf sheaths; leaf blade rounded to cuneate at base.

2a. Leaves 3 or 4, green on both surfaces; anther connective appendage 2-cleft, 1–3 mm 2. *B. rotunda*

2b. Leaves 1–3, usually 1, adaxially dark green, abaxially purplish red; anther connective appendage

absent 3. *B. albomaculata*

1. *Boesenbergia longiflora* (Wallich) Kuntze, Revis. Gen. Pl. 2: 685. 1891.

心叶凹唇姜 *xin ye ao chun jiang*

Gastrochilus longiflora Wallich, Pl. Asiat. Rar. 1: 22. 1829; *Boesenbergia fallax* Loesener; *Curcumorpha longiflora* (Wallich) A. S. Rao & D. M. Verma; *Kaempferia fallax* Lingelsheim & Borza (1914), not Gagnepain (1903).

Plants to 50–60 cm tall. Roots robust. Leaf blade green, ovate, 8–12 × 5–9 cm, base cordate, apex cuspidate. Inflores-

cences on separate shoots arising from rhizomes; bracts ovate, 2–4 cm, villous, apex acuminate. Flowers 3–6, bluish purple. Calyx 1–2 cm. Corolla to 4 cm; lobes lanceolate, 2.2–2.5 cm × 5–6 mm. Lateral staminodes ovate, equaling corolla lobes. Labellum obovate-cuneate, ca. 3 × 1.8–2 cm. Filament very short; anther ca. 1 cm; connective broad, appendage linear. Stigma thickened. $2n = 36^*$.

Forest floors in mountains; 1100–1900 m. C and SW Yunnan (Lufeng Xian, Menglian Dai-Lahu-Va Zu Zizhixian) [India, Laos, Myanmar, Thailand].

2. Boesenbergia rotunda (Linnaeus) Mansfield, Kulturpflanze 6: 239. 1958.

凹唇姜 ao chun jiang

Curcuma rotunda Linnaeus, Sp. Pl. 1: 2. 1753; *Boesenbergia pandurata* (Roxburgh) Schlechter; *Kaempferia pandurata* Roxburgh.

Plants to 50 cm. Rhizomes bright yellow, ovoid-globose, strongly aromatic; roots robust. Leaves 3 or 4; leaf sheath red; ligule 2-cleft, ca. 5 mm; petiole 7–16 cm, channeled; leaf blade green on both surfaces, ovate-oblong or elliptic-lanceolate, 25–50 × 7–12 cm, glabrous except for sparsely hairy midvein abaxially, base rounded to cuneate, apex apiculate. Inflorescences terminal on pseudostems, appearing from within apical leaf sheaths, subsessile, 3–7 cm; bracts lanceolate, 4–5 cm. Flowers aromatic. Calyx 1.5–2 cm, apex 2-cleft. Corolla pink; corolla tube 4.5–5.5 cm; lobes oblong, 1.5–2 cm. Lateral staminodes light pink, obovate, ca. 1.5 cm. Labellum white or pink with purple stripe, fiddle-shaped, 2.5–3.5 cm, concave, margin slightly crisped, apex entire. Filament short; connective appendage reflexed, 2-cleft, 1–3 mm. Fl. Jul–Aug. $2n = 36^*$.

Dense forests; ca. 1000 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [India, Indonesia, Malaysia, Sri Lanka; cultivated throughout

Indo-China].

Medicinal.

3. Boesenbergia albomaculata S. Q. Tong, Acta Phytotax. Sin. 24: 323. 1986.

白斑凹唇姜 bai ban ao chun jiang

Rhizomes white. Leaves 1–3, usually 1; petiole green or pale purplish red, 24–30 cm; leaf blade adaxially dark green, abaxially purplish red, ovate, 23–40 × 12–16 cm, base cuneate, apex acuminate. Inflorescences terminal on pseudostems, appearing from within apical leaf sheaths, 7–8 cm; bracts red, ovate, 2–2.5 × 1.2–1.4 cm, sparsely pubescent; bracteoles red, tubular, 1.2–1.5 cm, split to base on 1 side. Calyx pale red, 6–7 mm, apex 2-toothed. Corolla tube white, 2.8–3 cm; lobes 3, central one wider than lateral ones. Lateral staminodes subulate, ca. 1 mm wide. Labellum with white base and whitish stripes from middle to red apex, bag-shaped, ca. 2.5 × 1.6–1.7 cm, margin irregularly crenate. Filament white, ca. 5 mm; anther ca. 5 mm, locules dehiscing longitudinally; connective appendage absent. Ovary ellipsoid, 3-loculed.

• Moist forests; ca. 800 m. W Yunnan (Yingjiang Xian).

15. STAHLIANTHUS Kuntze, Revis. Gen. Pl. 2: 697. 1891.

土田七属 tu tian qi shu

Rhizomes tuberous. Pseudostems absent. Leaves few, arising directly from rhizomes, petiolate; leaf blade obovate- or lanceolate-oblong or lanceolate. Inflorescences pedunculate, capitate, surrounded by a campanulate involucre, several flowered. Calyx tubular, apex slightly 3-toothed. Corolla white, tubular, distally 3-lobed. Staminodes white, petaloid. Labellum white, rarely purple, with a central, yellow blotch, apex emarginate or shortly 2-lobed. Filament short, flat; connective appendage flat or absent. Ovary 3-loculed. Stylodes absent. Seeds globose.

Six species: Cambodia, China, India, Laos, Myanmar, Sikkim, Thailand, Vietnam; one species in China.

Stahlianthus rubromarginatus S. Q. Tong (Acta Phytotax. Sin. 33: 499. 1995) was described from a cultivated plant introduced to Mengla, S Yunnan from N Myanmar. It was transferred to *Kaempferia* by Searle (Telopea 8: 375. 1999), as *K. rubromarginata* (S. Q. Tong) R. J. Searle, but, according to Wu and Chen (Acta Phytotax. Sin. 34: 204. 1996), it is a synonym of *K. parviflora* Wallich ex Baker, which is distributed in India, Myanmar, and Thailand.

1. Stahlianthus involucratus (King ex Baker) Craib ex Loesener in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 15a: 564. 1930.

土田七 tu tian qi

Kaempferia involucrata King ex Baker in J. D. Hooker, Fl. Brit. India 6: 221. 1890.

Rhizomes brown-yellow inside, ca. 1 cm in diam., strongly fragrant; roots expanded into globose tubers at apex. Leaves erect; petiole 6–18 cm; leaf blade green or purplish, obovate-oblong or lanceolate, 10–18 × 2–3.5 cm. Peduncle 2.5–10 cm; involucre erect, 4–5 × 2–2.5 cm, apex 2- or 3-lobed, with small, brown, glandular spots; bracteoles linear, ca. 1.5 cm, membra-

nous. Calyx 0.9–1.1 cm. Corolla tube 2.5–2.7 cm; lobes ca. 1.2 cm, central one apiculate at apex. Lateral staminodes oblanceolate, 1.6–2 cm × ca. 4 mm. Labellum white with a central, yellow blotch, spatulate, ca. 2 × 1.3 cm, apex emarginate. Filament ca. 2 mm; anther ca. 5 mm; connective appendage semi-orbicular, ca. 3 cm. Ovary ovoid, ca. 3.5 mm. Style linear; stigma ciliate. Fl. May–Jun. $2n = 22$.

Forest floors, mountain slopes, also cultivated. Fujian, Guangdong, Guangxi, Yunnan [N India, Myanmar, ?Sikkim, Thailand].

Medicinal.

16. KAEMPFERIA Linnaeus, Sp. Pl. 1: 2. 1753.

山柰属 shan nai shu

Rhizomes fleshy, tuberous; roots often bearing small tubers. Pseudostem short or obsolete. Leaves 1 to few; ligule usually small or absent; petiole short; leaf blade suborbicular to filiform, sometimes variegated or abaxially purple. Inflorescences terminal on

pseudostems or on separate shoots arising from rhizomes (when appearing before pseudostems), capitate, spirally few to many flowered; bracts 1-flowered; bracteoles small, apically 2-lobed or sometimes 2-cleft to base. Calyx tubular, split on 1 side, apex unequally 2- or 3-toothed. Corolla tube equaling or much longer than calyx; lobes spreading or reflexed, lanceolate, subequal. Lateral staminodes petaloid. Labellum usually white or lilac, sometimes marked with different color near base, showy, apically 2-lobed to 2-cleft to base. Filament very short or absent; connective extended into crest exerted from throat of flower, entire or 2-cleft. Ovary 3-lobed. Capsule globose or ellipsoid; pericarp thin. Seeds subglobose to ellipsoid; aril lacerate.

About 50 species: tropical Asia; six species (one endemic) in China.

- 1a. Inflorescences on separate shoots arising from rhizomes, appearing before pseudostems.
 2a. Labellum wholly lilac, apically 2-cleft to base, lobes without yellow lines at center 1. *K. rotunda*
 2b. Labellum white or purple, apically 2-lobed for 1/3–1/2 its length, lobes with yellow lines at center.
 3a. Labellum white, apically 2-lobed for ca. 1/3 its length; calyx ca. 2.5 cm 2. *K. candida*
 3b. Labellum purple, more deeply colored at center, apically 2-lobed for ca. 1/2 its length; calyx 3–6 cm 3. *K. simaoensis*
 1b. Inflorescences terminal on pseudostems.
 4a. Leaves erect, leaf blade oblong or elliptic 4. *K. elegans*
 4b. Leaves spreading flat on ground, leaf blade suborbicular.
 5a. Leaf blade margin usually white; labellum with purple markings at base 5. *K. galanga*
 5b. Leaf blade margin purple brown; labellum with longitudinal, purple bands at center 6. *K. marginata*

1. *Kaempferia rotunda* Linnaeus, Sp. Pl. 1: 3. 1753.

海南三七 hai nan san qi

Rhizomes with tuberous roots. Leaves 2–4, erect; ligule broadly triangular, 3–4 mm; petiole 1–2 cm, channeled; leaf blade adaxially usually variegated dark and pale green on both sides of midvein, abaxially tinged purple, lanceolate-oblong, 17–27 × 7.5–9.5 cm, base cuneate. Inflorescences on separate shoots arising from rhizomes, appearing before pseudostems, sessile or shortly pedunculate, 4–6-flowered; bracts purple-brown; bracteoles ca. 2.3 cm, apex 2-toothed. Calyx 4.5–7 cm, split on 1 side, apex 3-toothed. Corolla tube equaling calyx; lobes spreading, white, linear, ca. 5 cm. Lateral staminodes erect, white, lanceolate, ca. 5 × 1.7 cm, apex acute. Labellum lilac, suborbicular, apically 2-cleft to base; lobes downcurved, ca. 3.5 × 2 cm, apex acute. Anther connective appendage erect, 2-cleft, fishtail-like. Ovary 4–6 mm, hairy. Fl. Apr. $2n = 33, 54$.

Open grasslands, also cultivated. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [India, Indonesia, Malaysia, Myanmar, Sri Lanka, Thailand].

Medicinal.

2. *Kaempferia candida* Wallich, Pl. Asiat. Rar. 1: 47. 1830.

白花山柰 bai hua shan nai

Rhizomes and roots tuberous. Leaves not seen. Inflorescences on separate shoots arising from rhizomes, appearing before pseudostems, 6–8-flowered; bracts white, elliptic, 5–7 cm, apex tinged with red. Calyx ca. 2.5 cm, apex 3-toothed. Corolla tube ca. 2 × as long as calyx; lobes lanceolate, ca. 2.5 cm, central one cucullate, apex apiculate. Lateral staminodes erect, white, yellow at base, obovate, ca. 3.5 cm. Labellum reflexed, white, with 2 yellow lines at center, orbicular-cuneate, ca. 4 cm, apically 2-lobed for ca. 1/3 its length. Anther connective appendage 2-cleft. Fl. May. $2n = 22$.

Mountains; ca. 1100 m. SW Yunnan (Lancang Lahu Zu Zizhixian) [Cambodia, Myanmar].

3. *Kaempferia simaoensis* Y. Y. Qian, Acta Bot. Austro Sin. 10: 65. 1995.

思茅山柰 si mao shan nai

Plants 10–40 cm tall. Rhizomes and roots tuberous. Leaves 4–7; leaf sheath 1.5–1.7 cm, villous; ligule 2-cleft, membranous, villous; petiole 0.2–6 cm; leaf blade adaxially deep green, abaxially grayish green, rarely purple on both sides of midvein, ovate or elliptic, rarely oblanceolate, 7–27 × 2.5–9.5 cm, glabrous, base cuneate, apex acute. Inflorescences on separate shoots arising from rhizomes, appearing before pseudostems, capitate, 4–9-flowered; peduncle 1–2 cm; bracts white with fine, purple dots adaxially, ovate or ovate-lanceolate, 1–1.6 cm; bracteoles ovate, 9–10 × 3–5 mm, apex becoming 2-lobed after anthesis. Calyx white proximally, pale purple distally, narrowly tubular, 3–6 cm. Corolla tube 4–7 cm; lobes white, lanceolate, 3–4.5 cm. Lateral staminodes white proximally, pale purple distally, obovate, 3–3.5 × 0.9–1.2 cm. Labellum purple, more deeply colored at center, apically 2-lobed for ca. 1/2 its length; lobes with yellowish midvein, ca. 1.5 cm. Filament 3–4 mm; anther yellowish, 7–10 mm; connective appendage white with purple veins, lanceolate, entire or 2-cleft, 8–10 mm. Ovary cylindrical, 4–5 mm. Capsule ellipsoid. Fl. Apr–May, fr. Jul–Aug.

• Forests; ca. 900 m. S Yunnan (Simao Xian).

4. *Kaempferia elegans* (Wallich) Baker in J. D. Hooker, Fl. Brit. India 6: 222. 1890.

紫花山柰 zi hua shan nai

Monolophus elegans Wallich, Pl. Asiat. Rar. 1: 24. 1830.

Rhizomes with fibrous roots bearing globose tubers. Leaves 2–4; petiole to 10 cm; leaf blade adaxially green, abaxially pale green, oblong or elliptic, 13–15 × 5–8 cm, base rounded, apex acute. Inflorescences terminal on pseudostems, several flowered; peduncle short; bracts green, oblong-lanceolate, ca. 5 cm. Flowers pale purple. Calyx ca. 2.5 cm. Corolla tube slender, ca. 5 cm; lobes lanceolate, 1.7–2 cm. Lateral staminodes obovate-cuneate, ca. 1.2 cm. Labellum apically 2-cleft to base; lobes obovate, 2–2.5 cm. Filament very short; anther ca. 3 mm; connective appendage suborbicular, entire, ca. 6 mm in diam. $2n = 22^*$.

Sichuan [India, Malaysia, Myanmar, Philippines, Thailand].

5. Kaempferia galanga Linnaeus, Sp. Pl. 1: 2. 1753.

山柰 shan nai

Rhizomes pale green or greenish white inside, tuberous, fragrant. Leaves usually 2, spreading flat on ground, subsessile; leaf sheath 2–3 cm; leaf blade green, orbicular, 7–20 × 3–17 cm, glabrous on both surfaces or villous abaxially, margin usually white, apex mucronate or acute. Inflorescences terminal on pseudostems, enclosed by imbricate leaf sheaths, sessile, few to many flowered; bracts lanceolate, ca. 2.5 cm. Calyx equaling bracts. Corolla tube 2–2.5 cm; lobes white, linear, ca. 1.2 cm. Lateral staminodes obovate-cuneate, ca. 1.2 cm. Labellum ca. 2.5 × 2 cm, apex slightly 2-lobed or deeply 2-cleft; lobes white with purple markings at base. Anther sessile; connective appendage strongly reflexed, rectangular, 2-lobed. Fl. Aug–Sep.

Open areas. Guangdong, Guangxi, Taiwan, Yunnan [?Cambodia, India; widely cultivated in SE Asia].

- 1a. Leaves 7–13 × 4–9 cm, glabrous on both surfaces or sparsely villous abaxially; labellum deeply 2-cleft at apex 5a. var. *galanga*
- 1b. Leaves 13–20 × 3–17 cm, villous abaxially; labellum slightly 2-lobed at apex 5b. var. *latifolia*

5a. Kaempferia galanga var. *galanga*

山柰(原变种) shan nai (yuan bian zhong)

Leaves 7–13 × 4–9 cm, glabrous on both surfaces or sparsely villous abaxially. Labellum deeply 2-cleft at apex. *2n* = 22.

Open areas. Guangdong, Guangxi, Taiwan, Yunnan [native to India; widely cultivated in SE Asia].

Cultivated for medicine and spice.

5b. Kaempferia galanga var. *latifolia* Donn ex Gagnepain in Lecomte, Fl. Indo-Chine 6: 49. 1908.

大叶山柰 da ye shan nai

Leaves 13–20 × 3–17 cm, villous abaxially. Labellum slightly 2-lobed at apex.

- S Yunnan [?Cambodia].

Medicinal.

6. Kaempferia marginata Carey ex Roscoe, Monandr. Pl. Scitam. t. 93. 1824.

苦山柰 ku shan nai

Rhizomes tuberous, yellow (toxic) or white (non-toxic) inside. Leaves usually 2, spreading flat on ground, sessile; ligule triangular; leaf blade purple-brown, adaxially green, abaxially purple, or green variegated purple, or rarely green, suborbicular, 8–11 × 6–9 cm, base cordate or rounded, margin thickened. Inflorescences terminal on pseudostems, enclosed by 2 leaf sheaths, 15–30-flowered; bracts greenish white, lanceolate, ca. 3.8 cm. Flowers slightly purple. Calyx ca. 2.5 cm, apex 2-cleft. Corolla tube ca. 4 cm; lobes linear, ca. 2.5 cm, central one hooked at apex. Lateral staminodes white, suborbicular. Labellum white with longitudinal, purple bands at center, oblate, 1.2–1.8 × 2–2.8 cm, apically 2-cleft to base; lobes suborbicular. Filament ca. 1 mm; anther ca. 4 mm; connective appendage oblong, 2-cleft.

Scrub, open grasslands. Yunnan [India, Myanmar, Thailand].

17. PYRGOPHYLLUM (Gagnepain) T. L. Wu & Z. Y. Chen, Acta Phytotax. Sin. 27: 126. 1989.

苞叶姜属 bao ye jiang shu

Kaempferia subgen. *Pyrgophyllum* Gagnepain, Bull. Soc. Bot. France 48: lxxvii. 1902.

Rhizomes globose; roots thick. Pseudostems erect. Ligule 2-cleft, membranous; petiole channeled; leaf blade ovate or oblong-lanceolate. Inflorescences terminal on pseudostems; bracts 1–3, large, concave, margin basally adnate to main rachis of inflorescence, apex with leaflike extension. Flowers sessile, yellow, soon withering. Calyx tubular, deeply split on 1 side, apex 2-toothed. Corolla tube longer than calyx; central lobe wider than lateral ones. Lateral staminodes sublinear, equaling corolla lobes. Labellum 2-lobed at apex; lobes ovate. Filament short; anther basifixed; connective appendage conspicuous, deltoid, entire. Ovary obovoid, 3-loculed. Stylodes 2, linear. Capsule subglobose. Seeds ovoid.

- One species: China.

1. Pyrgophyllum yunnanense (Gagnepain) T. L. Wu & Z. Y. Chen, Acta Phytotax. Sin. 27: 127. 1989.

苞叶姜 bao ye jiang

Kaempferia yunnanensis Gagnepain, Bull. Soc. Bot. France 48: lxxvii. 1902; *Camptandra fongyuensis* (Gagnepain) K. Schumann; *C. yunnanensis* (Gagnepain) K. Schumann; *Caulokaempferia yunnanensis* (Gagnepain) R. M. Smith; *Kaempferia fongyuensis* Gagnepain; *Monolophus yunnanensis* (Gagnepain) T. L. Wu & S. J. Chen.

Pseudostems 25–55 cm, base globose, with 1 or 2 blade-

less leaves. Leaves 4 or 5; petiole 0.5–7 cm; leaf blade 8–20 × 4–5 cm, adaxially glabrescent, abaxially pubescent, base subrounded, acute, or attenuate, apex acuminate. Bracts 7–13 cm, 1- or 2-flowered. Corolla tube ca. 2 × as long as calyx; central lobe ca. 2 × as wide as narrowly lanceolate lateral lobes. Capsule ca. 1 cm in diam. Fl. Sep–Nov. *2n* = 42*.

- Dense forests in mountains; 1500–2800 m. Sichuan, Yunnan.

18. HEDYCHIUM J. König in Retzius, Observ. Bot. 3: 61 [“73”]. 1783.

姜花属 jiang hua shu

Herbs terrestrial or epiphytic, with tuberous rhizomes. Pseudostems erect, leafy. Ligule conspicuous; leaf blade usually oblong or lanceolate. Inflorescence a terminal spike, densely numerous flowered; bracts imbricate or lax, 1- or more flowered; bracteoles tubular. Calyx tubular, usually split on 1 side, apex truncate or 3-toothed. Corolla tube long, slender; lobes reflexed at anthesis, linear. Lateral staminodes petaloid, larger than corolla lobes. Labellum suborbicular, large, apex usually 2-cleft; claw long or short. Filament usually long, rarely absent; anther dorsifixed, base divaricate; connective appendage absent. Ovary 3-loculed; placentation axile. Capsule globose, 3-valved. Seeds numerous; aril lacerate.

About 50 species: Africa (Madagascar), tropical to warm-temperate Asia; 28 species (18 endemic) in China.

Hedychium gardnerianum Roscoe, which is cultivated in China as an ornamental, is not described in this account.

- 1a. Bracts densely imbricate, broad, covering rachis, not or only apical one surrounding flowers; inflorescences conical.
 - 2a. Flowers 1 per bract; filament 1–2 mm 1. *H. efilamentosum*
 - 2b. Flowers 2–6 per bract; filament more than 2 mm.
 - 3a. Flowers white.
 - 4a. Flowers 2 or 3 per bract; corolla tube ca. 8 cm, lobes ca. 5 cm; labellum 4–6 × 4–6 cm 2. *H. coronarium*
 - 4b. Flowers 3–5 per bract; corolla tube 3.5–4 cm, lobes 1.7–2 cm; labellum 2.5–3 × 2–2.2 cm 3. *H. ximengense*
 - 3b. Flowers yellow.
 - 5a. Labellum 2-lobed at apex, lobes ca. 3.8 × 2.8 cm 4. *H. bipartitum*
 - 5b. Labellum 2-cleft at apex.
 - 6a. Leaves glabrous on both surfaces; labellum wholly yellow, wider than long 5. *H. flavum*
 - 6b. Leaves pubescent abaxially; labellum creamy yellow with an orange patch at base, longer than wide 6. *H. flavescens*
- 1b. Bracts laxly or densely arranged, not imbricate, usually surrounding flowers; inflorescences not conical.
 - 7a. Flowers 1 per bract.
 - 8a. Flowers densely arranged, corolla tube to 2.5 cm.
 - 9a. Bracts ca. 0.5 cm; labellum entire and mucronate at apex 7. *H. parvibracteatum*
 - 9b. Bracts 0.7–2 cm; labellum nearly 2-lobed or 2-cleft at apex.
 - 10a. Corolla tube 2.5–3 cm; labellum ca. 1.6 cm 8. *H. densiflorum*
 - 10b. Corolla tube 1.2–1.5 cm; labellum 0.7–1 cm.
 - 11a. Bracts 1.3–1.5 cm; labellum ca. 1 cm 9. *H. sinoaureum*
 - 11b. Bracts 0.7–1 cm; labellum ca. 0.7 cm 10. *H. nutantiflorum*
 - 8b. Flowers laxly or densely arranged; corolla tube 3.5–8 cm.
 - 12a. Corolla tube to 8 cm; filament shorter than labellum; ligule hairy 11. *H. spicatum*
 - 12b. Corolla tube 3.5–5 cm; filament much longer than labellum; ligule glabrous.
 - 13a. Labellum apically entire but projecting 12. *H. convexum*
 - 13b. Labellum apically 2-cleft for 1/2 to all its length.
 - 14a. Labellum 3–3.5 cm.
 - 15a. Petiole 3–7 cm; ligule 3–6 cm; labellum apically 2-cleft for ca. 2/3 its length, lobes narrowly lanceolate 13. *H. glabrum*
 - 15b. Petiole ca. 1.5 cm; ligule ca. 1.5 cm; labellum apically 2-cleft for ca. 1/2 its length, lobes linear 14. *H. tengchongense*
 - 14b. Labellum 1.3–2 cm.
 - 16a. Ligule entire, 1.5–2.5 cm; labellum obovate, ca. 2 cm, apically 2-cleft for ca. 1/2 its length; anther 1–1.2 cm 15. *H. yunnanense*
 - 16b. Ligule 2-cleft, ca. 0.4 cm; labellum narrowly oblong, ca. 1.3 cm, apically 2-cleft to base; anther ca. 0.5 cm 16. *H. pauciflorum*
 - 7b. Flowers more than 2 per bract.
 - 17a. Anther 2–3 mm; bracts and calyx densely brown sericeous 17. *H. villosum*
 - 17b. Anther more than 5 mm; bracts and calyx glabrous or hairy, but not brown sericeous.
 - 18a. Leaves glabrous on both surfaces.
 - 19a. Flowers yellow or red; filament ca. 5 cm.
 - 20a. Flowers yellow; labellum entire, emarginate, or shortly 3-toothed at apex 18. *H. bijiangense*
 - 20b. Flowers red; labellum deeply 2-cleft at apex 19. *H. coccineum*
 - 19b. Flowers white; filament 2.2–4 cm.
 - 21a. Bracts 4.5–6 cm; filament 3.5–4 cm, anther ca. 12 mm 20. *H. forrestii*
 - 21b. Bracts 2.5–4.6 cm; filament 2.2–2.8 cm, anther 5–9 mm.
 - 22a. Plants 1–1.2 m tall; corolla tube villous; labellum apically 2-cleft to base; filament longer than labellum, anther ca. 5 mm 21. *H. kwangsiense*
 - 22b. Plants to 0.5 m tall; corolla tube glabrous; labellum apically slightly 2-lobed or 2-cleft for ca.

- 1/2 its length; filament equaling labellum, anther ca. 9 mm 22. *H. brevicaulis*
- 18b. Leaves hairy abaxially, sometimes only along midvein.
- 23a. Leaves hairy only along midvein abaxially; labellum wholly white; filament ca. 1.3 cm 23. *H. yungjiangense*
- 23b. Leaves uniformly hairy abaxially; labellum white with different color at base or center; filament 2.4–6.8 cm.
- 24a. Labellum suborbicular, 1.8–2.2 × 1.8–2 cm.
- 25a. Corolla tube yellowish; labellum flesh-colored at base; filament flesh-colored, 5.2–5.7 cm, anther yellow 24. *H. neocarneum*
- 25b. Corolla tube white; labellum yellowish at base; filament white, 5.6–6.8 cm, anther white 25. *H. puerense*
- 24b. Labellum orbicular, ovate, or obovate, 2.5–3.5 × 2–2.5 cm.
- 26a. Labellum pale purple at base; filament purple, 5–5.5 cm 26. *H. simaoense*
- 26b. Labellum with yellow midvein or orange spots at center; filament yellow-red, 2.4–3.5 cm.
- 27a. Labellum with yellow midvein, broadly ovate, ca. 2.5 × 2 cm; filament ca. 2.4 cm 27. *H. tienlinense*
- 27b. Labellum with orange spots at center, obovate, 3–3.5 × 2–2.5 cm; filament 3–3.5 cm 28. *H. qingchengense*

1. *Hedychium efilamentosum* Handel-Mazzetti, Symb. Sin. 7: 1319. 1936.

无丝姜花 wu si jiang hua

Pseudostems ca. 1 m, base somewhat thickened. Leaves sessile; leaf sheath minutely pilose or glabrescent; ligule 5–10 mm, membranous, pubescent, apex truncate; leaf blade oblong or linear-elliptic, 10–60 × 3–10 cm, adaxially glabrous, abaxially densely pilose especially along midvein, base subrounded or cuneate, margin narrowly cartilaginous, often ciliate, apex subcaudate-acuminate. Spikes cylindric, 16–20 × 3–4 cm; bracts imbricate, dense, broadly ovate, 4–6 cm, 1-flowered, margin membranous; bracteoles 2, membranous, pilose. Calyx cylindric, ca. 3.5 cm, minutely pilose, apex 2-lobed. Corolla yellow, glandular punctate; tube narrowly cylindric, ca. 7 cm; lobes 1.5–2 cm. Lateral staminodes wider than corolla lobes. Labellum obovate, equaling lateral staminodes, apically 2-cleft for just over 1/2 its length, base truncate. Filament 1–2 mm; anther 7–10 mm. Stigma ciliate. Fl. Jul–Aug.

- Forests; ca. 1800 m. Xizang, NW Yunnan.

2. *Hedychium coronarium* J. König in Retzius, Observ. Bot. 3: 73. 1783.

姜花 jiang hua

Hedychium coronarium var. *baimao* Z. Y. Zhu.

Pseudostems 1–3 m. Leaves sessile; ligule 2–3 cm, membranous; leaf blade oblong-lanceolate or lanceolate, 20–40 × 4.5–8 cm, adaxially glabrous, abaxially finely pubescent or thinly hairy, base acute, apex long acuminate. Spikes ellipsoid, 10–20 × 4–8 cm; bracts imbricate, ovate, 4.5–5 × 2.5–4 cm, 2- or 3-flowered. Flowers white, fragrant. Calyx ca. 4 cm, split on 1 side. Corolla tube ca. 8 cm, slender; lobes lanceolate, ca. 5 cm, central one spatulate, apex mucronate. Lateral staminodes oblong-lanceolate, ca. 5 cm. Labellum white, pale yellow at base, obcordate, 4–6 × 4–6 cm, apex 2-cleft. Filament ca. 3 cm; anther ca. 1.5 cm. Ovary sericeous. Fl. Aug–Dec. 2n = 34.

Forests, also cultivated. Guangdong, Guangxi, Hunan, Sichuan, Taiwan, Yunnan [Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam; Australia].

Cultivated as an ornamental and for medicine and aromatic oil.

3. *Hedychium ximengense* Y. Y. Qian, Acta Bot. Austro Sin.

西盟姜花 xi meng jiang hua

Pseudostems 0.6–1.5 m. Leaves sessile; ligule (1–)2–3 cm, membranous; leaf blade elliptic-lanceolate or lanceolate, elliptic on proximal leaves, 6–45 × 3–13 cm, adaxially glabrous, abaxially villous, base cuneate, rounded on proximal leaves, apex long acuminate or caudate. Spikes ellipsoid or oblong, 12–30 × 8–12 cm; bracts imbricate, elliptic, 4–4.5 × 2.6–3.3 cm, pubescent, 3-flowered. Flowers white. Calyx 3–5 cm, pubescent, split to middle on 1 side. Corolla tube 3.5–4 cm, slender; lobes oblanceolate, 1.7–2 cm. Lateral staminodes narrowly oblong, 1.6–1.8 cm. Labellum obovate, 2.5–3 × 2–2.2 cm, apex 2-lobed. Filament 1.2–1.5 cm; anther ca. 1 cm. Ovary sericeous. Capsule ovoid, 1.7–2.5 × 1.3–1.8 cm, obtusely 3-angled, villous. Seeds red; aril red. Fl. Jul.

- Forests; ca. 2000 m. S Yunnan (Ximeng Va Zu Zizhixian).

4. *Hedychium bipartitum* G. Z. Li, Guihaia 5: 86. 1985.

深裂黄姜花 shen lie huang jiang hua

Pseudostems 1–2 m × 1–3 cm. Leaves sessile; ligule 2–4.5 cm, scarious, densely sericeous, apex rounded; leaf blade adaxially green, abaxially glaucous, oblong-lanceolate, 40–65 × 7.5–13 cm, abaxially sericeous, base broadly cuneate or acute, apex long acuminate. Spikes conical, 15–20 × 4–5 cm; bracts imbricate, ovate or oblong-ovate, 5–6 × 4–5 cm, 4–6-flowered; bracteoles ovate-triangular, 2–4 × 0.5–2 cm, margin involute. Flowers yellow, fragrant. Calyx 4.5–5.5 cm, sericeous, split on 1 side. Corolla tube 6–7 cm. Lateral staminodes oblanceolate, ca. 4 cm × 8 mm; claw red. Labellum broadly obcordate, apex 2-cleft; lobes suborbicular, ca. 3.8 × 2.8 cm. Filament ca. 4 cm; anther ca. 1.6 cm. Ovary densely sericeous distally. Stigma red, ciliate. Fl. Aug.

- Cultivated; ca. 1200 m. NE Guangxi (Guilin Shi).

5. *Hedychium flavum* Roxburgh, Fl. Ind. 1: 81. 1820.

黄姜花 huang jiang hua

Pseudostems 1.5–2 m. Leaves sessile; ligule lanceolate, 2–5 cm, membranous; leaf blade oblong-lanceolate, 25–45 × 5–8.5 cm, glabrous, base acute, apex acuminate. Spikes oblong, ca. 10 × 5 cm; bracts imbricate, oblong-ovate, 4–6 × 1.5–3 cm, 3- or 4-flowered; bracteoles ca. 2 cm, tubular. Flowers yellow.

Calyx ca. 4 cm, hirsute, split on 1 side. Corolla tube longer than calyx; lobes linear, ca. 3 cm. Lateral staminodes oblanceolate, ca. 3 cm × 8 mm. Labellum yellow, obcordate, wider than long, ca. 4 cm, apex emarginate; claw short. Filament ca. 3 cm; anther 1.2–1.5 cm. Ovary hirsute. Stigma funnellform. Fl. Aug–Sep.

Forests; 900–1200 m. Guangxi, Guizhou, Sichuan, Xizang, Yunnan [India, Myanmar, Thailand].

Cultivated as an ornamental and for aromatic oil.

6. *Hedychium flavescens* Carey ex Roscoe, Monandr. Pl. Scitam. t. 50. 1824.

峨眉姜花 e mei jiang hua

Hedychium emeiense Z. Y. Zhu; *H. panzhuum* Z. Y. Zhu.

Pseudostems 1–2 m. Leaves sessile; leaf sheath slightly pubescent; ligule 3–5 cm, membranous; leaf blade elliptic-lanceolate or lanceolate, 20–50 × 4–10 cm, abaxially pubescent, base attenuate, margin membranous, apex caudate-acuminate. Spikes oblong, 15–20 × 3–6 cm; bracts imbricate, oblong to ovate, 3–4.5 × 2–4 cm, concave, 4- or 5-flowered; bracteoles tubular, membranous. Flowers yellow or yellow-white, fragrant. Calyx 3.5–4 cm, split on 1 side, apical margin entire. Corolla tube 7–8.5 cm, slender; lobes linear, 3–3.5 cm. Lateral staminodes wider than corolla lobes. Labellum erect, creamy yellow with an orange patch at base, obcordate, longer than wide, apex 2-lobed. Filament subequalling labellum. Ovary hairy. Stigma funnellform, margin bearded. Fl. Jul–Sep. $2n = 34$.

Forests; 500–800 m. Sichuan [India, Nepal].

Medicinal.

7. *Hedychium parvibracteatum* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 27. 1978.

小苞姜花 xiao bao jiang hua

Pseudostems to 50 cm. Ligule ca. 4 mm, membranous, apex obtuse; petiole ca. 5 mm; leaf blade oblong, 15–17 × ca. 4 cm, glabrous, base attenuate, apex acuminate. Spikes ca. 10 × 2 cm, dense; rachis glabrous; bracts ovate-oblong, 5–6 mm. Flowers golden yellow. Calyx ca. 6 mm, obliquely split on 1 side. Corolla tube ca. 8 mm; lobes linear, ca. 7 × 1 mm. Lateral staminodes wider than corolla lobes. Labellum obovate, ca. 5 × 3 mm, apex entire but mucronate. Stamen orange; filament ca. 7 mm; anther ca. 3 mm. Ovary glabrous, subcubic, ca. 1 mm in diam. Stigma ciliate. Fl. Jul.

• Forests; ca. 2000 m. E Xizang (Bomi Xian).

8. *Hedychium densiflorum* Wallich, Hooker's J. Bot. Kew Gard. Misc. 5: 368. 1853.

密花姜花 mi hua jiang hua

Pseudostems 1–1.2 m. Ligule ca. 1 cm, apex obtuse; petiole absent to 1 cm; leaf blade oblong-lanceolate, 12–35 × 3–10 cm, glabrous, base attenuate, apex caudate. Spikes 10–18 × ca. 3 cm, dense; bracts oblong, ca. 2 cm, 1(or 2)-flowered. Flowers bright yellow, small. Calyx ca. 2.5 cm. Corolla tube 2.5–3 cm; lobes reflexed, linear, ca. 1.5 cm. Lateral staminodes lanceolate, ca. 2 cm. Labellum cuneate, ca. 1.6 cm × 6 mm, apex deeply 2-

cleft. Stamen longer than labellum; anther ca. 8 mm. Fl. Jul.

Forests; 2100–2300 m. E Xizang (Bomi Xian) [Bhutan, India, Nepal, Sikkim].

9. *Hedychium sinoaureum* Stapf, Bull. Misc. Inform. Kew 1925: 432. 1925.

小花姜花 xiao hua jiang hua

Pseudostems 60–90 cm. Ligule 5–10 mm, membranous; petiole absent to 1.5 cm; leaf blade lanceolate, 15–35 × 3–6 cm, glabrous, base attenuate, apex narrowly caudate. Spikes 10–20 × 3–3.5 cm, dense; bracts oblong, rolled tightly around calyx, 1.3–1.5 cm, distal ones 1-flowered. Flowers bright yellow. Calyx longer than bracts, apex obtuse, 3-toothed. Corolla tube 1.3–1.5 cm; lobes linear, 8–11 mm. Lateral staminodes obliquely lanceolate, ca. 8 mm. Labellum suborbicular, ca. 1 cm, apex 2-cleft. Filament ca. 1 cm; anther 5–6 mm. Fl. Jul–Aug.

Rocky hills; 1900–2800 m. Xizang, Yunnan [Sikkim].

10. *Hedychium nutantiflorum* H. Dong & G. J. Xu in H. Dong et al., Acta Phytotax. Sin. 35: 566. 1997.

垂序姜花 chui xu jiang hua

Pseudostems 50–100 cm, base subglobose. Ligule purple, 2–4 mm, glabrous, apex obtuse; petiole ca. 5 mm; leaf blade elliptic-lanceolate or narrowly lanceolate, 15–27 × 3–4 cm, glabrous on both surfaces, base cuneate or shortly so, apex acuminate. Spikes nodding, 4.6–5 cm, glabrous; bracts 7–10 mm, membranous, 1-flowered. Flowers yellow. Calyx ca. 1 cm. Corolla tube ca. 1.2 cm, throat villous; lobes linear, 8–10 × ca. 2 mm. Lateral staminodes petaloid, oblong-lanceolate, ca. 7 × 2 mm. Labellum oblong-ovate, ca. 7 × 2 mm, apically 2-cleft nearly to base. Filament ca. 1 cm × 2 mm; anther ca. 5 mm. Ovary globose, ca. 2 mm in diam., villous. Fl. Aug.

• Forests; 1600–1800 m. S Yunnan (Yuanyang Xian).

11. *Hedychium spicatum* Smith in Rees, Cycl. 17: *Hedychium* no. 3. 1811.

草果药 cao guo yao

Pseudostems ca. 1 m. Leaves sessile or shortly petiolate; ligule entire, 1.5–2.5 cm, membranous; leaf blade oblong or oblong-lanceolate, 10–40 × 3–10 cm, glabrous or abaxially sparsely villous along midvein, base acute, apex acuminate. Spikes to 20 cm, laxly few or densely many flowered; bracts oblong, 2.5–3 cm, 1-flowered. Flowers fragrant. Calyx 2.5–3.5 cm, apex 3-toothed, split on 1 side. Corolla pale yellowish; tube to 8 cm, apex sometimes purplish red; lobes linear, ca. 2.5 cm, base sometimes purplish red. Lateral staminodes white or becoming yellow, sometimes purplish red, obovate, apex 2-lobed; lobes clawed, apex acute. Labellum yellowish, sometimes purplish red. Filament pale reddish, shorter than labellum. Capsule subglobose, 1.5–2.5 cm in diam., 3-valved; valves ca. 6-seeded. Fl. Jun–Oct. fr. Oct–Nov.

Forests; 1200–3200 m. Guizhou, Sichuan, Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim, N Thailand].

Medicinal.

1a. Spikes densely many flowered; flowers

yellowish 11a. var. *spicatum*
1b. Spikes laxly few flowered; flowers yellowish
but apex of corolla tube, base of corolla
lobes, lateral staminodes, and labellum
purplish red 11b. var. *acuminatum*

11a. *Hedychium spicatum* var. *spicatum*

草果药(原变种) cao guo yao (yuan bian zhong)

Spikes densely many flowered. Flowers yellowish. Fl. Jun–Jul. $2n = 34$.

Forests; 1200–2900 m. Guizhou, Sichuan, Xizang, Yunnan [Myanmar, Nepal, N Thailand].

11b. *Hedychium spicatum* var. *acuminatum* (Roscoe) Wall-ich, Hooker's J. Bot. Kew Gard. Misc. 5: 328. 1853.

疏花草果药 shu hua cao guo yao

Hedychium acuminatum Roscoe, Monandr. Pl. Scitam. t. 47. 1824.

Spikes laxly few flowered. Flowers yellowish but apex of corolla tube, base of corolla lobes, lateral staminodes, and labellum purplish red. Fl. Aug–Oct.

Forests; 2000–3200 m. Xizang, Yunnan [Bhutan, NE India, Nepal, Sikkim].

12. *Hedychium convexum* S. Q. Tong, Acta Bot. Yunnan. 8: 41. 1986.

唇凸姜花 chun tu jiang hua

Pseudostems 50–80 cm. Ligule ca. 5 mm, somewhat leathery, glabrous, apex subtruncate; petiole 5–10 mm; leaf blade narrowly oblong, 16–30 × 3.5–8 cm, glabrous, base cuneate, apex caudate. Spikes capitate, 7–8 × 5–6 cm; bracts narrowly lanceolate, 1.7–2 cm, glabrous, 1-flowered; bracteoles tubular, ca. 1 cm. Calyx ca. 2.5 cm, split on 1 side. Corolla tube ca. 5 cm; lobes yellowish, linear, 4–5 cm. Lateral staminodes white, very narrowly oblanceolate, ca. 3 cm × 3 mm. Labellum narrowly obovate, ca. 3 cm × 7 mm, apex entire but projecting; claw ca. 1.2 cm. Filament yellowish except for orange apex, ca. 5 cm; anther brown-red, ca. 1.2 cm. Ovary green, glabrous. Fl. Aug.

• Forests; ca. 1000 m. SW Yunnan (Jinghong Xian).

13. *Hedychium glabrum* S. Q. Tong, Acta Phytotax. Sin. 27: 288. 1989.

无毛姜花 wu mao jiang hua

Pseudostems 1–1.2 m. Leaf sheath green except for red, apical margin; ligule reddish, entire, 3–6 cm, membranous, glabrous; petiole 3–7 cm on distal leaves; leaf blade lanceolate or narrowly oblong, 60–70 × 12–15 cm, glabrous, base cuneate, apex acuminate or shortly so. Spikes 20–30 × 8–12 cm, densely flowered; bracts green, ca. 2 cm, 1-flowered; bracteoles red spotted, ca. 1 cm, membranous, glabrous, apex entire. Flowers white becoming yellow. Calyx ca. 2 cm, apex truncate, red spotted. Corolla tube ca. 4 cm; lobes linear, ca. 3.5 cm. Lateral staminodes narrowly lanceolate, ca. 3 cm × 4 mm. Labellum ca. 3 cm, apically 2-cleft for ca. 2/3 its length; lobes narrowly lanceolate.

Filament red, ca. 4.4 cm; anther ca. 7 mm. Fl. Jun.

• Forests; ca. 2100 m. S Yunnan (Ximeng Va Zu Zizhixian).

14. *Hedychium tengchongense* Y. B. Luo, Acta Phytotax. Sin. 32: 574. 1994.

腾冲姜花 teng chong jiang hua

Pseudostems 70–80 cm. Ligule elliptic, ca. 1.5 cm, membranous, glabrous, apex truncate; petiole ca. 1.5 cm; leaf blade oblong or narrowly so, ca. 40 × 10 cm, base attenuate, apex acuminate. Spikes ca. 25 cm, densely flowered; bracts narrowly oblong, 1.5–1.7 cm, 1-flowered, margin convolute, apex rounded; bracteoles ovate, ca. 1 cm, apex rounded. Flowers yellow. Calyx ca. 2 cm, apex obscurely obtusely 3-toothed. Corolla tube slender, ca. 3.5 cm; lobes linear. Lateral staminodes linear, ca. 3.5 cm, apex mucronate. Labellum ca. 3.5 cm, apically 2-cleft for ca. 1/2 its length; lobes linear. Filament orange, ca. 4.5 cm; anther orange, ca. 8 mm. Ovary ca. 2 cm, glabrous. Stigma capitate. Stylodes filiform. Fl. Jul.

• Forests; 1600–1700 m. W Yunnan (Tengchong Xian).

15. *Hedychium yunnanense* Gagnepain, Bull. Soc. Bot. France 54: 164. 1907.

滇姜花 dian jiang hua

Pseudostems stout. Ligule oblong, entire, 1.5–2.5 cm, membranous; leaf blade ovate-oblong to oblong, 20–40 × ca. 10 cm, glabrous, base attenuate into short petiole, apex caudate. Spikes to 20 cm; bracts lanceolate, 1.5–2.5 cm, glabrous, 1-flowered, margin involute. Calyx 1.7–2.8 cm, apex obtusely 3-toothed, ciliate. Corolla tube 3.5–5 cm, slender; lobes linear, 2.5–3 cm. Lateral staminodes oblong-linear, shorter and wider than corolla lobes, base narrowed. Labellum obovate, ca. 2 cm, apically 2-cleft for ca. 1/2 its length. Filament 3.5–4 cm; anther 1–1.2 cm. Ovary pilose. Stigma ciliate. Capsule 1.2–1.4 cm in diam., 3-angled, glabrous. Seeds many; aril red, lacerate. Fl. Sep.

Forests. Guangxi, Yunnan [Vietnam].

16. *Hedychium pauciflorum* S. Q. Tong, Acta Bot. Yunnan. 8: 43. 1986.

少花姜花 shao hua jiang hua

Pseudostems ca. 70 cm. Ligule 2-cleft, ca. 4 mm, membranous, glabrous; petiole 5–10 mm; leaf blade narrowly elliptic, 18–32 × 5.3–6.5 cm, glabrous, base cuneate, apex acuminate. Spikes 9–13 × 5–6 cm, laxly few flowered; bracts green, oblong, 2–2.3 cm × 5–6 mm, glabrous, 1-flowered, apex entire; bracteoles tubular, ca. 1 cm, split to middle on 1 side. Flowers white, glabrous. Calyx ca. 2.3 cm, membranous, apex truncate. Corolla tube ca. 4.8 cm; lobes linear, ca. 1.8 cm. Lateral staminodes narrowly lanceolate, ca. 1.1 cm × 2 mm. Labellum narrowly oblong, ca. 1.2 cm × 8 mm, apically 2-cleft to base; lobes narrowly oblong, ca. 3 mm wide. Filament ca. 1.5 cm; anther brownish red, ca. 5 mm. Ovary brownish pubescent. Style white, linear; stigma orange, ciliate. Fl. Jul.

• Forests; ca. 1200 m. W Yunnan (Longchuan Xian).

17. *Hedychium villosum* Wallich in Roxburgh, Fl. Ind. 1: 12. 1820.

毛姜花 mao jiang hua

Pseudostems 1–2 m. Ligule lanceolate, 3.5–5 cm, membranous; petiole 1–2 cm; leaf blade oblong-lanceolate or oblong, 15–35 × 3.5–6(–9) cm, glabrous or abaxially pubescent along midvein. Spikes 15–25 cm, densely many flowered; rachis ± pubescent; bracts oblong, 1.5–2.5 cm, brown sericeous, 2- or 3-flowered. Calyx 2.5–3 cm, golden sericeous. Corolla white; tube ca. 3.5 cm; lobes reflexed, linear, 1.4–2.5 cm. Lateral staminodes slightly wider than corolla lobes. Labellum oblong-obovate, 1.4–2.5 cm, base attenuate into a claw, apex deeply 2-cleft. Filament purplish red, ca. 4.5 cm; anther sagittate, 2–3 mm. Capsule ovoid, ca. 1 cm, 3-valved, brown sericeous. Fl. and fr. Mar–Apr, (Dec).

Forests; 100–3400 m. Guangdong, Guangxi, Hainan, Yunnan [India, Myanmar, Nepal, Thailand, Vietnam].

- 1a. Bracts 1.8–2.5 cm; corolla lobes, lateral staminodes, and labellum ca. 2.5 cm 17a. var. *villosum*
1b. Bracts ca. 1.5 cm; corolla lobes, lateral staminodes, and labellum to 1.5 cm
..... 17b. var. *tenuiflorum*

17a. *Hedychium villosum* var. *villosum*

毛姜花(原变种) mao jiang hua (yuan bian zhong)

Bracts 1.8–2.5 cm. Corolla lobes, lateral staminodes, and labellum ca. 2.5 cm. Fl. Mar–Apr. $2n = 34$.

Forests; 100–3400 m. Guangdong, Guangxi, Hainan, Yunnan [India, Myanmar, Thailand, Vietnam].

17b. *Hedychium villosum* var. *tenuiflorum* Wallich ex Baker in J. D. Hooker, Fl. Brit. India 6: 229. 1892.

小毛姜花 xiao mao jiang hua

Hedychium tenuiflorum (Wallich ex Baker) K. Schumann.

Bracts ca. 1.5 cm. Corolla lobes, lateral staminodes, and labellum to 1.5 cm. Fl. Dec.

Forests; 800–900 m. S Yunnan (Xishuangbanna Dai Zu Zizhizhou) [India].

18. *Hedychium bijiangense* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 26. 1978.

碧江姜花 bi jiang jiang hua

Pseudostems 1.2–1.7 m. Leaves sessile; ligule elliptic, 2–3 cm, membranous, glabrous; leaf blade oblong-lanceolate, 25–35 × 6–8 cm, glabrous, base attenuate, apex acute. Spikes ca. 30 cm; bracts 50–60, lanceolate, 3–3.5 cm × ca. 5 mm, (1 or) 2-flowered, margin involute; bracteoles linear, ca. 2.5 cm. Flowers yellow. Calyx 2.5–3 cm. Corolla tube ca. 4.5 cm; lobes linear, ca. 3.5 cm × 2–3 mm. Lateral staminodes lanceolate, ca. 3 cm × 5–7 mm. Labellum obovate-cuneate, ca. 3 × 1.5–2 cm, base attenuate into a 6–8 mm long claw, apex rounded, emarginate, or minutely 3-toothed. Filament ca. 5 cm; anther ca. 1 cm. Ovary oblong, ca. 2 mm. Stigma ciliate. Fl. Sep.

- Forests; 2600–3200 m. NW Yunnan (Bijiang Xian).

Cultivated as an ornamental.

19. *Hedychium coccineum* Smith in Rees, Cycl. 17: *Hedychium* no. 5. 1811.

红姜花 hong jiang hua

Pseudostems 1.5–2 m. Leaves sessile; ligule 1.2–2.5 cm; leaf blade narrowly linear, 25–50 × 3–5 cm, glabrous, base subrounded or attenuate, apex caudate-acuminate. Spikes cylindrical, usually dense, glabrous or sparsely villous; bracts oblong, 3–3.5 cm, leathery, sparsely pubescent, rarely glabrous, 3-flowered, margin involute or rather flat, apex obtuse or acute. Flowers red. Calyx ca. 2.5 cm, sparsely pubescent especially at 3-toothed apex. Corolla tube slightly longer than calyx; lobes reflexed, linear, ca. 3 cm. Lateral staminodes lanceolate, ca. 2.3 cm. Labellum orbicular, ca. 2 cm wide or rather small, apex deeply 2-cleft. Filament ca. 5 cm; anther 7–8 mm. Ovary sericeous, 2.5–3 mm. Capsule globose, ca. 2 cm in diam. Seeds red. Fl. Jun–Aug, fr. Oct. $2n = 68$.

Forests. Guangxi, SE Xizang (Médog Xian), S Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand].

Cultivated as an ornamental.

20. *Hedychium forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 304. 1912.

圆瓣姜花 yuan ban jiang hua

Pseudostems 1–1.5 cm. Leaves sessile or shortly petiolate; ligule 2.5–3.5 cm; leaf blade oblong to lanceolate, 35–50 × 5–10 cm, glabrous, base narrow, apex caudate. Spikes cylindrical, 20–30 cm; rachis pubescent; bracts broadly or narrowly ovate, 4.5–6 × 1.5–3 cm, pilose, 2- or 3-flowered, margin incurved. Flowers white or yellow, fragrant. Calyx shorter than bracts. Corolla tube 4–4.5 cm; lobes linear, 3.5–4 cm. Lateral staminodes oblong, ca. 3.5 × 1.5 cm. Labellum orbicular, ca. 3 cm wide, apex 2-cleft. Filament 3.5–4 cm; anther ca. 1.2 cm. Capsule ovoid-oblong, ca. 2 cm. Fl. Aug–Oct, fr. Oct–Dec.

Forests; 200–900 m. Guangxi, Guizhou, Sichuan, Yunnan [Laos, Myanmar, Thailand, N Vietnam].

- 1a. Bracts narrowly ovate, ca. 1.5 cm wide; flowers white 20a. var. *forrestii*
1b. Bracts broadly ovate, ca. 3 cm wide; flowers yellow 20b. var. *latebracteatum*

20a. *Hedychium forrestii* var. *forrestii*

圆瓣姜花(原变种) yuan ban jiang hua (yuan bian zhong)

Bracts narrowly ovate, ca. 1.5 cm wide. Flowers white. Fl. Aug–Oct, fr. Oct–Dec.

Forests; 200–900 m. Guangxi, Guizhou, Sichuan, Yunnan [Laos, Myanmar, Thailand].

20b. *Hedychium forrestii* var. *latebracteatum* K. Larsen, Bot. Tidsskr. 61: 74. 1965.

宽苞圆瓣姜花 kuan bao yuan ban jiang hua

Bracts broadly ovate, ca. 3 cm wide. Flowers yellow. Fl. Aug.

Forests. Sichuan, Yunnan [N Vietnam].

21. *Hedychium kwangsiense* T. L. Wu & S. J. Chen, Acta Phytotax. Sin. 16(3): 26. 1978.

广西姜花 *guang xi jiang hua*

Pseudostems 1–1.2 m. Ligule oblong, 2.5–4.5 × 0.7–1.4 cm, villous to glabrescent; petiole 1–4.5 cm; leaf blade lanceolate, 20–40 × 5.5–8 cm, glabrous, base attenuate, apex caudate-acuminate. Spikes 10–20 × ca. 8 cm, densely numerous flowered; rachis brown hirsute; bracts oblong, 2.5–3 × ca. 1 cm, pubescent, 3-flowered; bracteoles tubular, 2–2.5 cm, hirsute, apex minutely mucronate. Flowers white. Calyx ca. 2.5 cm, hirsute, apex obliquely truncate. Corolla tube 3.3–3.5 cm, villous; lobes linear, ca. 2 cm. Lateral staminodes oblong, ca. 1.8 cm × 4–5 mm. Labellum apically 2-cleft to base; lobes oblong, 1.5–1.8 cm × 4–7 mm. Filament 2.5–2.8 cm, longer than labellum; anther ca. 5 mm. Ovary oblong, ca. 5 mm, brown sericeous. Stigma capitate. Fl. Mar–Jun.

• Forests; ca. 400 m. Guangxi.

22. *Hedychium brevicaule* D. Fang, Acta Phytotax. Sin. 18: 225. 1980.

矮姜花 *ai jiang hua*

Rhizomes creeping. Pseudostems 20–40 cm. Leaves sessile except for 2 apical ones; ligule brownish, 1–5 cm, sparsely appressed villous; leaf blade obovate or oblong, 15–27 × 8–10 cm, adaxially glabrous, abaxially appressed yellow villous along midvein, base cuneate, apex acute. Spikes 8–14 × 4–6 cm; rachis appressed yellow villous; bracts rusty, ovate-lanceolate, 3–4.6 × 1.2–2 cm, membranous, appressed yellow villous, 3-flowered; bracteoles tubular, 2.7–3 cm, appressed yellow villous. Flowers white, slightly fragrant. Calyx brownish, 3.3–3.5 cm, slightly split on 1 side, appressed yellow villous. Corolla tube ca. 4 cm, glabrous; lobes linear, 2.5–3 cm × 3–4 mm. Lateral staminodes oblanceolate, ca. 2.3 cm × 7 mm. Labellum broadly ovate, ca. 2.2 × 1.9 cm, apically slightly 2-lobed or 2-cleft for ca. 1/2 its length. Filament white, equaling labellum; anther ca. 9 mm. Ovary ca. 5 mm, appressed yellow villous. Stigma ciliate. Fl. Feb.

• Forests; 500–700 m. W Guangxi (Napo Xian).

23. *Hedychium yungjiangense* S. Q. Tong, Acta Bot. Yunnan. 8: 40. 1986.

盈江姜花 *ying jiang jiang hua*

Pseudostems 60–80 cm. Leaves sessile; ligule entire, 1.8–2.2 cm, densely brownish pubescent; leaf blade narrowly lanceolate, 20–30 × 3.5–6 cm, adaxially glabrous, abaxially brownish pubescent along midvein, base cuneate, apex caudate. Spikes ellipsoid, 7–10 × 5–7 cm, densely flowered; bracts white, narrowly obovate, ca. 2.5 cm × 8 mm, slightly brownish hairy, 3-flowered, margin membranous, apex acute; bracteoles tubular, ca. 1.2 cm. Flowers white. Calyx ca. 1.7 cm, brownish pubescent, apex 3-toothed. Corolla tube ca. 2.5 cm; lobes ca. 1.3 cm. Lateral staminodes 1.5–4 cm. Labellum suborbicular, ca. 1.3 × 1 cm, base attenuate into claw, apex deeply emarginate. Filament ca. 1.3 cm; anther ca. 6 mm. Ovary densely white villous.

Fl. Sep.

• Forests; ca. 1200 m. W Yunnan (Yingjiang Xian).

24. *Hedychium neocarneum* T. L. Wu et al., Novon 10: 91. 2000.

肉红姜花 *rou hong jiang hua*

Hedychium carneum Y. Y. Qian, Acta Bot. Austro Sin. 9: 48. 1994, not Loddiges (1823).

Pseudostems 1–2 m. Leaves sessile; leaf sheath greenish purple or purple, villous; ligule purple, oblong, 1.5–6 cm, villous; leaf blade lanceolate, rarely oblanceolate, oblong or ovate on proximal leaves, 10–50 × 6–16 cm, adaxially glabrous, abaxially villous, base subcordate to rounded or broadly cuneate, apex acuminate or caudate. Spikes cylindric, 22–35 × 14–20 cm; bracts oblong or lanceolate, 4.5–5.5 cm, villous, (1 or) 2–4-flowered, margin involute; bracteoles ovate or oblong, 1.8–3.5 cm, pubescent. Flowers white. Calyx 4.1–4.5 cm, villous, apex 3-toothed. Corolla tube yellowish, 5.3–6 cm; lobes pale green or yellowish, linear, 4–4.5 cm × 3.5–4 mm, apex involute. Lateral staminodes white, flesh red at base, linear-oblanceolate. Labellum flesh red at base, suborbicular, 1.8–2.8 × 1.6–2 cm, apex 2-cleft; claw 6–8 mm. Filament flesh red, 5.2–5.7 cm; anther yellow, 1.1–1.4 cm. Ovary green, oblong, 4–5.5 mm, sparsely villous. Stigma ciliate. Capsule yellow, long ovoid, 2–3.5 × 1–1.5 cm, obtusely 3-angled. Seeds red; aril red. Fl. Sep.

• Forests; 1600–1900 m. S Yunnan (Simao Xian).

25. *Hedychium puerense* Y. Y. Qian, Acta Phytotax. Sin. 34: 444. 1996.

普洱姜花 *pu er jiang hua*

Pseudostems 1.2–2 m. Leaves sessile; ligule 1.8–3.8 cm, densely villous; leaf blade elliptic-lanceolate or oblong-lanceolate, 6–65 × 3–18 cm, adaxially glabrous, abaxially villous, base rounded or cuneate, apex caudate. Spikes cylindric, 26–50 × 16–23 cm; rachis densely villous; bracts narrowly ovate, 4.5–5.5 × 1.5–2 cm, (2–)6(–8)-flowered; bracteoles 1.5–3.5 cm. Calyx 4.4–4.8 cm. Corolla tube white, 5.2–6 cm; lobes green, linear, 3.5–4.2 cm. Lateral staminodes white, 2.5–3 cm. Labellum white, yellowish at base and center, orbicular, 2–2.2 × 1.8–2 cm, apex 2-lobed. Filament white, 5.8–6.8 cm; anther white, 1–1.5 cm. Ovary 4–5 cm, densely villous. Capsule long ovoid, 2.5–4 cm, obtusely 3-angled, villous. Seeds red. Fl. Sep.

• Forests; 1300–1600 m. S Yunnan.

26. *Hedychium simaoense* Y. Y. Qian, Acta Phytotax. Sin. 34: 443. 1996.

思茅姜花 *si mao jiang hua*

Pseudostems ca. 1.8 m, sparsely villous. Leaves sessile; ligule 1–2.5 cm; leaf blade narrowly linear, 10–50 × 1.5–7 cm, adaxially glabrous, abaxially villous, base rounded or cuneate, apex caudate. Spikes cylindric, 20–35 × 15–22 cm; rachis densely villous; bracts long ovate, 4–5 cm, 3-flowered, apex obtuse. Flowers white or yellow. Calyx 3–3.5 cm, abaxially villous, apex 3-toothed. Corolla tube pale purple, 3.5–4.2 cm; lobes pendent, yellow, linear, 4.3–4.7 cm, apex involute. Lateral sta-

minodes white or yellow, pale purple at base, oblanceolate, 2.9–3.3 cm. Labellum white or yellow, pale purple at base, orbicular, 2.2–2.5 cm wide, apex 2-cleft. Filament purple, 5–5.5 cm; anther purple or orange, 1–1.2 cm. Ovary densely sericeous, 2.5–3 cm. Capsule ovoid-globose or ovoid, 1.3–3 × 1–1.7 cm. Seeds red. Fl. Aug.

- Forests; ca. 1400 m. S Yunnan (Simao Xian).

27. *Hedychium tienlinense* D. Fang, Acta Phytotax. Sin. 16 (3): 52. 1978.

田林姜花 tian lin jiang hua

Pseudostems ca. 85 cm. Leaves sessile; ligule 0.5–2.5 cm, glabrescent, apex rounded; leaf blade oblong-lanceolate, 4–33 × 1.5–6 cm, adaxially glabrous, abaxially sparsely villous, more densely so along both sides of midvein, base rounded to cuneate, apex acuminate. Spikes erect, ca. 15 × 4 cm; rachis ± villous; bracts oblong-obovate, 3.2–4.3 × ca. 2.2 cm, ± villous, ca. 5-flowered; bracteoles broadly ovate-deltoid, ca. 2 cm, ± villous. Flowers white, ca. 9 cm, slightly fragrant. Calyx hairy abaxially, split on 1 side. Corolla tube ca. 5 cm; lobes linear, ca. 2.6 cm. Lateral staminodes linear, falcate, ca. 2.7 cm × 2 mm. Labellum broadly ovate, ca. 2.5 × 2 cm, midvein yellow, apex 2-cleft. Filament yellowish red, ca. 2.4 cm; anther ca. 1.1 cm; connective extending ca. 1 mm beyond anther. Ovary ca. 5 mm,

± villous. Stigma shortly ciliate. Fl. Aug–Sep.

- Valleys; ca. 500 m. NW Guangxi (Tianlin Xian).

28. *Hedychium qingchengense* Z. Y. Zhu, Bull. Sichuan School Chin. Mat. Med. 30(2): 28. 1992.

青城姜花 qing cheng jiang hua

Pseudostems 0.8–1.2 m. Leaves sessile or subsessile; ligule 2–4 cm, membranous, appressed villous; leaf blade lanceolate or elliptic-lanceolate, 20–40 × 4–8 cm, adaxially glabrous, abaxially densely appressed villous, base attenuate, apex caudate-acuminate. Spikes ellipsoid or oblong, 6–15 cm, villous; bracts oblong, 3.5–5 × 1–1.5 cm, villous, 1–3-flowered, margin usually involute; bracteoles lanceolate, 1.5–2.4 cm. Flowers white. Calyx membranous, 3.5–4.5 cm, split on 1 side, distally villous. Corolla tube 7–8 cm; lobes linear, 3–3.8 cm. Lateral staminodes oblong-oblanceolate, 3–3.5 cm × 8–10 mm, margin entire or undulate. Labellum with an orange spot at center, obovate, 3–3.5 × 2–2.5 cm, apex 2-cleft; lobes entire or irregularly undulate at margin. Filament 3–3.5 cm; anther yellow, ca. 1.5 cm. Ovary oblong, white sericeous. Fl. Jul–Sep, fr. Sep–Oct.

- Forests; ca. 500 m. C Sichuan (Guan Xian).

Edible.

19. SILIQUAMOMUM Baillon, Bull. Mens. Soc. Linn. Paris: 1193. 1895.

长果姜属 chang guo jiang shu

Pseudostems erect. Leaves petiolate; leaf blade lanceolate or lanceolate-oblong. Inflorescence a terminal raceme, laxly few flowered; bracts small. Pedicel long, articulate near apex. Calyx tubular-campanulate, split on 1 side, apex 2- or 3-toothed. Corolla tube narrowly cylindrical, apex dilated, campanulate; lobes very narrow, apex obtuse, central lobe larger than lateral ones. Lateral staminodes narrowly obovate. Labellum obovate, large, apical margin undulate. Filament short; anther linear, apex with a membranous appendage not derived from connective. Ovary 3-loculed basally, 1-loculed apically. Capsule cylindrical, torulose.

One species: China, Vietnam.

1. *Siliquamomum tonkinense* Baillon, Bull. Mens. Soc. Linn. Paris: 1193. 1895.

长果姜 chang guo jiang

Pseudostems 0.6–2 m. Leaves usually 3; ligule glabrous; petiole 4.5–7 cm; leaf blade 20–55 × 7–14 cm, base acute, apex acuminate. Racemes 13–14 cm, 9–12-flowered; peduncle ca. 18 cm. Pedicel articulate ca. 5 mm from apex. Calyx ca. 3.5 cm,

Corolla yellowish white; tube ca. 2 cm; lobes 2.5–3 cm. Lateral staminodes ca. 2.5 cm. Labellum variegated, 3–3.5 cm. Anther including apical appendage ca. 2 cm. Ovary glabrous. Stigma ciliate. Capsule yellow, 12–13 × ca. 1 cm. Fl. Oct. $2n = 48$.

Dense forests in mountain valleys; ca. 800 m. SE Yunnan (Pingbian Miao Zu Zizhixian) [N Vietnam].

20. CAULOKAEMPFERIA K. Larsen, Bot. Tidsskr. 60: 166. 1964.

大苞姜属 da bao jiang shu

Herbs perennial. Pseudostems erect, leafy. Leaves sessile or petiolate; ligule 2-lobed, small. Inflorescences terminal; bracts 1–10, distichous, lanceolate, 1–4-flowered, margin free to base; bracteoles absent in species with 1-flowered bracts. Calyx tubular, not deeply split on 1 side, apex often 2- or 3-toothed. Corolla tube long, narrow, widened at mouth; lobes 3, central one slightly longer and wider than lateral ones. Lateral staminodes petaloid, large. Labellum orbicular or broadly ovate, large, ± concave, apex entire or 2-lobed. Filament very short or absent, borne on corolla tube; anther basifixed; connective forming a conspicuously reflexed crest. Ovary 3-loculed. Stylodes linear, short, free.

About ten species: China, India, Myanmar, Sikkim, Thailand; one species (endemic) in China.

1. *Caulokaempferia coenobialis* (Hance) K. Larsen, Bot. Tidsskr. 60: 177. 1964.

黄花大苞姜 huang hua da bao jiang

Monolophus coenobialis Hance, J. Bot. 8: 75. 1870; *Kaemp-*

feria coenobialis (Hance) C. H. Wright; *Roscoea flava* Merrill.

Plants slender, tufted. Pseudostems 15–30 cm × ca. 3 mm. Leaves 5–9, sessile or shortly petiolate, basal ones smaller than apical; leaf blade lanceolate, 5–14 × 1–2 cm, thin, glabrous, base acute, apex long caudate-acuminate. Bracts 2 or 3, 3–5 cm, 1- or 2-flowered. Calyx 1–1.5 cm, persistent. Corolla yellow; tube ca. 3 cm; lobes lanceolate, ca. 1 cm. Lateral staminodes elliptic, ca. 1.2 cm. Labellum yellow, broadly ovate, ca. 1.5 × 2 cm. Filament very short; anther ca. 3 mm; connective crest oblong, ca. 4 mm. Capsule ovoid-oblong, ca. 1 cm. Seeds ellipsoid-ovoid. Fl. Apr–Jul, fr. Aug. $2n = 24^*$.

- Forest floors. Guangdong, Guangxi.

Medicinal.

