

## ARISTOLOCHIACEAE

马兜铃科 ma dou ling ke

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Herbs, shrubs, rarely lianas, subshrubs, or trees; root, stems, and leaves with oil cells. Leaves alternate; stipules absent; petiole usually present and well defined; leaf blade simple, usually pinnately veined, sometimes palmately 3–5-veined, margin usually entire, rarely 3–5-lobed. Inflorescences terminal or axillary, racemes, cymes, or corymbs, or flowers solitary. Flowers bisexual, zygomorphic or actinomorphic. Perianth usually with 1 petaloid whorl (in *Saruma* with 2 whorls: outer one sepaloid, inner one petaloid), mostly connate into distinct tube, cylindrical to campanulate or subglobose; limb rotate, urceolate, cylindrical, or ligulate, 1–3-lobed; lobes valvate. Stamens 6–12 (in China), in 1 or 2 series; filaments adnate to ovary (in *Asarum*) or style column (in *Thottea*) with anthers free, or filaments and anthers fully adnate to style column to form gynostemium (in *Aristolochia*); anthers 2-loculed, dehiscence longitudinal. Ovary inferior to superior, 6-loculed (in *Thottea* 4-loculed); carpels connate only at base or fully fused; ovules numerous, anatropous, usually in 1 or 2 series; placentation parietal. Styles free or connate, column 3- or 6-lobed (in *Thottea* 5–20-lobed). Fruit a fleshy or dry capsule, rarely siliquiform or follicular. Seeds many; testa somewhat hard or crustaceous; endosperm copious, fleshy; embryo minute.

About eight genera and 450–600 species: primarily in tropical and subtropical regions; four genera (one endemic) and 86 species (69 endemic) in China.

Cheng Ching-yung, Yang Chun-shu & Hwang Shu-mei. 1988. Aristolochiaceae. In: Kiu Hua-shing & Ling Yeou-ruenn, eds., Fl. Reipubl. Popularis Sin. 24: 159–245.

- 1a. Perianth biseriolate; fruit follicular; carpels connate only at base ..... 1. *Saruma*
- 1b. Perianth uniseriate; fruit dry or fleshy capsules, or siliquiform; carpels fully connate.
  - 2a. Ovary 4-loculed; fruit siliquiform; stems erect; stamens 8–9 in 1 series [6–36(–46) in 1 or 2 series] ..... 3. *Thottea*
  - 2b. Ovary 6-loculed; fruit subglobose to cylindrical capsules; stems usually climbing or twining; stamens usually 6 in 1 series or 12 in 2 series.
    - 3a. Perianth actinomorphic; stamens usually 12 in 2 series; stems herbaceous, rhizomatous; fruit fleshy or spongy capsules; flowers terminal, solitary ..... 2. *Asarum*
    - 3b. Perianth zygomorphic; stamens 6 in 1 series; stems woody or herbaceous, usually climbing or twining; fruit dry capsules; flowers axillary, solitary, fasciculate, or arranged in inflorescences ..... 4. *Aristolochia*

### 1. SARUMA Oliver, Hooker's Icon. Pl. 19: t. 1895. 1889.

马蹄香属 ma ti xiang shu

Herbs perennial, erect. Roots fragrant. Leaves alternate, cordate. Flowers borne on petiole (strictly terminal), solitary. Perianth biseriolate, actinomorphic. Sepals basally connate, adnate to gynoecium and stamens forming calyx cup; lobes 3, ovate. Petals 3, free. Stamens 12 in 2 series; filaments inflated and incurved at apex; anthers functionally introrse (due to curvature). Ovary half-inferior; carpels 6, connate only at base. Fruit follicular, with persistent calyx. Seeds convex on 1 face, transversely rugose, with fleshy funicle.

- One species.

1. *Saruma henryi* Oliver, Hooker's Icon. Pl. 19: t. 1895. 1889.

马蹄香 ma ti xiang

Rhizomes robust, ca. 5 mm in diam. Stems 0.5–1 m tall, gray-brown pubescent. Petiole 3–12 cm, pubescent; leaf blade cordate, 6–15 × 5–13 cm, both surfaces pubescent, base cordate, apex shortly acuminate. Pedicel 2–3.5 cm, pubescent. Calyx lobes ca. 10 × 7 mm. Petals yellow or yellow-green, cordate-reniform, clawed, ca. 10 × 8 mm. Stamens overtopping

ovary; filaments ca. 2 mm; anthers oblong, with connectives slightly extended beyond anthers. Style absent; stigma decurrent along ventral surface of carpel. Fruit follicular, 6–8 × 4–6 mm. Seeds deltoid-obconic, ca. 3 mm, densely transversely rugose. Fl. Apr–Jul.

- Dense forests, valleys, stream banks; 600–1000 m. Gansu, Guizhou, Hubei, Jiangxi, Shaanxi, Sichuan.

This species is used medicinally.

### 2. ASARUM Linnaeus, Sp. Pl. 1: 422. 1753.

细辛属 xi xin shu

*Asiasarum* F. Maekawa; *Geotaenium* F. Maekawa; *Heterotropa* C. Morren & Decaisne; *Japonasarum* Nakai.

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Herbs perennial; annual growth modules consisting of 2–4 cataphylls, 1 or 2 foliage leaves, and a terminal flower. Rhizomes short and vertical or long and horizontal; rhizomes and roots often pungently aromatic. Stems herbaceous. Foliage leaves solitary or paired on each growth module (when paired appearing opposite), usually long petiolate, often cordate or sagittate, margin entire. Flowers terminal, solitary (rarely paired). Perianth uniseriate, actinomorphic (rarely slightly zygomorphic). Calyx adnate to ovary to varying degrees; sepals either connate beyond attachment to ovary and forming a tube or free and forming false tube above ovary; tube cupular, urceolate, campanulate, funnellform, or cylindric, often ribbed or tessellate on adaxial surface, constricted or open at throat (orifice), throat with or without narrowly projected, contiguous shelf of tissue (orifice ring); lobes 3, erect, spreading, or reflexed. Stamens 12 in 2 series, rarely with 3 staminodes; filaments long to almost absent; anthers extrorse. Ovary inferior or half-inferior, 6-loculed; carpels fully connate. Styles 6, free or united into column, apex entire or 2-lobed; stigma terminal or lateral. Fruit a fleshy or spongy capsule, splitting irregularly when ripe. Seeds convex dorsally, plane or grooved ventrally, with fleshy funicle at base.  $2n = 12, 24, 26$ .

About 90 species: mostly in SE Asia, a few species in North America, one species endemic to Europe; 39 species (34 endemic) in China.

No material of *Asarum sprengeri* Pampanini (Nuovo Giorn. Bot. Ital., n.s., 18: 113. 1911) has been seen. It is possibly related to *A. chinense*. The unpublished name "*Asarum campaniforme*" is in use among horticulturalists for a plant of apparently Chinese origin, which has large bell-shaped flowers with whitish interior of the calyx tube and almost black calyx lobes.

- 1a. Sepals free or connate beyond attachment to ovary, without distinct tube or only with very short one; sepals abaxially pubescent; stamen filaments usually longer than anthers; styles connate into column, apex entire or notched; stigmas terminal; ovary inferior.
  - 2a. Sepals connate beyond attachment to ovary, forming a calyx tube.
    - 3a. Calyx actinomorphic, lobes triangular, apically acute; styles slender; stigmas not radiating downward; leaves paired on flowering shoots, solitary on nonflowering shoots.
      - 4a. Stamens 6–9; flowers (including lobes) less than 1 cm; calyx lobes erect ..... 6. *A. debile*
      - 4b. Stamens 12; flowers (including lobes) more than 1.5 cm; calyx lobes spreading ..... 7. *A. caudigerellum*
    - 3b. Calyx slightly zygomorphic, lobes triangular-orbicular to rounded-ovate, apically rounded; styles short and thick, stigmas radiating downward, subdecurrent; leaves paired on flowering and nonflowering shoots.
      - 5a. Leaf blade narrowly ovate or ovate-lanceolate, apex acuminate; anthers 0.8–1.2 mm; connectives less than 0.3 mm ..... 11. *A. epigynum*
      - 5b. Leaf blade ovate, ovate-cordate, or broadly ovate, apex acute or obtuse; anthers 2–3 mm; connectives 0.7–1.3 mm.
        - 6a. Leaf blade 13–22 cm; stamen filaments 0.4–0.7 mm ..... 9. *A. yunnanense*
        - 6b. Leaf blade 5–10 cm; stamen filaments less than 0.4 mm ..... 10. *A. geophilum*
  - 2b. Sepals free beyond attachment to ovary (sometimes connivent but not connate).
    - 7a. Calyx lobes erect or spreading, caudate to acuminate, rarely acute.
      - 8a. Shoots elongate, internodes 2–6 cm ..... 3. *A. cardiophyllum*
      - 8b. Shoots condensed, internodes less than 2 cm.
        - 9a. Calyx lobe abruptly caudate at apex, tail 10–25 mm; style lobes entire, stigmas terminal ..... 1. *A. caudigerum*
        - 9b. Calyx lobe gradually caudate at apex, tail 2–4 mm; style lobes notched, stigmas at base of notch ..... 2. *A. renicordatum*
    - 7b. Calyx lobes reflexed and appressed to false tube, rounded, obtuse, or acute.
      - 10a. Plants densely covered with long white hairs, hairs turning black when dried ..... 4. *A. pulchellum*
      - 10b. Plants only sparingly to moderately pubescent, hairs remaining white when dried.
        - 11a. Leaves paired on vegetative shoots; stamens and styles slightly exerted ..... 5. *A. caulescens*
        - 11b. Leaves solitary on vegetative shoots; stamens and styles included ..... 8. *A. himalaicum*
- 1b. Sepals connate beyond attachment to ovary, forming variously shaped tube; sepals abaxially glabrous, rarely pubescent; stamen filaments very short or nearly lacking; styles free or rarely united at base, apex often notched or 2-cleft; stigmas lateral, rarely terminal; ovary superior or inferior.
  - 12a. Stamen filaments longer than anthers; leaves paired on vegetative shoots; styles short; calyx tube without laminate ring.
    - 13a. Calyx lobes erect or spreading, never reflexed at anthesis; leaf blade apex shortly acuminate or acute, adaxially sparsely pubescent ..... 12. *A. sieboldii*
    - 13b. Calyx lobes reflexed at anthesis; leaf blade apex acute or obtuse, adaxially shortly pubescent along veins ..... 13. *A. heterotropoides*
  - 12b. Stamen filaments usually very short; leaves solitary on vegetative shoots; styles long; calyx tube usually with laminate ring at throat.
    - 14a. Styles entire at apex, rarely slightly 2-cleft; stigmas terminal or subterminal.
      - 15a. Calyx tube strongly constricted at throat, adaxial surface tessellate (sometimes only inconspicuously transversely corrugate), orifice ring present.
      - 16a. Rhizomes long spreading, horizontal; leaf blade elliptic or ovate, rarely cordate, apex acuminate; calyx tube gradually dilated above orifice forming short neck, then divided into lobes ..... 14. *A. chinense*

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- 16b. Rhizomes short, vertical; leaf blade cordate or ovate-cordate, apex acute to obtuse; calyx tube without neck, divided immediately into lobes ..... 15. *A. ichangense*
- 15b. Calyx tube slightly or not constricted at throat, adaxial surface longitudinally rugose, orifice ring absent.
- 17a. Leaf blade ovate-cordate to ovate, both surfaces glabrous, adaxially shiny; lateral calyx lobes erect or spreading; connectives obtuse; styles connate, apex with 6, erect, slightly 2-cleft arms ..... 16. *A. hongkongense*
- 17b. Leaf blade triangular-ovate to narrowly ovate, pubescent, adaxially not shiny; lateral calyx lobes reflexed; connectives awl-shaped; styles 6, free, apex entire ..... 17. *A. fukienense*
- 14b. Styles conspicuously 2-fid or notched at apex; stigmas lateral.
- 18a. Calyx tube inner surface tessellate.
- 19a. Calyx tube slightly or not at all constricted at throat, orifice ring narrow (ca. 1 mm or less wide) or absent.
- 20a. Calyx tube broadly cupular or subglobose, orifice ca. 15 mm in diam., ring absent ..... 18. *A. splendens*
- 20b. Calyx tube subcylindric to campanulate, orifice 4–8 mm in diam., ring absent or present.
- 21a. Calyx lobes adaxially pubescent, spreading, orifice ring absent ..... 22. *A. taipingshanianum*
- 21b. Calyx lobes adaxially glabrous (sometimes papillose), erect or slightly spreading, orifice ring present.
- 22a. Leaf blade broadly cordate to reniform-cordate, length and width subequal; calyx lobes adaxially smooth, without papillate area ..... 19. *A. forbesii*
- 22b. Leaf blade triangular-oblong to triangular-ovate, length greater than width; calyx lobes adaxially papillose or rugose at base.
- 23a. Leaves 6–17 × 5–16 cm; petiole 8–25 cm; calyx lobes 1.5–2 × 2–2.5 cm, with rounded papillose area at base (Sichuan) ..... 21. *A. bashanense*
- 23b. Leaves 3–7 × 2.3–2.9 cm; petiole 5–8 cm; calyx lobes ca. 0.4 × 0.5 cm, irregularly thickened, glandular-rugose at base (Taiwan) ..... 20. *A. crassisepalum*
- 19b. Calyx tube strongly constricted at throat, orifice ring broad and evident (2.5–5 mm wide).
- 24a. Stigmas elongate, linear-oblong or oblong-ovoid; style apex hooked; calyx lobe margins undulate.
- 25a. Leaf blade triangular-ovate, abaxially with purple veins; petiole streaked reddish brown; stamens oblong; connectives thick and notched at apex; stigmas linear-oblong; style apex distinctly hooked ..... 23. *A. macranthum*
- 25b. Leaf blade ovate-cordate or narrowly ovate, abaxially with green veins; petiole uniformly green; stamens triangular; connectives obtuse or acute, entire at apex; stigma oblong-ovoid; style apex obscurely hooked ..... 24. *A. crispulatum*
- 24b. Stigmas not elongate, rounded to ovoid; style apex not hooked; calyx lobe margins hardly undulate.
- 26a. Flower 2–2.5 cm in diam., calyx tube urceolate, 1–1.2 × 1.1–1.4 cm, orifice ring ca. 1 mm wide ..... 28. *A. porphyronotum*
- 26b. Flowers more than 3 cm in diam.; calyx tube subcylindric or conic, 1.5–2 × 0.7–1.5 cm, orifice ring 1.5–3 mm wide.
- 27a. Petiole 4–7 cm, pilose at maturity; calyx 2.5–3 cm in diam. .... 27. *A. chengkouense*
- 27b. Petiole 10–21 cm, glabrous at maturity; calyx 3–6 cm in diam.
- 28a. Connectives slightly extended beyond anthers, apex awl-shaped; calyx lobes broadly ovate, 2–3 × 3–4 cm ..... 25. *A. delavayi*
- 28b. Connectives not extended beyond anthers, apex rounded; calyx lobes subrotund, ca. 1 × 2 cm ..... 26. *A. hypogynum*
- 18b. Calyx tube inner surface with longitudinal ridges, sometimes with crossbars, but not tessellate.
- 29a. Calyx tube abruptly swollen toward middle or above, forming barrel-shaped dilated zone.
- 30a. Calyx lobes with pinkish, triangular papillate area at base; tube above abruptly swollen into broad disk which is longitudinally ridged, orifice very constricted, ring broad ..... 29. *A. inflatum*
- 30b. Calyx lobes with white or yellowish, circular or semicircular pulvinate area at base; tube with robust dilated zone at middle inner surface without ridges, orifice ring absent.
- 31a. Calyx tube swollen forming girdle-like ring near middle, lobes with papillate transverse rows at base, orifice ca. 1 cm in diam.; peduncle 1–5 cm ..... 30. *A. maximum*
- 31b. Calyx tube swollen with girdle-like ring near apex, lobes without papillate transverse rows, orifice small, less than 1 cm in diam.; peduncle 2–9.5 cm ..... 31. *A. insigne*
- 29b. Calyx tube cylindric or enlarged gradually, but lacking prominent dilated zone.
- 32a. Calyx tube and abaxial surface of leaf blade densely yellowish brown pubescent; peduncle recurved, pubescent ..... 37. *A. wulingense*
- 32b. Calyx tube and leaf blade abaxially glabrous or only veins with hairs; peduncle erect, subglabrous.
- 33a. Orifice ring absent or inconspicuous (rarely formed by papillae, but not as a contiguous ring); calyx tube 2–5 cm, slightly or not at all constricted at throat.

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- 34a. Calyx 2.5–3 cm wide; tube 2–2.5 cm, lobes with minute pulvinate area (ca. 2 mm in diam.) or scattered papillae at base, papillae not forming ribs in tube; petiole 2.5–7.5 cm ..... 32. *A. nanchuanense*
- 34b. Calyx 4–5 cm wide; tube 3–5 cm, lobes usually with prominent papillate area at base, over 5 mm in diam., papillae extending in longitudinal rows from base to form ribs in tube; petiole 6–23 cm.
- 35a. Calyx tube erect and symmetric, throat not constricted, rarely with papillate ring; leaf blade triangular-ovate to elliptic-ovate, apex acute to shortly acuminate; rhizomes short, vertical ..... 38. *A. magnificum*
- 35b. Calyx tube often inclined to one side, slightly asymmetric, throat slightly constricted; leaf blade narrowly ovate, triangular-ovate, or oblong-hastate, apex long acuminate; rhizomes elongated, horizontal ..... 39. *A. petelotii*
- 33b. Orifice ring present, conspicuous, 2–3 mm wide; calyx tube 1–2.5 cm, slightly to strongly constricted at throat.
- 36a. Calyx lobes not conspicuously pubescent adaxially.
- 37a. Plants robust, with short rhizomes and thick, fleshy roots; leaf blade narrowly or broadly ovate to triangular-ovate, 11–14 cm wide; flowers usually paired; stamen connectives awl-shaped ..... 33. *A. sagittarioides*
- 37b. Plants slender, with long rhizomes and fibrous roots; leaf blade oblong-ovate or narrowly elliptic-ovate, 5–8 cm wide; flowers solitary; stamen connectives ligulate ..... 34. *A. longerhizomatosum*
- 36b. Calyx lobes densely pubescent adaxially.
- 38a. Calyx tube cylindrical, 0.9–1.5 cm in diam.; leaf blade adaxially uniformly green ..... 36. *A. tongjiangense*
- 38b. Calyx tube lantern-shaped, slightly swollen at middle, ca. 2 cm in diam.; leaf blade adaxially faintly white spotted ..... 35. *A. nobilissimum*

**1. *Asarum caudigerum*** Hance, J. Bot. 19: 142. 1881.

尾花细辛 wei hua xi xin

*Asarum arrhizoma* H. Léveillé & Vaniot; *A. caudigerum* var. *leptophyllum* (Hayata) S. S. Ying; *A. caudigerum* var. *triangulare* (Hayata) S. S. Ying; *A. leptophyllum* Hayata; *A. leptophyllum* var. *triangulare* Hayata.

Herbs. Rhizomes vertical, 2–4 mm in diam., internodes less than 1 cm. Leaves paired; petiole 5–20 cm, villous; leaf blade adaxially dark green with white blotches along veins, broadly ovate, triangular-ovate, or ovate-cordate, 4–10 × 3.5–10 cm, abaxial surface densely pubescent, adaxial surface sparsely pubescent, base auriculate or cordate, lateral lobes 3–4 × 3–3.5 cm, apex acute or long acuminate; cataphylls ovate or ovate-lanceolate, 0.8–1.3 × 0.4–0.6 cm. Peduncle erect to ascending, 1–2 cm. Calyx green to purplish green, ± campanulate, 2–5 × 1–2 cm; sepals free beyond attachment to ovary, abaxially white villous; pseudotube subglobose, 0.6–1.0 × 0.9–1.5 cm; lobes erect or spreading, 1–3 × 0.4–1.2 cm, base ovate-oblong, apex abruptly narrowed to a slender cauda 10–25 mm. Stamens 12; filaments as long as anthers; connectives extended beyond anthers, ligulate to awl-shaped. Ovary inferior. Styles connate, apex 6-cleft, lobes entire; stigmas terminal. Fl. Mar–May.

Mixed forests, mountain slopes, along streams; 300–1700 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Taiwan, Yunnan [Vietnam].

This species is used medicinally, know as 土细辛 (tu xi xin).

**2. *Asarum renicordatum*** C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 569. 1983.

肾叶细辛 shen ye xi xin

Herbs. Rhizomes horizontal, ca. 3 mm in diam., internodes less than 1 cm. Leaves paired; petiole 10–14 cm, villous; leaf

blade uniformly colored, reniform-cordate or subcordate, 3–4 × 6–7.5 cm, abaxial surface and along margin densely pubescent, adaxial surface sparsely pubescent, base cordate, lateral lobes ca. 0.2 × 0.3 cm, apex rounded or obtuse; cataphylls broadly ovate, ca. 1 × 1 cm. Peduncle recurved, ca. 2.5 cm. Calyx yellowish brown, campanulate, 1.5–2 × 1–1.5 cm; sepals free beyond attachment to ovary, abaxially brown pubescent; pseudotube subglobose, 0.5–1.0 × 1–1.5 cm; lobes erect or spreading, triangular-lanceolate, ca. 1 × 0.4 cm, apex gradually narrowed to a slender cauda 2–4 mm. Stamens 12; filaments longer than anthers; connectives extended beyond anthers, awl-shaped. Ovary inferior. Styles connate, apex 6-cleft, lobes notched; stigmas at base of style lobe notches. Fl. May.

• Mixed forests, mountain slopes, along streams; ca. 700 m. Anhui.

This species is used medicinally.

**3. *Asarum cardiophyllum*** Franchet, Bull. Mus. Hist. Nat. (Paris) 1: 65. 1895.

花叶细辛 hua ye xi xin

*Asarum caudigerum* var. *cardiophyllum* (Franchet) C. Y. Cheng & C. S. Yang.

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes 2–6 cm. Leaves paired; petiole 2–5 cm, puberulent to villous; leaf blade sometimes with white blotches along veins, cordate, 3–5 × 3–5 cm, both surfaces strigose puberulent, base cordate, lateral lobes 2–3 × 2–3 cm, apex acute to rounded; cataphylls linear to broadly elliptic, 4–14 × 2–9 cm. Peduncle erect to ascending, 1.5–2 cm. Calyx green, ± campanulate, 2–3 × 0.6–1 cm; sepals free beyond attachment to ovary, abaxially sparsely white villous; pseudotube subglobose, 0.3–0.6 × 0.8–1 cm; lobes erect or spreading, 1–1.5 × 0.3–0.6 cm, base linear-triangular, apex abruptly narrowed to a slender cauda 5–11 mm.

Stamens 12; filaments as long as anthers; connectives extended beyond anthers, rhomboid. Ovary inferior. Styles connate, apex 6-cleft; stigmas terminal. Fl. Mar–May.

• Forests, on mountain slopes, along streams; ca. 1100 m. Sichuan, Yunnan.

**4. *Asarum pulchellum*** Hemsley, Gard. Chron., ser. 3, 7: 422. 1890.

长毛细辛 chang mao xi xin

*Geotaenium pulchellum* (Hemsley) F. Maekawa, comb. inval.; *Asarum caulescens* var. *setchuenense* Franchet.

Herbs densely covered with long white hairs, hairs turning black when dried. Rhizomes horizontal, 2–7 mm in diam., internodes 3.5–7.5 cm. Leaves paired; petiole 10–20 cm, densely white villous; leaf blade uniformly colored, ovate-cordate or broadly ovate, 5–8 × 5–9.5 cm, both surfaces densely white villous, base cordate, lateral lobes 1–2.5 × 2–3 cm, apex acute or acuminate; cataphylls ovate, 1.5–2 × 1 cm. Peduncle pendent, 1–2.5 cm. Calyx abaxially purple, adaxially white, urceolate-cylindric, 1–2 × 0.8–1.5 cm; sepals free beyond attachment to ovary, abaxially long villous; pseudotube urceolate, 0.8–1.2 × 0.8–1.4 cm; lobes reflexed, triangular, 0.4–0.8 × 0.6–1 cm, apex obtuse or acute. Stamens 9–12; filaments longer than anthers; connectives extended beyond anthers, ligulate. Ovary inferior. Styles connate, apex 6-cleft; stigmas terminal. Fl. Apr–May.

• Mixed forests; 700–1700 m. Anhui, Guizhou, Hubei, Jiangxi, Sichuan, NE Yunnan.

This species is used medicinally.

**5. *Asarum caulescens*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 17: 162. 1872.

双叶细辛 shuang ye xi xin

*Asarum brevistylum* Franchet; *A. caulescens* f. *geroense* J. Ohara; *A. franchetianum* Diels; *Japonasarum caulescens* (Maximowicz) Nakai.

Herbs sparsely to moderately white pubescent, hairs remaining white when dried. Rhizomes horizontal, 2–3 mm in diam., internodes 3–6 cm. Leaves paired; petiole 6–12 cm, sparsely villous; leaf blade uniformly colored, subcordate, 4–9 × 5–10 cm, adaxial surface sparsely pubescent, base cordate, lateral lobes 1.5–2.5 × 2.5–4 cm, apex acuminate; cataphylls broadly ovate, ca. 1.3 × 1.3 cm. Peduncle pendent, 1–2 cm. Calyx pink to purplish, cupulate, 0.8–1.3 × 0.8–1.4 cm; sepals free beyond attachment to ovary, abaxially villous, adaxially puberulent; pseudotube subglobose, 0.3–0.6 × 0.8–1.3 cm; lobes reflexed, triangular, 0.3–0.6 × 0.6–0.8 cm. Stamens 12, slightly exerted; filaments as long as anthers; connectives extended beyond anthers, subcylindric. Ovary inferior. Styles connate, apex 6-cleft, slightly exerted; stigmas terminal. Fl. Apr–May.

• Mixed forests, in humus; 700–1700 m. Gansu, Guizhou, Hubei, Shaanxi, Sichuan.

This species is used medicinally.

**6. *Asarum debile*** Franchet, J. Bot. (Morot) 12: 305. 1898.

铜钱细辛 tong qian xi xin

Herbs. Rhizomes horizontal, 1–2 mm in diam., internodes 1.5–4.5 cm. Leaves paired on flowering modules, solitary on nonflowering modules; petiole 5–12 cm, glabrous; leaf blade uniformly colored, cordate, 2.5–4 × 3–6 cm, both surfaces pubescent along veins or abaxial surface glabrous, base cordate, lateral lobes 0.7–2 × 1–2.5 cm, apex acute or obtuse; cataphylls ovate, ca. 1 × 0.7 cm. Peduncle pendent, 1–1.5 cm. Calyx actinomorphic, purple, campanulate, 0.7–1.4 × 0.5–0.9 cm; sepals connate beyond attachment to ovary, abaxially sparsely white villous; tube subglobose, 0.3–0.5 × 0.5–0.7 cm; lobes erect, triangular, 0.3–0.4 × 0.2–0.3 cm. Stamens 6–9; filaments as long as anthers; connectives not extended beyond anthers, obconic. Ovary inferior. Styles connate, slender, apex 6-cleft; stigmas terminal. Fl. May–Jun.

• Mixed forests, along streams, moist places, rock crevices; 1300–2300 m. Anhui, Hubei, Shaanxi, Sichuan.

This species is used medicinally.

**7. *Asarum caudigerellum*** C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 571. 1983.

短尾细辛 duan wei xi xin

Herbs. Rhizomes horizontal, 2–3 mm in diam., internodes 3.5–8 cm. Leaves paired on flowering module, solitary on nonflowering modules; petiole 4–10 cm, glabrous; leaf blade uniformly colored, cordate, 3–7 × 4–10 cm, abaxial surface pubescent along veins, adaxial surface sparsely pubescent, base cordate, lateral lobes 1–3 × 2–4 cm, apex acuminate; cataphylls broadly ovate, 1.5–2 × 1–1.5 cm. Peduncle ascending to pendent, 1–1.5 cm. Calyx actinomorphic, brownish purple, campanulate, 1.8–2.7 × 0.8–1.4 cm; sepals connate beyond attachment to ovary, abaxially sparsely white villous; tube subglobose, 0.6–1.2 × 0.9–1.5 cm; lobes spreading, triangular, 0.7–1.0 × 0.7–1.6 cm. Stamens 12; filaments slightly longer than anthers; connectives extended beyond anthers, ligulate. Ovary inferior. Styles connate, slender, apex 6-cleft; stigmas terminal. Fl. Apr–May.

• Thickets, along streams, moist places; 1600–2100 m. Guizhou, Hubei, Sichuan, NE Yunnan.

This species is used medicinally.

**8. *Asarum himalaicum*** J. D. Hooker & Thomson ex Klotzsch, Monatsber. Konigl. Preuss. Akad. Wiss. Berlin 1: 585. 1859 [*“himalaycum”*].

茗叶细辛 tiao ye xi xin

*Asarum himalaicum* var. *bhutanicum* W. W. Smith.

Herbs sparingly to moderately white pubescent, hairs remaining white when dried. Rhizomes horizontal, 1–2 mm in diam., internodes 3.5–4.5 cm. Leaves solitary (one per module); petiole 10–25 cm, glabrate; leaf blade uniformly colored, cordate or rounded-cordate, 4–8 × 6.5–11 cm, abaxial surface long puberulent, adaxial surface short puberulent, base cordate, lateral lobes 2–4 × 2.5–5 cm, apex shortly acuminate; cataphylls ovate-rounded, 0.5–1 × 0.5–0.7 cm. Peduncle pendent,

3–7 cm. Calyx purplish, subcampanulate, 1–1.5 × 0.8–1.4 cm; sepals free beyond attachment to ovary, abaxially glabrous to white villous, adaxially dark red puberulent; pseudotube subglobose, 0.6–0.8 × 0.8–1.4 cm; lobes reflexed, triangular, 0.3–0.5 mm × 0.6–0.8 cm. Stamens 12, included; filaments ca. 2 × as long as anthers; connectives slightly extended beyond anthers, obconic. Ovary inferior. Styles connate, apex 6-cleft, included; stigmas terminal. Fl. Apr–Jun.

Mixed forests, along streams, moist places; 1300–3100 m. Gansu, Guizhou, W Hubei, Shaanxi, Sichuan, Xizang [Bhutan, India, Nepal, Sikkim].

**9. *Asarum yunnanense*** T. Sugawara, Ogisu & C. Y. Chen, Acta Phytotax. Geobot. 41: 7. 1990.

云南细辛 yun nan xi xin

Herbs. Rhizomes vertical, 3–4 mm in diam., internodes 0.5–1 cm. Leaves paired; petiole 5–8 cm, villous; leaf blade adaxially deep green with white speckles on veins, cordate-ovate, 13–22 × 7–14 cm, abaxial surface glabrous or pubescent on veins, adaxial surface sparsely hispid, base cordate, apex acute; cataphylls not seen. Peduncle declinate, 2–2.5 cm. Calyx slightly zygomorphic, purplish, campanulate, 1.5–2.5 × 2–3 cm; sepals connate beyond attachment to ovary, abaxially pilose, adaxially dark red pubescent; tube obconic, 0.7–0.8 × 0.7–0.8 cm; lobes spreading, triangular-orbicular, ca. 1.5 × 1.5 cm. Stamens 12; filaments 0.4–0.7 mm, shorter than anthers; anthers 2–3 mm; connectives 0.7–1.3 mm, extended beyond anthers, subcylindric. Ovary inferior. Styles connate, short and thick, apex 6-cleft; stigmas terminal, radiating downward, decurrent. Fl. Mar–Apr.

- S Yunnan (Hekou).

No specimens were seen; the data above are from the original description and figure.

**10. *Asarum geophilum*** Hemsley, Gard. Chron., ser. 3, 7: 422. 1890.

地花细辛 di hua xi xin

*Asarum cavaleriei* H. Léveillé & Vaniot; *A. cavaleriei* var. *esquirolii* Léveillé; *A. taiwanense* S. S. Ying; *Geotaenium geophilum* (Hemsley) F. Maekawa, comb. inval.

Herbs. Rhizomes horizontal, 3–4 mm in diam., internodes 0.5–1.5 cm. Leaves paired; petiole 3–15 cm, villous; leaf blade uniformly colored, orbicular-cordate, ovate-cordate, or broadly ovate, 5–10 × 5.5–12.5 cm, abaxial surface densely yellow-brown pubescent or glabrescent, adaxial surface sparsely pubescent or glabrous, apex acute or obtuse; cataphylls ovate or narrowly ovate, ca. 0.8 × 0.4 cm. Peduncle declinate, 0.5–1.5 cm. Calyx slightly zygomorphic, purplish, subrotate, 1.5–2 × 2–2.5 cm; sepals connate beyond attachment to ovary, abaxially pubescent, adaxially dark red pubescent; tube obconic, ca. 0.5 × 0.6–1 cm; lobes spreading, triangular-orbicular, ca. 0.8 × 1–1.2 cm. Stamens 12; filaments less than 0.4 mm, shorter than anthers; anthers 2–3 mm; connectives extended beyond anthers, subcylindric, 0.7–1.3 mm. Ovary inferior. Styles connate, short and thick, apex 6-cleft; stigmas terminal, radiating downward, decurrent. Fl. Apr–Jun.

• Dense forests, moist valleys; 200–700 m. Guangdong, Guangxi, S Guizhou.

This species is used medicinally, know as 土细辛 (tu xi xin).

**11. *Asarum epigynum*** Hayata, Icon. Pl. Formosan. 5: 140. 1915.

台湾细辛 tai wan xi xin

*Geotaenium epigynum* (Hayata) F. Maekawa.

Herbs. Rhizomes horizontal, 4–5 mm in diam., internodes 1–2 cm. Leaves paired; petiole 4–6 cm, villous; leaf blade uniformly colored, narrowly ovate or ovate-lanceolate, 4–9 × 2.5–6.5 cm, abaxial surface densely pubescent, adaxial surface sparsely pubescent on veins and margin, base cordate, lateral lobes 1–2.5 × ca. 2 cm, apex acuminate; cataphylls oblong, ca. 0.8 × 0.4 cm. Peduncle declinate, 1–2 cm. Calyx slightly zygomorphic, greenish purple, subrotate, 1.5–2 × 2–2.5 cm; sepals connate beyond attachment to ovary, abaxially densely pubescent, adaxially dark red pubescent; tube obconic, 0.5–1 × 0.7–0.8 cm; lobes spreading, triangular-reniform or ovate-rounded, ca. 0.8 × 1 cm. Stamens 12; filaments shorter than anthers; anthers 0.8–1.2 mm; connectives extended beyond anthers, ligulate, less than 0.3 mm. Ovary inferior. Styles connate, short and thick, apex 6-cleft; stigmas terminal, radiating downward, decurrent. Fl. Feb–Mar.

- Forests, valleys. Hainan, Taiwan.

**12. *Asarum sieboldii*** Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 134. 1865.

汉城细辛 han cheng xi xin

*Asarum sieboldii* f. *seoulense* (Nakai) C. Y. Chang & C. S. Yang; *A. sieboldii* var. *seoulense* Nakai; *Asiasarum heterotropoides* (F. Schmidt) F. Maekawa var. *seoulense* (Nakai) F. Maekawa; *A. sieboldii* (Miquel) F. Maekawa.

Herbs. Rhizomes vertical or horizontal, 2–3 mm in diam., internodes 1–2 cm. Leaves paired; petiole 8–18 cm, glabrous or pubescent; leaf blade uniformly colored, cordate or ovate-cordate, 4–11 × 4.5–13.5 cm, abaxial surface pubescent only along veins or densely pubescent, adaxial surface sparsely puberulent, base deeply cordate, lateral lobes 1.5–4 × 2–2.5 cm, apex shortly acuminate or acute; cataphylls reniform-rounded, ca. 1.3 × 1.3 cm. Peduncle declinate, 2–4 cm. Calyx dark purple, urceolate to campanulate, 1–1.5 × 1–1.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subglobose, 6–8 × 1–1.5 cm, adaxially longitudinally ribbed; lobes erect or spreading, triangular-ovate, ca. 0.7 × 1 cm. Stamens 12; filaments slightly longer than anthers; connectives shortly extended beyond anthers, awl-shaped. Ovary superior. Styles free, short, apex shallowly 2-cleft; stigmas lateral. Fl. Apr–May.

Forests, moist valleys. Liaoning [Korea].

**13. *Asarum heterotropoides*** F. Schmidt, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 12: 71. 1868.

细辛 xi xin

*Asiasarum heterotropoides* (F. Schmidt) F. Maekawa.

Herbs. Rhizomes horizontal, 2–3 mm in diam., internodes 0.1–0.5 cm. Leaves paired; petiole 1–15 cm, puberulent; leaf blade uniformly colored, ovate-cordate to subreniform, 4–9 × 5–13 cm, abaxial surface densely pubescent, adaxial surface pubescent along veins, base cordate, lateral lobes 3–4 × 4–5 cm, apex obtuse or acute; cataphylls subrounded, ca. 0.8 × 0.8 cm. Peduncle recurved at anthesis, erect in fruit, 3–5 cm. Calyx purplish brown, broadly urceolate, 1–1.5 × ca. 1 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, ca. 1 × 1 cm, adaxially longitudinally ribbed; lobes reflexed, triangular-ovate, ca. 0.7 × 0.9 cm. Stamens 12; filaments slightly longer than anthers; connectives not extended beyond anthers. Ovary superior. Styles free, short, apex shallowly 2-cleft; stigmas lateral. Fl. May.

Forests, mountain slopes, valleys, moist shady areas, occasionally cultivated in S China. Heilongjiang, Jilin, Liaoning [Japan].

Material from China belongs to the endemic form, *Asarum heterotropoides* f. *mandshuricum* (Maximowicz) Kitagawa (*A. sieboldii* Miquel var. *mandshuricum* Maximowicz; *Asiasarum heterotropoides* (F. Schmidt) F. Maekwa var. *mandshuricum* (Maximowicz) F. Maekawa); whereas f. *heterotropoides* is restricted to Japan. The authentic traditional Chinese medicine 细辛 (xi xin).

**14. *Asarum chinense*** Franchet, J. Bot. (Morot) 12: 303. 1898.

川北细辛 chuan bei xi xin

*Asarum chinense* f. *fargesii* Franchet; *A. fargesii* Franchet; *A. wulongense* Z. L. Yang.

Herbs. Rhizomes spreading, horizontal, ca. 1 mm in diam., internodes ca. 2 cm. Leaves solitary; petiole 5–15 cm, glabrous; leaf blade adaxially green or along veins white, rarely near midvein white blotched, elliptic or ovate, rarely cordate, 3–7 × 2.5–6 cm, abaxial surface glabrous, adaxial surface sparsely pubescent, base auriculate-cordate, lateral lobes 1.5–2 × ca. 2.5 cm, apex acuminate; cataphylls ovate, 1–1.5 × 0.7–0.8 cm. Peduncle ascending, ca. 1.5 cm. Calyx purple or greenish purple, campanulate, 1.5–2 × 2–2.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube globose or ovoid-globose, ca. 0.8 × 1 cm, apically constricted and gradually dilated forming a short neck below lobes, adaxially longitudinally ribbed and sometimes inconspicuously transversely corrugate, orifice ring ca. 1 mm wide; lobes spreading, broadly ovate, ca. 1 × 1 cm, base with dense papillae forming semicircular area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse. Ovary superior or half-inferior. Styles free, apex truncate or slightly notched; stigmas subterminal. Fl. Apr–May.

- Forests, moist valleys; 1300–1500 m. W Hubei, NE Sichuan.

**15. *Asarum ichangense*** C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 579. 1983.

小叶马蹄香 xiao ye ma ti xiang

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes 0.5–1 cm. Leaves solitary; petiole 3–15 cm, glabrous; leaf blade adaxially dark green, with white patches along midvein, cordate or ovate-cordate, rarely subhastate, 3–6 × 3.5–7.5 cm, abaxial surface glabrous, adaxial surface puberulent along veins and margin, base cordate, lateral lobes 2–4 × 2.5–6 cm, apex acute

or obtuse; cataphylls ovate or oblong, ca. 1 × 0.7 cm. Peduncle recurved, ca. 1 cm. Calyx purplish green to dark purple, campanulate-urceolate, 1–1.5 × 1–1.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube globose, ca. 1 × 1 cm, apically constricted and abruptly dilated to lobes, adaxially tessellate, orifice ring ca. 1 mm wide; lobes triangular-ovate, 1–1.4 × 0.8–1 cm, base corrugate-papillate. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse, shallowly notched. Ovary superior. Styles free, apex subtruncate; stigmas terminal. Fl. Apr–May.

- Forests, along streams, moist shady areas, open grasslands; 300–1400 m. Anhui, Fujian, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Zhejiang.

**16. *Asarum hongkongense*** S. M. Hwang & T. P. Wong Siu, Acta Phytotax. Sin. 28: 406. 1990.

香港细辛 xiang gang xi xin

Herbs. Rhizomes horizontal, ca. 3 mm in diam., internodes 0.8–15 mm. Leaves solitary; petiole 12–30 cm, glabrous; leaf blade uniformly colored, ovate-cordate to ovate, 6–11 × 5–8 cm, both surfaces glabrous, adaxially shiny, base deeply cordate, lateral lobes slightly divaricate, ca. 1.5 × 2–3.5 cm, apex acute; cataphylls ovate, ca. 1.2 × 1 cm. Peduncle ascending, 1.5–4 cm. Calyx purple-green, campanulate-urceolate, ca. 2 × 2.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube broadly ovoid to subglobose, ca. 1.5 × 1.5 cm, slightly constricted at throat, adaxially longitudinally papillate-rugose, orifice ring inconspicuous; lobes broadly ovate, ca. 1.5 × 1.2 cm, base with purple papillate-corrugate area; lateral lobes erect or spreading. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse. Ovary subsuperior. Styles connate, apex with 6, erect, slightly 2-cleft arms; stigmas subterminal. Fl. Feb–May.

- Thickets, mountain slopes, moist shady areas; 500–700 m. Hong Kong.

**17. *Asarum fukienense*** C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 581. 1983.

福建细辛 fu jian xi xin

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes 0.5–1 cm. Leaves solitary; petiole 7–17 cm, yellow pubescent; leaf blade adaxially dark green, occasionally with white patches, triangular-ovate to narrowly ovate, 4.5–10 × 4–7 cm, abaxial surface densely yellowish brown pubescent, adaxial surface pubescent along midvein, base auriculate-cordate, lateral lobes 2–3 × 1.5–3.5 cm, apex acute or shortly acuminate; cataphylls ovate, ca. 1.5 × 1 cm. Peduncle often recurved, 1–2.5 cm. Calyx purplish green, campanulate, 2–3 × 1.5–2 cm; sepals connate beyond attachment to ovary, abaxially yellowish pubescent; tube cylindrical, ca. 1.5 × 1 cm, not constricted apically, adaxially longitudinally ribbed, orifice ring absent; lobes reflexed, broadly ovate, ca. 1.5 × 1 cm, basal 1/2 with yellowish semicircular pulvinate ring. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, awl-shaped. Ovary superior. Styles 6, free, entire; stigmas subterminal. Fl. Apr–Nov.

- Forests, moist shady valleys; 300–1000 m. Anhui, Fujian, Jiangxi, Zhejiang.

**18. *Asarum splendens*** (F. Maekawa) C. Y. Cheng & C. S. Yang in H. S. Kiu & Y. R. Ling, Fl. Reipubl. Popularis Sin. 24: 180. 1988.

花脸细辛 hua lian xi xin

*Heterotropa splendens* F. Maekawa, J. Jap. Bot. 57: 261. 1982; *Asarum chingchengense* C. Y. Cheng & C. S. Yang.

Herbs. Rhizomes horizontal, 2–3 mm in diam., internodes ca. 1.5 cm. Leaves solitary; petiole 8–16 cm, glabrous; leaf blade adaxially often with white blotches, ovate-cordate or nearly hastate, 6–10 × 5–9 cm, abaxial surface glabrous, adaxial surface sparsely pubescent along midvein, base auriculate to subcordate, lateral lobes 2–3.5 × 2–3.5 cm, apex acute; cataphylls oblong, ca. 2 × 1.5 cm. Peduncle recurved, ca. 1 cm. Calyx purplish green, campanulate, 2–3 × 2.5–3 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube broadly cupular to subglobose, ca. 1.4 × 2 cm, slightly constricted at throat, adaxially tessellate, orifice ring narrow, inconspicuous; lobes broadly ovate, ca. 2 × 2.5 cm, base with semi-circular corrugate-papillate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, rounded. Ovary superior. Styles free, apex 2-forked or -notched; stigmas lateral. Fl. Apr–May.

• Thickets, grasslands, moist mountain slopes; 800–1300 m. Guizhou, Hubei, Sichuan, NE Yunnan.

**19. *Asarum forbesii*** Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 31: 92. 1887.

杜衡 du heng

Herbs. Rhizomes vertical, 1–2 mm in diam., internodes 0.5–1 cm. Leaves solitary; petiole 3–15 cm, glabrous; leaf blade adaxially dark green with white blotches along midvein, broadly cordate to reniform-cordate, 3–8 × 3–8 cm, abaxial surface glabrous, adaxial surface with short hairs along midvein, base cordate, lateral lobes 1–3 × 1.5–3.5 cm, apex obtuse to rounded; cataphylls reniform-cordate or obovate, ca. 1 × 1 cm. Peduncle ascending, 1–2 cm. Calyx dark purple, cylindrical to campanulate, 1.5–2.5 × ca. 1 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, 1–1.5 × 0.8–1 cm, not constricted at throat, adaxially tessellate, orifice ring less than 1 mm wide; lobes broadly ovate, 0.5–0.7 × 0.5–0.7 cm, base smooth. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, rounded. Ovary half-inferior. Styles free, apex 2-lobed; stigmas lateral. Fl. Apr–May.

• Forests, moist shady valleys; below 800 m. Anhui, Henan, Hubei, Jiangsu, Jiangxi, Sichuan, Zhejiang.

This species is used medicinally, known as 土细辛 (tu xi xin).

**20. *Asarum crassisepalum*** S. F. Huang et al., Taiwania 40: 100. 1995 [*“crassusepalum”*].

鸳鸯湖细辛 yuan yang hu xi xin

Herbs. Rhizomes horizontal, 1–2 mm in diam., internodes 0.5–1 cm. Leaves solitary; petiole 5–8 cm, villous; leaf blade abaxially uniformly purplish green, adaxially green with white spots, triangular-oblong to triangular-ovate, 3–7 × 2.3–2.9 cm,

abaxial surface glabrous, adaxial surface dotted with glands, pubescent when young, glabrescent with age, base cordate, lateral lobes divaricate, 1–1.4 × ca. 1.7 cm, apex acuminate or acute; cataphylls oblong, to 1 × 0.6 cm. Peduncle ascending to erect, ca. 0.4 cm. Calyx purple, campanulate, 1.5–2 × 1–1.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, 0.4–0.5 × 0.7–1 cm, slightly constricted at throat, adaxially tessellate, orifice ring less than 1 mm wide; lobes ovate-deltoid, ca. 0.4 × 0.5 cm, base irregularly thickened and glandular-rugose. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, ligulate. Ovary nearly superior. Styles free, apex shallowly 2-lobed; stigmas lateral. Fl. Feb–Apr.

• Forests, lake shores; 1600–1700 m. Taiwan.

No specimens were seen; the data above are from the original description and figure.

**21. *Asarum bashanense*** Z. L. Yang, Acta Bot. Boreal.-Occid. Sin. 5: 50. 1985.

巴山细辛 ba shan xi xin

Herbs. Rhizomes vertical, 2–5 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 8–25 cm, glabrous to sparsely pilose; leaf blade uniformly colored, ovate-cordate to hastate-cordate, 6–17 × 5–16 cm, abaxial surface glabrous, adaxial surface pubescent, base broadly cordate, lateral lobes 2–3 × 3.5–6 cm, apex acute to acuminate; cataphylls ovate to ovate-lanceolate, ca. 1.5 × 1 cm. Peduncle ascending to recurved, 1–5 cm. Calyx deep red, campanulate-rotate, 2–3 × 4–5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube cylindrical, ca. 0.9 × 1–1.5 cm, slightly constricted at throat, adaxially reticulate-corrugate, orifice ring ca. 1 mm wide; lobes broadly ovate, 1.5–2 × 2–2.5 cm, base with a rounded papillose area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse. Ovary half-inferior. Styles free, apex notched; stigmas lateral. Fl. Mar–Jun.

• Forests, mountain slopes, moist shady areas; 700–900 m. Sichuan.

No specimens were seen; the data above are from the original description and figure. That figure was labeled “*Asarum infaustum* Z. L. Yang,” but this was clearly in error because this name is otherwise unknown and the same vernacular name as *A. bashanense* was used.

**22. *Asarum taipingshanianum*** S. F. Huang C. X. Xie & T. C. Huang, Taiwania 40: 106. 1995.

太平山细辛 tai ping shan xi xin

Herbs. Rhizomes horizontal, 2–3 mm in diam., internodes 1–3 cm. Leaves solitary; petiole 6–8 cm, sparsely pubescent to glabrescent; leaf blade abaxially uniformly pale green or purple, adaxially green with white spots, triangular-oblong, 3.2–5.3 × 2.1–4.7 cm, adaxial surface dotted with glands, glabrescent to sparsely pubescent along veins and margin, base cordate, lateral lobes 1–2 × 1.3–2.3 cm, apex obtuse; cataphylls ovate, to 1 × 1 cm. Peduncle ascending to recurved, ca. 0.4 cm. Calyx purple, campanulate, 1.5–2 × 1–1.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube campanulate, ca. 1 × 1 cm, slightly constricted at throat, adaxially inconspicuous.

ously tessellate, orifice ring absent; lobes spreading, broadly ovate, 0.5–0.8 × 0.4–0.7 cm, adaxially pubescent. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obconic. Ovary nearly superior. Styles free, apex emarginate; stigmas lateral. Fl. Jan.

- Forests, shady mountain slopes; ca. 1900 m. Taiwan.

No specimens were seen; the data above are from the original description and figure.

**23. *Asarum macranthum*** J. D. Hooker, Bot. Mag. 114: t. 7022. 1888.

大花细辛 da hua xi xin

*Asarum albomaculatum* Hayata; *A. infrapurpleum* Hayata; *A. taitonense* Hayata; *Heterotropa albomaculata* (Hayata) F. Maekawa ex Nemoto; *H. infrapurea* (Hayata) F. Maekawa ex Nemoto; *H. macrantha* (J. D. Hooker) F. Maekawa ex Nemoto; *H. taitoensis* (Hayata) F. Maekawa ex Nemoto.

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole streaked reddish brown, 10–20 cm, glabrous; leaf blade abaxially greenish, purple along principal veins, adaxially greenish with yellow-green blotches, triangular-ovate, 10–13 cm, both surfaces sparsely pubescent, base deeply cordate, lateral lobes rounded, 1–1.5 × 2–2.5 cm, apex acute; cataphylls broadly ovate, 0.8–1 × 0.6–0.8 cm. Peduncle ascending to erect, ca. 0.9 cm. Calyx dark purple, campanulate, 3–3.5 × 5–6 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube obconic, ca. 1.7 × 2 cm, strongly constricted at throat, adaxially tessellate, orifice ring 4–5 mm wide, broadly laminate; lobes broadly ovate, ca. 2.5 × 2 cm, base with papillate-corrugate area, undulate along margin. Stamens 12, oblong; filaments much shorter than anthers; connectives slightly extended beyond anthers, notched; staminodes 3, petaloid. Ovary superior. Styles free, apex hooked; stigmas lateral, linear-oblong. Fl. May.

- Forests; 500–1000 m. Taiwan.

**24. *Asarum crispulatum*** C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 585. 1983.

皱花细辛 zhou hua xi xin

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole uniformly green, 6–15 cm, pubescent; leaf blade abaxially uniformly light green, adaxially dark green, occasionally with white blotches, ovate-cordate or narrowly ovate, 5–9 × 2.5–5 cm, abaxial surface glabrous, adaxial surface sparsely pubescent along veins and margin, base cordate or auriculate-cordate, lateral lobes 2–3.5 × ca. 4.5 cm, apex acute or shortly acuminate; cataphylls ovate, ca. 2 × 1.3 cm. Peduncle ascending to recurved, ca. 1 cm. Calyx purple-green, rotate, 3–4 × 3–5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube obconic, ca. 1.5 × 1.2–2 cm, strongly constricted at throat, adaxially tessellate, orifice ring ca. 1.5 mm wide; lobes ovate, 1.8–2.2 × 2–2.8 cm, base with papillate-corrugate area, slightly undulate along margin. Stamens 12, triangular; filaments much shorter than anthers; connectives slightly extended beyond anthers, acute to

obtuse. Ovary half-inferior. Styles free, apex 2-forked and slightly uncinatate; stigmas lateral; oblong-ovoid. Fl. Apr.

- Forests, moist shady areas, mountain slopes, roadsides. Sichuan.

**25. *Asarum delavayi*** Franchet, Bull. Mus. Hist. Nat. (Paris) 1: 66. 1895.

川滇细辛 chuan dian xi xin

*Asarum maekawae* Hara.

Herbs robust. Rhizomes horizontal, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 10–21 cm, glabrous; leaf blade abaxially greenish, rarely reddish purple, glossy, adaxially green, occasionally with white blotches or white reticulate veins, ovate or sagittate, 7–15 × 6–11 cm, adaxial surface sparsely pubescent along veins, base auriculate or auriculate-cordate, lateral lobes 2–6 × 1.5–5 cm, apex long acuminate; cataphylls oblong or ovate, 1–3 × 0.8–1 cm. Peduncle ascending to recurved, 1–3.5 cm. Calyx purple-green, campanulate, 4–5 × 4–6 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, ca. 2 × 1.5 cm, strongly constricted at throat, adaxially tessellate, orifice ring 2–3 mm wide; lobes broadly ovate, 2–3 × 3–4 cm, base with papillate-rugose area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, awl-shaped. Ovary nearly superior or half-inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Apr–Jun.

- Forests, thickets, moist shady areas, mountain slopes; 800–1600 m. SW Sichuan, NE Yunnan.

**26. *Asarum hypogynum*** Hayata, Icon. Pl. Formosan. 5: 144. 1915.

下花细辛 xia hua xi xin

*Asarum grandiflorum* Hayata (1915), not Klotzsch (1859); *A. grandiflorum* var. *colocasiifolium* Hayata; *A. hayatana* F. Maekawa ex Masamune; *Heterotropa hayatana* F. Maekawa; *H. hayatana* f. *colocasiifolia* (Hayata) F. Maekawa ex Nemoto; *H. hypogyna* (Hayata) F. Maekawa ex Nemoto.

Herbs. Rhizomes vertical, 5–6 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 10–18 cm, glabrescent; leaf blade adaxially green with white spots, oblong-triangular, 13–19.5 × 6.6–20 cm, abaxial surface uniformly pale green, dotted with glands, adaxial surface initially glabrescent, base deeply cordate, lateral lobes 3–9 × 2.8–9.5 cm, apex acuminate or caudate; cataphylls ovate, ca. 0.4 × 0.5 cm. Peduncle ascending, 3–6 cm. Calyx purple-green, campanulate-rotate, 3–3.5 × 3–4 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, ca. 0.9 × 1 cm, strongly constricted at throat, adaxially tessellate, orifice ring ca. 1.5 mm wide; lobes subrotund, ca. 1 × 2 cm, base with abundant glands and papillate-corrugate area. Stamens 12; filaments much shorter than anthers; connectives not extended beyond anthers, rounded. Ovary superior or half-inferior. Styles free, apex 2-cleft; stigmas subterminal. Fl. Oct–Jul.

- Forests, shady areas, mountain slopes; 1000–2000 m. Taiwan.

No specimens were seen; the data above are from the original description and figure.

27. *Asarum chengkouense* Z. L. Yang, Acta Bot. Boreal.-Occid. Sin. 5: 54. 1985.

城口细辛 cheng kou xi xin

Herbs. Rhizomes horizontal, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 4–7 cm, pilose; leaf blade abaxially light green to purplish, adaxially white variegated between the veins, ovate-cordate to elongate cordate, 7–9 × 4–8 cm, abaxial surface subglabrous, adaxial surface subglabrous, base cordate, lateral lobes 2–4 × 2–5 cm, apex acuminate; cataphylls lanceolate to broadly ovate, ca. 1.5 × 1–1.5 cm. Peduncle recurved, ca. 1 cm. Calyx campanulate, 3–4 × 2.5–3 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, 1.2–1.5 × 0.6–1.3 cm, slightly constricted at throat, adaxially corrugate-reticulate, orifice ring ca. 2 mm wide; lobes broadly ovate, 1.5–2 × ca. 1.5 cm, base with papillate-corrugate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, rounded. Ovary half-inferior. Styles free, apex notched; stigmas lateral. Fl. Jun.

- Forests, mountain slopes; 1000–1200 m. Chongqing.

No specimens were seen; the data above are from the original description and figure.

28. *Asarum porphyronotum* C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 586. 1983.

紫背细辛 zi bei xi xin

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 5–15 cm, glabrescent; leaf blade abaxially uniformly purple-red or greenish, adaxially with or without white blotches, elliptic-oblong to broadly ovate, rarely nearly hastate, 6–10 × 5–7 cm, abaxial surface glabrescent, adaxial surface sparsely pubescent along veins and margin, base auriculate to cordate, apex acute or obtuse; cataphylls broadly ovate, 1–2 × 8–1 cm. Peduncle ascending, 3–6 cm. Calyx purple-green, rotate-urceolate, 1.5–2 × 2–2.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube urceolate, 1–1.2 × 1.1–1.4 cm, strongly constricted at throat, adaxially tessellate, orifice ring ca. 1 mm wide; lobes broadly triangular-ovate, ca. 0.8 × 1 cm, base densely papillate in a triangular pattern. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, acute to obtuse. Ovary nearly superior. Styles free, apex 2-forked; stigmas lateral. Fl. Apr–May.

- Forests, thickets, moist shady areas. Sichuan.

This species contains carcinogenic substances.

- 1a. Leaf blade adaxially light green, with white blotches, abaxially purplish red; connectives acute ..... 28a. var. *porphyronotum*
- 1b. Leaf blade adaxially dark green, without blotches, abaxially light green; connectives obtuse ..... 28b. var. *atrovirens*

28a. *Asarum porphyronotum* var. *porphyronotum*

紫背细辛(原变种) zi bei xi xin (yuan bian zhong)

Leaf blade abaxially purplish red, adaxially light green, white blotched. Anther connectives acute. Fl. Apr–May.

- Forests, thickets, moist shady areas. Sichuan.

28b. *Asarum porphyronotum* var. *atrovirens* C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 586. 1983.

深绿细辛 shen lu xi xin

Leaf blade adaxially dark green, without blotches, abaxial surface greenish. Anther connectives obtuse.

- Sichuan.

29. *Asarum inflatum* C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 589. 1983.

灯笼细辛 deng long xi xin

?*Asarum dabiieshanense* D. Q. Wang & S. H. Hwang.

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 7–10 cm, puberulent; leaf blade uniformly colored, ovate, triangular-ovate, or subhastate, 4–11 × 5–11 cm, abaxial surface glabrous or puberulent, adaxial surface puberulent along veins and margin, base auriculate, lateral lobes divaricate, 2.5–3.5 × ca. 2.3 cm, apex acute; cataphylls ovate, ca. 1.5 × 1 cm. Peduncle ascending to recurved, ca. 1 cm. Calyx dull purple, campanulate-rotate, inflated at middle, 3–4 × 3–4.5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube lantern-shaped, basal 1/2 cylindric, ca. 1 × 1.5 cm, apical 1/2 abruptly swollen into broad disk with abaxial ridges, ca. 0.9 × 2 cm, narrowly constricted at throat, adaxially densely rugose-ribbed, orifice ring ca. 4 mm wide; lobes ovate, ca. 3.5 × 2.5 cm, base with pinkish triangular corrugate-papillate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse. Ovary half-inferior. Styles free, apex 2-forked; stigmas lateral. Fl. May.

- Forests, valleys, moist places, rock fissures. ?Anhui, NE Sichuan.

*Asarum dabiieshanense*, described from Anhui (Changchong), is included here on the basis of the protologue; further research is needed to clarify its position and status.

This species is used medicinally.

30. *Asarum maximum* Hemsley, Gard. Chron., ser. 3, 7: 422. 1890.

大叶细辛 da ye xi xin

Herbs. Rhizomes horizontal, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 10–23 cm, glabrous; leaf blade adaxially dull green, rarely with white blotches, narrowly to broadly ovate, or nearly hastate, 6–13 × 7–15 cm, abaxial surface glabrescent, adaxial surface pubescent along veins and margin, base cordate, lateral lobes 3–7 × 3.5–6 cm, apex acute; cataphylls ovate, 1–1.8 × 0.8–1 cm. Peduncle ascending to recurved, 1–5 cm. Calyx dark purple, campanulate-rotate, 3–4 × 4–6 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube campanulate, ca. 2.5 × 1.5–2 cm, middle portion abruptly swollen forming a robust girdle-like ring near middle abaxially lacking ridges, slightly constricted at throat, adaxially longitudinally ribbed, orifice ring absent or corrugate and not contiguous; lobes broadly ovate, 2–4 × 2–3 cm, basal 1/2 with

transversely papillate-corrugate rows, base with white semicircular pulvinate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse. Ovary half-inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Apr–May.

- Forests, in humus; 600–800 m. Hubei, Sichuan.

**31. *Asarum insigne*** Diels, Notizbl. Bot. Gart. Berlin-Dahlem 10: 885. 1930.

金耳环 jin er huan

*Asarum gracilipes* C. S. Yang ex C. F. Liang; *A. longepedunculatum* O. C. Schmidt.

Herbs. Rhizomes vertical, 2–4 mm in diam., internodes 0.2–0.5 cm. Leaves solitary; petiole 10–20 cm, uncinat-sericeous; leaf blade adaxially with white blotches on lateral veins, narrowly ovate, ovate, or triangular-ovate, 10–15 × 6–11 cm, abaxial surface with tiny oily spots, uncinat-sericeous along veins and margin, adaxial surface sparsely uncinat-sericeous, base deeply auriculate, lateral lobes divaricate, ca. 4 × 4–6 cm, apex acute or acuminate; cataphylls ovate, 1.5–3.5 × 1–1.5 cm. Peduncle ascending to recurved, 2–9.5 cm. Calyx purplish, campanulate-rotate, 3–4 × 3.5–5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube campanulate, 1.5–2.5 × ca. 1.5 cm, apical portion swollen and expanded into a girdle-shaped ring without adaxial ridges, narrowly constricted and triangular at throat, adaxially longitudinally plicate, orifice ring absent; lobes broadly ovate to reniform-ovate, 1.5–2.5 × 2–3.5 cm, base with white semicircular pulvinate area ca. 1 cm wide. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, awl-shaped to broadly ligulate. Ovary inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Apr–Mar.

- Forests, mountain slopes, rock fissures; ca. 500 m. Guangdong. Guangxi. Jiangxi.

**32. *Asarum nanchuanense*** C. S. Yang & J. L. Wu, J. Arnold Arbor. 64: 591. 1983.

南川细辛 nan chuan xi xin

Herbs. Rhizomes vertical, 3–4 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 2.5–7.5 cm, glabrous; leaf blade abaxially reddish purple, glossy, rarely green, adaxially green with white blotches along veins, cordate or ovate-cordate, 5–7.5 × 6–8.5 cm, abaxial surface glabrous, adaxial surface pubescent along lateral veins, base cordate, lateral lobes divaricate, 2–2.5 × ca. 3.5 cm, apex acute; cataphylls broadly ovate, ca. 2 × 1.8 cm. Flowers usually paired. Peduncle ascending, ca. 1.5 cm. Calyx purplish, urceolate-rotate, 3–4 × 2.5–3 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube cylindric, 2–2.5 × ca. 2 cm, slightly constricted at throat, adaxially longitudinally 10-ribbed, orifice ring inconspicuous or absent; lobes broadly ovate, ca. 1.5 × 1.5 cm, base with small pulvinate area and scattered papillae. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, awl-shaped. Ovary half-inferior. Styles free, apex notched; stigmas lateral. Fl. May.

- Thickets, rock crevices. Chongqing.

**33. *Asarum sagittarioides*** C. F. Liang, Acta Phytotax. Sin. 13(2): 23. 1975.

慈姑叶细辛 ci gu ye xi xin

Herbs robust, with fleshy roots. Rhizomes vertical, 3–4 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 15–25 cm, glabrous; leaf blade adaxially deep green, rarely blotched, narrowly or broadly ovate to triangular-ovate, 15–25 × 11–14 cm, abaxial surface glabrescent, adaxial surface glabrous, base auriculate-ovate or auriculate, lateral lobes divaricate, 6–11 × 4–6 cm, apex acuminate; cataphylls ovate, ca. 1 × 0.5 cm. Peduncle ascending, 1.5–6 cm. Calyx purplish green, campanulate, 2.5–3 × 2.5–3 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, 1.5–2.5 × 0.7–1.2 cm, strongly constricted at throat, adaxially longitudinally ribbed, orifice ring ca. 2 mm wide; lobes ovate-reniform, 1–1.4 × 1.2–1.8 cm, base with papillate-corrugate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, awl-shaped. Ovary half-inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Nov–Apr.

- Thickets, moist shady areas, mountain slopes, near streams; 900–1200 m. Guangxi.

**34. *Asarum longerhizomatosum*** C. F. Liang & C. S. Yang, Acta Phytotax. Sin. 13(2): 21. 1975.

长茎金耳环 chang jing jin er huan

Herbs slender, with fibrous roots. Rhizomes horizontal, 2–3 mm in diam., internodes 6–12 cm. Leaves solitary; petiole 7–18 cm, glabrous; leaf blade uniformly colored, oblong-ovate or narrowly elliptic-ovate, 8–14 × 5–8 cm, abaxial surface glabrous, adaxial surface sparsely pubescent, more densely so along veins and margin, base auriculate or nearly hastate, lateral lobes nearly triangular, 3–3.5 × 2–2.5 cm, apex acuminate; cataphylls narrowly ovate, 1–1.5 × 0.5–0.7 cm. Flowers solitary. Peduncle ascending, ca. 1.5 cm. Calyx purplish green, urceolate-campanulate, 2–3 × 2–3 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube cylindric, ca. 1.5 × 1 cm, strongly constricted at throat, adaxially longitudinally corrugate, orifice ring ca. 2 mm wide; lobes broadly ovate, ca. 1.5 × 1.5 cm, base with papillate-corrugate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, ligulate. Ovary half-inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Jul–Dec.

- Thickets, open mountain slopes, moist shady areas; ca. 200 m. Guangxi.

The protologue apparently cites two types, “*C. L. Chang 001*” and “*C. L. Chang 002*” deposited in CMMI (Institute of Chinese Materia Medica, Beijing) and IBK (Guangxi Institute of Botany), respectively, which would make the name invalid. However, all other information for these specimens is identical, so we prefer to regard the specimens as holotype and isotype and the name, therefore, as valid.

**35. *Asarum nobilissimum*** Z. L. Yang, Acta Bot. Boreal-Occid. Sin. 5: 56. 1985.

高贵细辛 gao gui xi xin

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes less than 1 cm. Leaves solitary; petiole 6–14 cm, glabrous; leaf

blade adaxially faintly white spotted, ovate-cordate, 5–11 × 5–10 cm, abaxial surface glabrous, adaxial surface puberulent along veins and margin, base cordate, lateral lobes divaricate, 2.5–3.5 × 2–4 cm, apex shortly acuminate; cataphylls lanceolate. Peduncle recurved, 1–5.5 cm. Calyx deep purple, campanulate-rotate, 3–5 × 4–6 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube lantern-shaped, 1–2 × 1–2 cm, constricted at throat, adaxially longitudinally corrugate, becoming reticulate above, orifice ring 3–4 mm wide; lobes ovate to broadly ovate, 2–3 × ca. 2 cm, base with triangular corrugate-papillate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, obtuse. Ovary half-inferior. Styles free, apex notched; stigmas lateral. Fl. May.

- Forests, mountain slopes; 800–1100 m. Sichuan.

No specimens were seen; the data above are from the original description and figure.

**36. *Asarum tongjiangense*** Z. L. Yang, Acta Bot. Boreal.-Occid. Sin. 5: 52. 1985.

同江细辛 tong jiang xi xin

Herbs. Rhizomes horizontal, ca. 3 mm in diam., internodes 0.5–2(–5) cm. Leaves solitary; petiole 8–22 cm, glabrous; leaf blade uniformly green, ovate-cordate to triangular-cordate, or rarely hastate-cordate, 5–13 × 4–10 cm, abaxial surface glabrous, adaxial surface velutinous, base cordate or rarely auriculate, lateral lobes 1.5–2 × 1.5–4 cm, apex acuminate; cataphylls lanceolate, ca. 1.8 × 0.6–1 cm. Peduncle ascending, 1–3.5 cm. Calyx purplish, campanulate, 4–5 × 3–4 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube subcylindric, 1.2–1.5 × 0.9–1.5 cm, slightly constricted at throat, adaxially longitudinally corrugate, orifice ring 2–3 mm wide; lobes triangular-ovate, 1.5–2 × 1–2 cm, adaxially densely tomentose, base with triangular papillate-rugose area. Stamens 12; filaments shorter than anthers; connectives slightly extended beyond anthers, ligulate. Ovary nearly superior or half-inferior. Styles free, apex notched; stigmas lateral. Fl. Apr–Jun.

- Forests, mountain slopes; 800–1400 m. NE Sichuan.

No specimens were seen; the data above are from the original description and figure.

**37. *Asarum wulingense*** C. F. Liang, Acta Phytotax. Sin. 13(2): 22. 1975.

五岭细辛 wu ling xi xin

Herbs. Rhizomes vertical, 3–4 mm in diam., internodes less than 5 mm. Leaves solitary; petiole recurved, 7–18 cm, pubescent; leaf blade adaxially green with white blotches, narrowly ovate or ovate-elliptic, rarely triangular-ovate, 7–17 × 5–9 cm, abaxial surface densely brown-yellow pubescent, adaxial surface glabrous or pubescent along lateral veins and margin, base auriculate or auriculate-cordate, lateral lobes divaricate, 2–5 × 1.5–4 cm, apex acute to acuminate; cataphylls ovate, ca. 1.2 × 0.8 cm. Peduncle recurved, ca. 2 cm. Calyx purplish, urceolate-campanulate, 2–3 × 2–3 cm; sepals connate beyond attachment to ovary, abaxially densely yellow pubescent; tube cylindric, ca. 2.5 × 1.2 cm, constricted at throat, adaxially longitudinally ribbed, orifice ring ca. 1 mm wide;

lobes triangular-ovate, ca. 1.5 × 1.5 cm, base with papillate-corrugate area. Stamens 12; filaments much shorter than anthers; connectives extended beyond anthers, ligulate. Ovary inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Dec–Apr.

- Forests, mountain slopes, moist shady areas; ca. 1100 m. Guangdong, Guangxi, Guizhou, Hunan, Jiangxi.

**38. *Asarum magnificum*** Tsiang ex C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 593. 1983.

祁阳细辛 qi yang xi xin

Herbs. Rhizomes vertical, 2–3 mm in diam., internodes less than 5 mm. Leaves solitary; petiole 6–16 cm, glabrescent; leaf blade adaxially with or without white blotches, triangular-ovate or nearly triangular to elliptic-ovate, 6–13 × 5–12 cm, abaxial surface glabrous, adaxial surface pubescent along mid-vein or over entire surface, base cordate-auriculate, apex acute or shortly acuminate; cataphylls ovate, ca. 1.5 × 0.7 cm. Peduncle recurved, ca. 1.5 cm. Calyx purplish green, urceolate-rotate, 3–5 × 4–5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube cylindric, 1–5 × 0.8–1.5 cm, not constricted at throat, adaxially longitudinally ribbed with rows of papillae, orifice ring inconspicuous; lobes triangular-ovate, ca. 3 × 2.5–3 cm, base with triangular papillate area. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, acute. Ovary inferior. Styles free, apex 2-forked; stigmas lateral. Fl. Apr–May.

- Forests, thickets, mountain slopes, moist shady areas; 300–700 m. Guangdong, Hunan.

- 1a. Calyx tube 3–5 × ca. 1.5 cm; leaf blade triangular-ovate or nearly triangular, adaxially with white blotches, pubescent only on veins ..... 38a. var. *magnificum*
- 1b. Calyx tube ca. 1 × 0.8 cm; leaf blade elliptic-ovate, adaxially without white blotches, sparsely pubescent ..... 38b. var. *dinghuense*

**38a. *Asarum magnificum* var. *magnificum***

祁阳细辛(原变种) qi yang xi xin (yuan bian zhong)

Leaf blade adaxially with white blotches, triangular-ovate or nearly triangular, adaxial surface pubescent only on veins. Calyx tube 3–5 × ca. 1.5 cm.

- Forests, mountain slopes, moist shady areas; 300–700 m. Hunan.

**38b. *Asarum magnificum* var. *dinghuense*** C. Y. Cheng & C. S. Yang, J. Arnold Arbor. 64: 596. 1983.

鼎湖细辛 ding hu xi xin

Leaf blade adaxially without white blotches, elliptic-ovate, adaxial surface sparsely pubescent. Calyx tube ca. 1 × 0.8 cm.

- Thickets, moist shady areas; 300–700 m. Guangdong.

**39. *Asarum petelotii*** O. C. Schmidt, Notizbl. Bot. Gart. Berlin-Dahlem 11: 100. 1931.

红金耳环 hong jin er huan

## ARISTOLOCHIACEAE

Herbs. Rhizomes horizontal, 3–4 mm in diam., internodes 6–8 cm. Leaves solitary; petiole 8–23 cm, glabrous; leaf blade uniformly colored, narrowly ovate, triangular-ovate, or oblong-hastate, 13–21 × 6.5–13 cm, abaxial surface pubescent along veins then glabrescent, adaxial surface glabrous, base auriculate or hastate, lateral lobes divaricate, ca. 7 × 6 cm, apex long acuminate; cataphylls ovate-lanceolate, ca. 1.6 × 0.5 cm. Peduncle ascending, 3–5 cm. Calyx purple or greenish purple, urceolate-rotate, 4–5 × 4–5 cm; sepals connate beyond attachment to ovary, abaxially glabrous; tube cylindrical, asymmetrically inclined to one side, 3–5 × 1.5–2 cm, slightly constricted at throat, adaxially longitudinally ribbed with rows of papillae,

orifice ring inconspicuous; lobes broadly ovate, ca. 2 × 2.5 cm, middle with semirounded purplish area, base with papillae, these forming vertical rows extending basally. Stamens 12; filaments much shorter than anthers; connectives slightly extended beyond anthers, ligulate. Ovary half-inferior. Styles free, apex 2-fid; stigmas lateral. Fl. Feb–May.

Forests, mountain slopes, moist shady areas; 1100–1700 m. S Yunnan [Vietnam].

No specimens were seen; the data above are from the original description and figure.

This species is used medicinally.

### 3. *THOTTEA* Rottbøll, Nye Saml. Kongel. Danske Vidensk. Selsk. Skr. 2: 529. 1783.

线果兜铃属 xian guo dou ling shu

Subshrubs or rarely shrubs, erect. Leaves alternate, pinnately veined or palmately 3–5-veined, margin entire. Flowers axillary, arranged in racemes, cymes, corymbs, or scorpioid cymes; bracts opposite to flowers. Perianth uniseriate, actinomorphic. Calyx lobes fused; tube campanulate, cupular, or urceolate, throat usually with thickened ring; lobes 3 or 4, valvate. Stamens 8 or 9 in 1 series [or 6–36(–46) in 1 or 2 series]; filaments short or absent, free or partly connate, adnate to style with anthers remaining free; anthers extrorse. Ovary inferior, 4-loculed; carpels fully connate. Style short, 5–20-lobed; stigma terminal or lateral. Fruit siliquiform. Seed: testa transversely rugose or glandular punctate.

About 25 species: India, Indonesia, Malaysia, Myanmar, Philippines, Vietnam; one species (endemic) in China.

1. *Thottea hainanensis* (Merrill & W. Y. Chun) D. Hou, Blumea 27: 321. 1981.

海南线果兜铃 hai nan xian guo dou ling

*Apama hainanensis* Merrill & W. Y. Chun, Sunyatsenia 2: 220. 1935.

Subshrubs to 1 m tall. Branchlets densely brown-yellow pubescent, nodes swollen, internodes 2–5 cm. Petiole ca. 1 cm; leaf blade obovate or oblong, rarely ovate or elliptic, 20–30 × 8–12 cm, papery or thin leathery, both surfaces glabrous or with

sparse hairs on veins, veins pinnate, 8–12 pairs, reticulate veins conspicuous, base subrounded, apex acute or acuminate. Racemes aggregated in cymes or corymbs, 3–5 cm. Pedicel pubescent; bracts lanceolate, 4–9 × 1.5–2.5 mm. Calyx purplish red, campanulate, ca. 1 × 1 cm; ring inconspicuous; lobes triangular, 3 × 4 mm. Anthers oblong. Style column robust, apex shortly 6-lobed; lobes linear-lanceolate, 1.5–3 mm. Fruit 4-angled, ca. 5 × 0.5 cm. Seeds oblong-globose, obtusely triangular, 3.5 × 2.5 mm. Fl. Aug–Dec, fr. Feb–Apr.

• Dense forests. Hainan.

### 4. *ARISTOLOCHIA* Linnaeus, Sp. Pl. 2: 960. 1753.

马兜铃属 ma dou ling shu

*Hocquartia* Dumortier; *Isotrema* Rafinesque.

Shrubs or herbs, rarely subshrubs or lianas, usually twining or climbing, rarely erect. Roots often tuberous. Stems woody or herbaceous. Leaves alternate, veins pinnate or palmately 3–7 from base, margin entire or 3–7-lobed. Flowers axillary, sometimes produced from old woody stems, solitary, fasciculate, or arranged in inflorescences. Perianth uniseriate, zygomorphic (in China). Calyx lobes fused; tube often enlarged at or near base to form a utricle, apically cylindrical or funnel-shaped, rectilinear or curved; limb ligulate, discoid, or subpeltate; lobes 1–3 (less commonly to 6-dentate). Stamens 6 in 1 series, fully adnate to the style column to form gynostemium; filaments absent; anthers extrorse. Ovary inferior, 6-loculed, 6-angled; carpels fully connate; gynostemium 3- or 6-lobed. Fruit dry capsules, 6-valved, dehiscent from the apex (acropetally) or from the base (basipetally) [or rarely indehiscent]. Seeds flat or plano-convex, with or without wing, with fleshy funicle, persistent on seed as a membranous elaiosome.

About 400 species: widely distributed in tropical, subtropical, and temperate regions of the Old World, also in Australia; 45 species (33 endemic) in China.

*Aristolochia jingiangensis* H. Zhang & C. K. Hsieh (Acta Acad. Medic. Sichuan 15: 12. 1984) and *A. faucimaculata* H. Zhang & C. K. Hsien (loc. cit.: 13. 1984) are known to us by name only. *Aristolochia blinii* H. Léveillé, *A. mairei* H. Léveillé, *A. viridiflora* H. Léveillé, and *A. viridiflora* var. *occlusa* H. Léveillé are all *Ceropegia mairei* (H. Léveillé) H. Huber (Asclepiadaceae).

Wu Zhengyi (editor's note) believes that species 1–29 should be transferred to the genus *Isotrema*.

1a. Herbs twining; calyx tube rectilinear or slightly curved; utricle present; tube gradually dilated to funnellform apically; limb ligulate; gynostemium 6-lobed; anthers elliptic, opposite to lobes of gynostemium; capsule usually dehiscent

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- acropetally.
- 2a. Utricle stipitate, with short stipe connected to ovary.
- 3a. Leaf blade deeply 3-lobed ..... 42. *A. polymorpha*
- 3b. Leaf blade entire or lobed.
- 4a. Leaf blade glabrous on both surfaces, veins and veinlets sparsely reticulate ..... 43. *A. tagala*
- 4b. Leaf blade densely puberulous or pubescent abaxially, at least along veinlets, veins and veinlets closely reticulate or foveolate-reticulate.
- 5a. Leaf blade ovate-lanceolate to lanceolate, base auriculate, sinus 0.4–0.6 cm deep; seeds without wing ..... 44. *A. impressinervis*
- 5b. Leaf blade triangular-ovate to rhombic-cordate, base shallowly cordate; seeds with wing ..... 45. *A. zollingeriana*
- 2b. Utricle sessile, directly attached to ovary.
- 6a. Leaf blade abaxially densely puberulous, hairs along veins and veinlets forming closely foveolate reticulation.
- 7a. Racemes less than 3 cm or flowers almost fasciculate.
- 8a. Leaf blade triangular-lanceolate to sagittate, base auriculate, lateral lobes parallel or spreading ..... 29. *A. austrochinensis*
- 8b. Leaf blade ovate-lanceolate to lanceolate, base deeply cordate to auriculate, lateral lobes overlapping or slightly incurved ..... 30. *A. foveolata*
- 7b. Racemes 3–6 cm.
- 9a. Bracts and bractlets ovate, ca. 1.5 × 1 cm, base cordate and slightly amplexicaul ..... 31. *A. chlamydophylla*
- 9b. Bracts and bractlets subulate to ovate-lanceolate, 3–10 × 1–4 mm, base rounded to cuneate ..... 32. *A. fordiana*
- 6b. Leaf blade adaxially glabrous or pubescent, but without hairs along veins and veinlets.
- 10a. Stems and leaves densely white or brownish villous ..... 33. *A. fujianensis*
- 10b. Stems and leaves generally glabrous or glabrate (*A. longganensis* densely pubescent on abaxial leaf surface, otherwise glabrous).
- 11a. Calyx limb with long-tailed or long-acuminate apex.
- 12a. Leaf blade ovate-cordate or cordate to subrotund; seeds without wing ..... 34. *A. longganensis*
- 12b. Leaf blade narrowly deltate to deltate-cordate; seeds with membranous wing ..... 35. *A. contorta*
- 11b. Calyx limb with obtuse to acute apex (occasionally long acuminate in *A. zhongdianensis*).
- 13a. Leaves sessile or subsessile; stems pruinose, with condensed nodes ..... 37. *A. delavayi*
- 13b. Leaves petiolate; stems green, with elongate internodes.
- 14a. Seeds obtusely deltoid, with membranous wing; capsule 4–6 cm in diam. .... 36. *A. debilis*
- 14b. Seeds ovoid, without wing; capsule 1–2.5 cm in diam.
- 15a. Leaf blade 0.5–4 × 0.5–5 cm, rounded-cordate, triangular-cordate, or subreniform; petiole 1–4 cm; bractlets subulate.
- 16a. Leaf blade deltate-cordate, 0.5–3 × 0.5–2 cm, base auriculate ..... 38. *A. zhongdianensis*
- 16b. Leaf blade cordate-reniform or rounded-cordate, 3–4 × 4–5 cm, base shallowly cordate ..... 39. *A. gentilis*
- 15b. Leaf blade 3–15 × 3–16 cm, cordate or ovate-cordate; petiole 2–10 cm; bractlets ovate.
- 17a. Leaf blade densely punctate; petiole and branchlets with red juice when broken; roots linear or terete ..... 40. *A. tubiflora*
- 17b. Leaf blade not punctate; petiole and branchlets without red juice; roots fusiform or globose ..... 41. *A. tuberosa*
- 1b. Shrubs climbing, rarely shrubs erect or lianas; calyx tube horseshoe-shaped or geniculately curved at middle; limb often 2- or 3-lobed; gynostemium 3-lobed; anthers oblong, adnate in pairs opposite the gynostemium lobes; capsule usually dehiscent basipetally.
- 18a. Calyx limb cylindrical or saccate, 2–6-dentate or deeply 2- or 3-lobed.
- 19a. Calyx limb saccate, asymmetric.
- 20a. Calyx limb ca. 6 × 1.5 cm; lobes lanceolate, ca. 25 × 10 mm ..... 23. *A. forrestiana*
- 20b. Calyx limb 1–2 × 0.3–1.5 cm; lobes ovate-deltate, ca. 4 × 5 mm ..... 24. *A. utriformis*
- 19b. Calyx limb cylindrical or subcylindrical (sometimes slightly expanded apically), symmetric.
- 21a. Shrubs erect; stems and branchlets with condensed nodes; calyx limb 5- or 6-dentate ..... 25. *A. thwaitesii*
- 21b. Shrubs or herbs climbing; stems and branchlets with elongate internodes; calyx limb 2- or 3-lobed.
- 22a. Calyx limb indistinctly 2- or 3-lobed; lobes unequal ..... 26. *A. transsecta*
- 22b. Calyx limb distinctly 3-lobed; lobes equal or slightly unequal.
- 23a. Leaf blade ovate, abaxially densely gray or yellow-brown villous; calyx lobes subrounded ..... 27. *A. ovatifolia*
- 23b. Leaf blade trullate-lanceolate, ovate-lanceolate, or lanceolate, abaxially sparsely pubescent or glabrescent; calyx lobes lanceolate-acuminate ..... 28. *A. cucurbitoides*
- 18b. Calyx limb discoid or obliquely trumpet-shaped, 3-lobed.
- 24a. Calyx limb gradually dilated above, obliquely trumpet-shaped; lobes distinctly recurved, orifice larger than tube.
- 25a. Leaf blade base cordate, abaxially densely white tomentose; calyx with purple veins and blotches, orifice nearly quadrate ..... 21. *A. saccata*
- 25b. Leaf blade base rounded, abaxially villous to glabrescent, hairs brownish or yellowish; calyx without

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- blotches, orifice nearly orbicular ..... 22. *A. hainanensis*
- 24b. Calyx limb abruptly expanded, discoid, lobes plano-spreading, orifice distinctly smaller than tube.
- 26a. Leaf blade polymorphic, margin deeply or shallowly lobed, rarely entire.
- 27a. Leaf blade deeply palmately 5–7-lobed ..... 1. *A. cucurbitifolia*
- 27b. Leaf blade margin never as above.
- 28a. Calyx limb oblique, unilaterally 3-lobed, lobes ovate-lanceolate or oblong-lanceolate ..... 2. *A. obliqua*
- 28b. Calyx limb not oblique, lobes broadly ovate or broadly deltate.
- 29a. Leaf blade pandurate or obovate-oblong, subrotund on old branches ..... 3. *A. thibetica*
- 29b. Leaf blade never as above.
- 30a. Leaf blade ovate to ovate-lanceolate, obovate-oblong, or linear, margin entire or lobed near base, base cordate or auriculate, sinus over 0.5 cm wide ..... 4. *A. kaempferi*
- 30b. Leaf blade broadly oblong-oblancheolate, linear, or oblong, margin entire or shallowly 2–3-lobed, base narrowly auriculate, sinus 0.3–0.5 cm wide ..... 5. *A. howii*
- 26b. Leaf blade uniform, margin entire.
- 31a. Leaf blade generally as wide as long, cordate to orbicular (rarely ovate); veins palmate, basal veins 5–7.
- 32a. Leaf blade glabrous, base truncate ..... 6. *A. caulialata*
- 32b. Leaf blade ± with hairs, base cordate or auriculate.
- 33a. Flowers large, limb 3.5–12 cm in diam.
- 34a. Plants densely hirsute, hairs dusty yellow or brownish; calyx limb 3.5–4.5 cm in diam., dark purple, with spines, distinctly tuberculate ..... 7. *A. kwangsiensis*
- 34b. Plants villous, hairs white or reddish brown; calyx limb 4–12 cm in diam., nearly smooth or sparsely papillate.
- 35a. Calyx tube horseshoe-shaped at middle; limb 4–6 cm in diam.; seeds deltoid-cordiform or cordiform, 6–7 × 6–7 mm, both surfaces slightly plano-convex, verrucose ..... 8. *A. manshuriensis*
- 35b. Calyx tube geniculately curved at middle; limb 6–12 cm in diam.; seeds ovoid, ca. 4 × 3 mm, upper surface plano-convex, lower deeply concave, with a septumlike funiculus at center, rugose or smooth ..... 9. *A. griffithii*
- 33b. Flowers small; calyx limb 2–3.5 cm in diam.
- 36a. Leaf blade abaxially densely tomentose, hairs white or gray ..... 10. *A. mollissima*
- 36b. Leaf blade abaxially sparsely to densely villous, hairs yellowish.
- 37a. Calyx limb oblique, unilaterally 3-lobed, lobes ovate-lanceolate or oblong-lanceolate ..... 2. *A. obliqua*
- 37b. Calyx limb not oblique, discoid or rounded, lobes rounded.
- 38a. Leaf blade ovate to ovate-cordate, 5–12 cm wide, base deeply cordate or auriculate, sinus 1–2.5 cm deep; bractlets ovate, ca. 1.5 × 1 cm ..... 11. *A. moupinensis*
- 38b. Leaf blade ovate to narrowly ovate, 4–8 cm wide, base shallowly cordate, sinus ca. 1 cm deep; bractlets subulate, 5–8 × 2–3 mm ..... 12. *A. kunmingensis*
- 31b. Leaf blade longer than wide, ovate to narrowly ovate, elliptic, oblong, or lanceolate; veins pinnate, often 4–6 pairs.
- 39a. Leaf blade base cordate or auriculate (sometimes narrowly so).
- 40a. Flowers small; calyx limb 2–2.5 cm in diam.
- 41a. Racemes 3–5-flowered, cauliflorous; leaf blade base cordate, sinus 1–2 × 1–2 cm ..... 13. *A. scytophylla*
- 41b. Flowers solitary or paired, axillary; leaf blade base narrowly auriculate, sinus 0.5–1.5 × 0.2–0.4 cm ..... 14. *A. fulvicoma*
- 40b. Flowers large; calyx limb 4–13 cm.
- 42a. Calyx limb 8–13 cm in diam. .... 15. *A. westlandii*
- 42b. Calyx limb 4–6 cm in diam. .... 16. *A. versicolor*
- 39b. Leaf blade base rounded to shallowly cordate.
- 43a. Calyx limb adaxially papillate; leaf blade lanceolate, elliptic-lanceolate, or linear-lanceolate.
- 44a. Calyx tube upper part abruptly dilated into limb, margin not revolute ..... 17. *A. championii*
- 44b. Calyx tube upper part gradually dilated into limb, margin revolute ..... 18. *A. bambusifolia*
- 43b. Calyx limb adaxially smooth; leaf blade oblong, ovate-oblong, or ovate, rarely ovate-lanceolate.
- 45a. Calyx tube horseshoe-shaped curved at middle; leaf blade base rounded ..... 19. *A. fangchi*
- 45b. Calyx tube geniculately curved at middle; leaf blade base shallowly cordate ..... 20. *A. petelotii*

**1. *Aristolochia cucurbitifolia*** Hayata, Icon. Pl. Formosan. 5: 137. 1915.

瓜叶马兜铃 *gua ye ma dou ling*

Shrubs climbing, slightly herbaceous. Stems terete, striate, pubescent to subglabrous. Petiole ca. 3 cm, pubescent; leaf

blade ovate to ovate-cordate, 6–9 × 5–11 cm, subleathery, abaxially sparsely pubescent, adaxially glabrous, veins palmate, 3 pairs from base, base cordate, palmately 5–7-lobed, basal lobes ovate, 2–3 × ca. 1.5 cm, lateral lobes spatulate or ob-lanceolate, shorter and narrower than middle lobe, middle lobe spatulate-obovate, 2–9 × 1–3 cm, apex acute. Flowers in axils

of leafy shoots, solitary. Peduncle often pendulous, ca. 3 cm, densely pubescent; bractlets oblong-ovate, ca.  $1 \times 0.5$  cm, slightly amplexicaul, inserted at middle of pedicel. Calyx brownish, 5–6 cm; tube horseshoe-shaped, abaxially pubescent; basal portion of tube ca.  $2.5 \times 0.7$  mm; limb discoid, oblique, ca.  $1.5 \times 1$  cm, shallowly 2-lobed, orifice with slightly raised ring. Anthers oblong, ca. 1.5 mm. Gynostemium 3-lobed. Capsule ovoid-fusiform, ca.  $6 \times 1.5$  cm, dehiscent basipetally. Seeds ovoid-triangular, ca.  $4.5 \times 5$  mm. Fl. Apr.

- Mixed forests; ca. 500 m. Taiwan.

**2. *Aristolochia obliqua*** S. M. Hwang, Acta Phytotax. Sin. 19: 226. 1981.

偏花马兜铃 pian hua ma dou ling

Shrubs climbing, slightly herbaceous. Stems terete, striate, sparsely villous or glabrous. Petiole 3–4 cm, pilose to glabrous; leaf blade oblong-lanceolate to narrowly ovate,  $12\text{--}16 \times 4\text{--}6.5$  cm, papery, abaxially sparsely villous, adaxially glabrous, veins palmate, 4–5 pairs from base, base auriculate, sinus 1–1.5 cm deep, apex acute to shortly acuminate. Flowers in axils of leafy shoots, solitary. Peduncle often pendulous, ca. 3 cm, pilose; bractlets subulate, ca.  $3 \times 1$  mm, inserted on basal 1/2 of peduncle. Calyx yellowish, ca. 3 cm; tube horseshoe-shaped, abaxially glabrous to pilose; basal portion of tube ca.  $15 \times 8$  mm; limb oblique, unilaterally 3-lobed; lobes ovate-lanceolate or oblong-lanceolate, ca.  $6 \times 4$  mm. Anthers oblong, ca. 1 mm. Gynostemium 3-lobed. Capsule not seen. Fl. Jun.

- Mixed forests, mountain slopes, moist shady areas; 2200–2600 m. Yunnan.

This species is used medicinally.

**3. *Aristolochia thibetica*** Franchet, J. Bot. (Morot) 12: 313. 1898.

川西马兜铃 chuan xi ma dou ling

*Aristolochia feddei* H. Léveillé; *A. kaempferi* Willdenow f. *thibetica* (Franchet) S. M. Hwang; ?*A. liangshanensis* Z. L. Yang; *A. setchuenensis* Franchet; *A. setchuenensis* var. *holotricha* Diels.

Shrubs climbing. Stems terete-angular, pubescent. Petiole 0.5–1 cm, pilose; leaf blade pandurate or obovate-oblong, often subrotund on old branches,  $5\text{--}10 \times 2\text{--}4$  cm, papery, both surfaces pilose, veins palmate, 2–4 pairs from base, base truncate to slightly cordate, sinus to 0.3 cm deep, apex rounded and abruptly apiculate. Flowers on short axillary branches, solitary or paired. Peduncle pendulous, 2–3 cm, pubescent; bractlets ovate,  $3\text{--}5 \times 2\text{--}3$  mm, inserted at middle of peduncle. Calyx limb purplish, 3–4 cm; tube horseshoe-shaped, abaxially pubescent; basal portion of tube ca.  $20 \times 10$  mm; limb expanded, discoid, ca. 2 cm in diam., indistinctly 3-lobed; lobes broadly ovate. Anthers oblong, ca. 1 mm. Gynostemium 3-lobed. Capsule not seen. Fl. Apr–Jun.

- Forests, mountain slopes; ca. 2500 m. Sichuan, Yunnan.

*Aristolochia liangshanensis* is included here on the basis of the protologue; further research is needed to clarify its position and status.

**4. *Aristolochia kaempferi*** Willdenow, Sp. Pl. 4: 152. 1805.

异叶马兜铃 yi ye ma dou ling

*Aristolochia chrysops* (Stapf) E. H. Wilson ex Rehder; *A. dabienshanensis* C. Y. Cheng & W. Yu; *A. heterophylla* Hemsley; *A. kaempferi* f. *heterophylla* S. M. Hwang; *A. kaempferi* f. *mirabilis* S. M. Hwang; *A. mollis* Dunn; *A. neolongifolia* J. L. Wu & Z. L. Yang; *A. shimadae* Hayata; *Isotrema chrysops* Stapf; *I. heterophyllum* (Hemsley) Stapf; *I. lasiops* Stapf.

Shrubs climbing, somewhat herbaceous. Stems terete, striate, villous, glabrescent. Petiole 1.5–6 cm, densely villous; leaf blade ovate to ovate-lanceolate, obovate-oblong, or linear,  $3\text{--}18 \times 0.3\text{--}8$  cm, papery, abaxially sparsely white villous, adaxially glabrous, veins palmate, 2–4 pairs from base, base shallowly cordate to auriculate, sinus 0.5–1 cm deep, margin lobed or entire, apex acute to acuminate. Flowers axillary, solitary or paired. Peduncle usually pendulous, 2–7 cm, pubescent; bractlets brownish, ovate to lanceolate or subrotund,  $5\text{--}15 \times 3\text{--}15$  mm, inserted at base or middle of peduncle, with short stalk or sessile and amplexicaul. Calyx yellow-green with purple veins, throat yellow, 3–4 cm; tube horseshoe-shaped, abaxially villous; basal portion of tube  $20\text{--}25 \times 30\text{--}80$  mm; limb discoid-subrotund, 2–3 cm in diam., 3-lobed; lobes broadly ovate. Anthers oblong, ca. 1 mm. Gynostemium 3-lobed. Capsule cylindrical or ovoid,  $3\text{--}7 \times 1.5\text{--}2$  cm, dehiscent basipetally. Seeds obovoid,  $3\text{--}4 \times 2\text{--}3$  mm. Fl. Mar–May, fr. Jun–Aug.

Forests, thickets, mountain slopes. Anhui, S Gansu, W Hubei, Shaanxi, W Sichuan, Taiwan [Japan].

**5. *Aristolochia howii*** Merrill & W. Y. Chun, Sunyatsenia 5: 46. 1940.

南粤马兜铃 nan yue ma dou ling

*Hocquartia howii* (Merrill & W. Y. Chun) Migo.

Shrubs climbing. Stems terete, striate, shortly hirsute, then glabrescent. Petiole 1–2 cm, shortly hirsute; leaf blade broadly oblong-oblongate, linear, or oblong,  $7\text{--}20 \times 1\text{--}10$  cm, leathery, abaxially densely villous, then glabrescent, adaxially glabrate, veins palmate, 7–12 pairs from base, base narrowly auriculate, sinus 0.3–0.5 cm deep, margin entire to shallowly 2- or 3-lobed, apex acute. Flowers axillary, sometimes on old woody stems, solitary or paired. Peduncle pendulous, 3–4 cm, villous; bractlets subulate, 3–5 mm, inserted near base of peduncle. Calyx dark red or dark brown, 4–5 cm; tube horseshoe-shaped, abaxially brown villous; basal portion of tube  $20\text{--}30 \times 3\text{--}4$  mm; limb discoid-orbicular, 1.5–3 cm in diam., shallowly 3-lobed; lobes broadly ovate. Anthers oblong, ca. 3 mm. Gynostemium 3-lobed. Capsule cylindrical, ca.  $4 \times 2$  cm, dehiscent basipetally. Seeds ovoid,  $3\text{--}4 \times 2\text{--}3$  mm. Fl. May–Sep, fr. Oct–Dec.

- Mixed forests; 200–600 m. Hainan.

**6. *Aristolochia caulialata*** C. Y. Wu ex J. S. Ma & C. Y. Cheng, Acta Phytotax. Sin. 27: 294. 1989.

翅茎马兜铃 chi jing ma dou ling

Shrubs climbing. Stems terete, tuberculate, old stem with longitudinally fissured, corky bark, subglabrous. Petiole 5–7 cm, subglabrous; leaf blade orbicular,  $18\text{--}30 \times 16\text{--}26$  cm, papery, both surfaces glabrous, veins palmate, 2–3 pairs from

base, base truncate, margin entire, apex acute. Racemes in axils of leafy shoots or on old woody stems, 2-flowered, 13–16 cm. Pedicel pendulous, 2–4 cm; bractlets ovate, 2–4 × 1–3 mm. Calyx limb purple, throat yellow with dark purple spots; tube geniculately curved, abaxially brown pubescent; basal portion of tube 30–40 × 20–30 mm; limb subpeltate, 2–4 cm in diam., shallowly 3-lobed, verrucose; lobes unequal, rounded. Anthers not seen. Gynostemium 3-lobed. Capsule not known. Fl. May.

- Dense forests in valleys. Fujian, Yunnan.

**7. *Aristolochia kwangsiensis*** W. Y. Chun & F. C. How ex C. F. Liang, *Acta Phytotax. Sin.* 13(2): 12. 1975.

广西马兜铃 *guang xi ma dou ling*

?*Aristolochia austroszechuanica* J. L. Wu & Z. L. Yang.

Shrubs climbing. Stems terete, shallowly striate, densely dusty yellow to brownish hirsute. Petiole 6–15 cm, densely hirsute; leaf blade cordate to orbicular, 11–13 × 9–32 cm, papery, both surfaces moderately to densely hirsute, veins palmate, 2 pairs from base, base cordate or auriculate, sinus 3–5 cm deep, apex obtuse or acute. Racemes in axils of leafy shoots, 2- or 3-flowered. Pedicel pendulous, 2.5–3.5 cm, hirsute; bractlets subulate, 3–6 mm. Calyx limb dark purple, throat yellow, 4–5 cm; tube horseshoe-shaped, abaxially densely hirsute; basal portion of tube 20–35 × 3–10 mm; limb discoid-suborbicular, 3.5–4.5 cm in diam., distinctly 3-lobed; lobes broadly deltoid. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule cylindrical, 8–10 × 2 cm, dehiscent basipetally. Seeds ovoid, 5 × 4 mm. Fl. Mar–May, fr. Aug–Sep.

- Forests on mountain slopes; 600–1600 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Yunnan, Zhejiang.

*Aristolochia austroszechuanica* is included here on the basis of the protologue; further research is needed to clarify its position and status.

**8. *Aristolochia manshuriensis*** Komarov, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 22: 112. 1903.

关木通 *guan mu tong*

*Hocquartia manshuriensis* (Komarov) Nakai; *Isotrema manshuriense* (Komarov) H. Huber.

Shrubs climbing. Stems terete, striate, densely white villous. Petiole 6–8 cm, villous; leaf blade cordate to orbicular, 15–29 × 13–28 cm, leathery, both surfaces white villous, adaxially glabrescent, veins palmate, 2–3 pairs from base, base cordate, sinus 1–4.5 cm deep, apex obtuse or acute. Flowers axillary, solitary or paired. Peduncle pendulous, 1.5–3 cm, glabrous; bractlets ovate-cordate or cordate, ca. 1 cm, inserted below middle of peduncle. Calyx limb purple, 4.5–5.5 cm; tube horseshoe-shaped, abaxially white hirsute; basal portion of tube 20–25 × 10–12 mm; limb discoid, 4–6 cm in diam., 3-lobed; lobes broadly deltoid. Anthers oblong, 2–3 mm. Gynostemium 3-lobed. Capsule narrowly cylindrical, 9–11 × 3–4 cm, dehiscent basipetally. Seeds deltoid-cordiform or cordiform, 6–7 × 6–7 mm, both surfaces slightly plano-convex, verrucose. Fl. Jun–Jul, fr. Aug–Sep.

- Mixed forests, moist shady areas; 100–2200 m. Gansu, Heilongjiang, Hubei, Jilin, Liaoning, Shaanxi, Shanxi, Sichuan.

**9. *Aristolochia griffithii*** J. D. Hooker & Thomson ex Duchartre, *Prodr.* 15: 437. 1864.

西藏马兜铃 *xi zang ma dou ling*

*Aristolochia yunnanensis* Franchet; *A. yunnanensis* var. *meionantha* Handel-Mazzetti; *Isotrema griffithii* (J. D. Hooker & Thomson ex Duchartre) C. E. C. Fischer.

Shrubs climbing. Stems terete, striate, densely reddish brown villous. Petiole 5–10 cm, densely villous; leaf blade cordate to orbicular, 10–28 × 8–2.6 cm, papery, abaxially densely red-brown or white villous, adaxially sparsely pubescent, veins palmate, 3–4 pairs from base, base cordate to auriculate, sinus 3–6 cm, apex acute or shortly acuminate. Flowers solitary. Peduncle pendulous, ca. 10 cm, villous; bractlets ovate, 3 × 2.5 cm, inserted below middle of peduncle. Calyx dark purple with yellow spots on tube and limb, throat blood red, 10–12 cm; tube horseshoe-shaped, abaxially villous; basal portion of tube ca. 80 × 35 mm; limb discoid-rotund, 6–12 cm in diam., shallowly 3-lobed; lobes broadly deltoid. Anthers oblong, 3–4 mm. Gynostemium 3-lobed. Capsule cylindrical, 10–18 × 2.5–3 cm, dehiscent basipetally. Seeds ovoid, ca. 4 × 3 mm, upper surface plano-convex, lower surface deeply concave, with a septumlike funiculus at center, rugose or smooth. Fl. Apr–Jul, fr. Aug–Oct.

Mixed forests; 2100–2800 m. Xizang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

**10. *Aristolochia mollissima*** Hance, *J. Bot.* 17: 300. 1879.

寻骨风 *xun gu feng*

Shrubs climbing. Stems terete, densely gray to white tomentose. Petiole 2–5 cm, densely tomentose; leaf blade cordate to ovate-cordate, 3.5–10 × 2.5–8 cm, papery, abaxially densely gray to white tomentose, adaxially densely strigose, veins palmate, 2–3 pairs from base, base cordate or auriculate, sinus 1–2 cm deep, apex obtuse or acute. Flowers solitary. Peduncle pendulous, 1.5–3 cm, densely tomentose; bractlets ovate to oblong, 5–15 × 3–10 mm, inserted on basal 1/3 of peduncle. Calyx yellowish with purple veins, throat purple, 4–5 cm; tube geniculately curved, abaxially densely white tomentose on tube; basal portion of tube 5–15 × 3–6 mm; limb discoid-rounded, 2–2.5 cm in diam., shallowly 3-lobed; lobes broadly ovate. Anthers oblong, ca. 1 mm. Gynostemium 3-lobed. Capsule cylindrical to ovoid-cylindrical with ribs undulate, ca. 3.5 × 1.5–2 cm, dehiscent basipetally. Seeds ovoid-deltoid, ca. 4 × 3 mm. Fl. Mar–Jun, fr. Aug–Oct.

- Thickets, grasslands, on mountain slopes; 100–900 m. S Anhui, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Zhejiang.

**11. *Aristolochia moupinensis*** Franchet, *Nouv. Arch. Mus. Hist. Nat.*, sér. 2, 10: 79. 1887.

淮通 *huai tong*

*Aristolochia bonatii* H. Lévillé; *A. jinshanensis* Z. L. Yang & S. X. Tan.

Shrubs climbing. Stems terete, striate, densely gray-yellow villous. Petiole 3–8 cm, densely villous; leaf blade ovate to ovate-cordate, 6–16 × 5–12 cm, papery, abaxially densely gray-yellow villous, adaxially sparsely gray strigose, veins palmate,

2–3 pairs from base, base deeply cordate or auriculate, sinus 1–2.5 cm deep, apex acute or acuminate. Flowers axillary, solitary or paired. Peduncle slightly pendulous, 3–8 cm, densely villous; bractlets ovate, ca. 1.5 × 1 cm, inserted near base of peduncle. Calyx yellowish with purple veins, 4–5 cm; tube geniculately curved, abaxially villous on tube; basal portion of tube 20–30 × 8–10 mm; limb discoid-subrotund, 3–3.5 cm in diam., shallowly 3-lobed; lobes broadly ovate, recurved. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule cylindrical, 6–8 × 2–3.5 cm, dehiscent basipetally. Seeds narrowly ovoid, 5–6 × 3–4 mm. Fl. May–Jun, fr. Aug–Oct.

• Forests, thickets, along streams; 2000–3200 m. Fujian, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

This species is used medicinally.

**12. *Aristolochia kunmingensis*** C. Y. Cheng & J. S. Ma, Acta Phytotax. Sin. 27: 29. 1989.

昆明马兜铃 *kun ming ma dou ling*

*Aristolochia salweenensis* C. Y. Cheng & J. S. Ma.

Shrubs climbing. Stems terete, pubescent, glabrescent. Petiole 1.5–4 cm, pilose or glabrous; leaf blade ovate to narrowly ovate, 6–14 × 4–8 cm, papery or leathery, abaxially pubescent or glabrous, adaxially glabrous, veins palmate, 4–6 pairs from base, base shallowly cordate, sinus ca. 1 cm deep, apex acuminate or acute. Flowers in axils of leafy shoots, solitary. Peduncle pendulous, 3–5 cm, long pilose; bractlets subulate, 5–8 × 2–3 mm, inserted near base of pedicel. Calyx limb dark purple, throat yellow with purple striations; tube geniculately curved, abaxially pubescent; basal portion of tube 20–30 × ca. 6 mm; limb rounded, 2–2.5 cm in diam., 3-lobed; lobes semirounded. Anthers oblong. Gynostemium 3-lobed. Capsule narrowly cylindrical, 3–4 × ca. 2 cm, dehiscent basipetally. Seeds ovoid-deltoid. Fl. May, fr. Aug.

• Thickets on mountain slopes; ca. 2000 m. Guizhou, Yunnan.

**13. *Aristolochia scytophylla*** S. M. Hwang & D. L. Chen, Acta Phytotax. Sin. 19: 224. 1981.

革叶马兜铃 *ge ye ma dou ling*

Shrubs climbing. Stems terete, striate, densely white tomentose. Petiole 2–6 cm, densely tomentose; leaf blade narrowly ovate to ovate-oblong, 7–20 × 3.5–10 cm, leathery, abaxially densely white villous, adaxially glabrous, veins pinnate, 4 or 5 pairs, base cordate, sinus 1–2 × 1–2 cm, apex acute to acuminate. Racemes cauliflorous, often on old woody stems, 3–5-flowered, rachis short. Pedicel ca. 1.5 cm, pendulous, pubescent; bractlets subulate to lanceolate, 2–3 mm. Calyx limb purple-red, 4–5 cm; tube geniculately curved, abaxially densely white villous; basal portion of tube ca. 20 × 8 mm; limb discoid-rounded, 2–2.5 cm in diam., shallowly 3-lobed; lobes broadly deltoid, abaxially papillate near base. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule not seen. Fl. Jun–Apr.

• Thickets on limestone mountain slopes; ca. 600 m. Guangxi, Guizhou, Sichuan, Yunnan.

**14. *Aristolochia fulvicoma*** Merrill & W. Y. Chun, Sunyatsenia 5: 48. 1940.

黄毛马兜铃 *huang mao ma dou ling*

*Hocquartia fulvicoma* (Merrill & W. Y. Chun) Migo.

Shrubs climbing. Stems terete, densely yellow villous. Petiole 1.5–4 cm, densely villous; leaf blade ovate-elliptic to oblong-elliptic, 10–23 × 7–12 cm, leathery, abaxially densely yellowish villous, adaxially glabrous or yellowish villous along veins, veins pinnate, 5–8 pairs, base narrowly auriculate, sinus 0.5–1.5 × 0.2–0.4 cm, apex acute or shortly acuminate. Flowers axillary, solitary or paired. Peduncle pendulous, 1–2.5 cm, densely brown villous; bractlets triangular. Calyx reddish purple with dark purple veins on the tube, limb purple or yellow, 5–7 cm; tube geniculately curved, abaxially densely yellow-brown villous on tube; basal portion of tube ca. 20 × 6–10 mm; limb discoid-rotund, ca. 2 cm in diam., 3-lobed; lobes broadly ovate to deltoid. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule cylindrical, 6–8 × ca. 2.5 cm, dehiscent basipetally. Seeds ovoid-deltoid, 5–6 × 3–4 mm. Fl. May–Jun, fr. Jul–Aug.

• Dense forests; 200–600 m. Hainan.

**15. *Aristolochia westlandii*** Hemsley, J. Bot. 23: 286. 1885.

香港马兜铃 *xiang gang ma dou ling*

Shrubs climbing. Stems terete, striate, densely villous. Petiole 1–1.5 cm, sparsely villous; leaf blade lanceolate-oblong to narrowly oblong, 12–20 × 2–5 cm, leathery or papery, abaxially sparsely villous, glaucous, adaxially glabrous, veins pinnate, 8–12 pairs, base narrowly auriculate, sinus 2–5 cm deep, apex acute. Flowers in axils of leafy shoots or on old woody stems, solitary. Peduncle pendulous, 7–12 cm, villous; bractlets not seen. Calyx yellow with purple veins and blotches, 10–15 cm; tube geniculately curved, abaxially villous; basal portion of tube 50–60 × 15–20 mm; limb discoid, 8–13 cm in diam., shallowly 3-lobed or emarginate; lobes broadly rounded, slightly unequal. Anthers oblong, 4.5–5 mm. Gynostemium 3-lobed. Capsule not seen. Fl. Apr–Mar.

• Forests in valleys; 300–800 m. Guangdong.

**16. *Aristolochia versicolor*** S. M. Hwang, Acta Phytotax. Sin. 19: 224. 1981.

过石珠 *guo shi zhu*

Shrubs climbing. Stems terete, striate-sulcate, villous. Petiole 1–2 cm, sparsely pilose; leaf blade narrowly elliptic to lanceolate-elliptic, 14–25 × 4–6.5 cm, leathery, abaxially sparsely villous along veins, glaucous, adaxially glabrous, veins pinnate, 8–12 pairs, base narrowly auriculate, sinus 0.5–0.7 cm deep, apex acute or acuminate. Flowers axillary, solitary or paired. Peduncle pendulous, 2–3 cm, brown villous; bractlets subulate, minute, inserted on basal 1/3 or peduncle. Calyx yellow-green with purple veins, 7–9 cm; tube geniculately curved, abaxially densely yellow-brown villous; basal portion of tube 30–40 × 6–8 mm; limb discoid-subrotund, 4–6 cm in diam., 3-lobed; lobes broadly rounded, equal. Anthers oblong, ca. 2.5 mm. Gynostemium 3-lobed. Capsule ellipsoid, 5–8 × 1.5–2 cm, dehiscent basipetally. Seeds ovoid-deltoid, ca. 6 × 4 mm. Fl. Apr–Jun, fr. Aug–Oct.

• Thickets, mountain slopes, moist shady valleys; 500–1500 m. Guangdong, Guangxi, Yunnan.

The tuber is used medicinally.

**17. *Aristolochia championii*** Merrill & W. Y. Chun, Sunyatsenia 5: 47. 1940.

长叶马兜铃 chang ye ma dou ling

*Aristolochia longifolia* Champion ex Bentham, Hooker's J. Bot. Kew Gard. Misc. 6: 116. 1854, not Roxburgh (1832), nor Sessé y Lacasta & Mociño (1894), nor (Chamisso) Hauman (1923); *A. compressicaulis* Z. L. Yang.

Shrubs climbing. Stems terete, striate, densely yellow-brown villous. Petiole 1–2 cm, densely villous; leaf blade lanceolate to elliptic-lanceolate or linear-lanceolate, 15–30 × 2–5 cm, leathery, abaxially densely brown villous, adaxially villous along veins, veins pinnate, 6–15 pairs, base rounded to shallowly cordate, sinus less than 0.2 cm deep, apex narrowly acuminate. Racemes on old woody stems, 2–5-flowered. Pedicel 3–4 cm, pendulous, brown villous; bractlets lanceolate-ovate, ca. 10 × 5 mm. Calyx yellow-green, limb reddish purple, 10–12 cm; tube geniculately curved, abaxially villous; basal portion of tube 50–70 × ca. 15 mm; limb discoid, 4–6 cm in diam., 3-lobed, adaxially papillate; lobes broadly rounded, slightly unequal. Anthers oblong, ca. 3 mm. Gynostemium 3-lobed. Capsule ellipsoid, 6–8 × ca. 3 cm, dehiscent basipetally. Seeds ovoid, ca. 5 × 3 mm. Fl. Jun–Jul, fr. Sep–Nov.

• Dense forests in valleys; 500–900 m. Guangdong, Guangxi, Guizhou, Sichuan.

**18. *Aristolochia bambusifolia*** C. F. Liang ex H. Q. Wen, Guihaia 12: 217. 1992.

竹叶马兜铃 zhu ye ma dou ling

Lianas woody. Stems terete, densely brown villous. Petiole 0.7–1 cm, densely brown villous; leaf blade linear-lanceolate, 9.5–23 × 1.1–2.7(–5) cm, leathery, abaxially densely brown villous, adaxially glabrous, veins pinnate, 12–16 pairs, base rounded or shallowly cordate, apex acuminate. Flowers solitary. Peduncle pendulous, ca. 1.8 cm, brown villous; bractlets lanceolate-ovate, 5–8 × 2–3 mm, inserted near middle and base of peduncle. Calyx abaxially yellow-green with purple veins, adaxially whitish with purple speckles, limb deep purple; tube geniculately curved, abaxially densely brown villous; basal portion of tube ca. 30 × 10 mm, apical portion gradually dilated and abruptly constricted at orifice, margin revolute; limb discoid, 1.5–2 cm in diam., adaxially papillate, truncate. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule not seen. Fl. Feb–Apr, Oct.

• Forests on limestone mountain slopes, rock fissures. Guangxi (Longlin).

**19. *Aristolochia fangchi*** Y. C. Wu ex L. D. Chow & S. M. Hwang, **sp. nov.**

广防已 guang fang yi

Type: China. Guangdong: Jilong Shan, *K. L. Shi* 2 (holotype, IBSC).

*Aristolochia fangchi* Y. C. Wu ex L. D. Chow & S. M. Hwang, Acta Phytotax. Sin. 13(2): 108. 1975 (includes Latin diagnosis), nom. inval.

Shrubs climbing. Stems terete, obscurely striate, villous. Petiole 1–4 cm, densely brown villous; leaf blade oblong to ovate-oblong, rarely ovate-lanceolate, 6–16 × 3.5–5 cm, leathery, abaxially densely brown or gray pubescent, adaxially villous along veins, veins pinnate, 4–6 pairs, base rounded, apex acute or obtuse. Racemes on old woody stems, 2–4-flowered, 4–6 cm. Pedicel 5–7 cm, pendulous, densely villous; bractlets subulate, 3–8 × ca. 1 mm. Calyx purple with yellow blotches, throat white; tube horseshoe-shaped, abaxially densely villous; basal portion of tube 40–50 × 8–10 mm; limb subrotund-peltate, 4–6 cm in diam., shallowly 3-lobed; lobes equal, acute. Anthers oblong, 4–5 mm. Gynostemium 3-lobed. Capsule 5–10 × 3–5 cm, dehiscent basipetally. Seeds ovoid-deltoid, 5–7 × 3–4 mm. Fl. Apr–May, fr. Jul–Sep.

• Dense forests, thickets, on slopes; 500–1000 m. Guangdong, Guangxi, Guizhou.

When originally published (Chow and Hwang, loc. cit.), this name was invalid under Art. 8.1 and 37 of the St. Louis Code because two types were indicated (one flowering, one fruiting). The flowering specimen has here been chosen as the holotype because the flower is much more clearly diagnostic in this genus than the fruit. The specific epithet is derived from the vernacular name.

This species is used medicinally.

**20. *Aristolochia petelotii*** O. C. Schmidt, Repert. Spec. Nov. Regni Veg. 32: 95. 1933.

滇南马兜铃 dian nan ma dou ling

*Aristolochia austroyunnanensis* S. M. Hwang.

Shrubs climbing. Stems terete to slightly complanate, striate, densely yellow-brown villous. Petiole 2–4 cm, densely yellow-brown villous; leaf blade narrowly ovate, ovate-oblong, or lanceolate-ovate, 12–18 × 5–8 cm, leathery, both surfaces glabrous or villous along veins, veins pinnate, 4–6 pairs, base shallowly cordate, apex acuminate. Racemes on old woody stems, 2- or 3-flowered, 4–6 cm. Pedicel 3–4 cm, pendulous, yellow-brown villous; bractlets ovate-lanceolate, ca. 10 × ca. 5 mm. Calyx yellow with purple-brown blotches and reticulate veins; tube geniculately curved, abaxially densely villous; basal portion of tube 50–65 × 10–20 mm; limb oblong-peltate, 5–8 × 4–7 cm, 3-lobed; lobes unequal, rounded. Anthers oblong, 3–4 mm. Gynostemium 3-lobed. Capsule narrowly ellipsoid, 10–15 × 5–8 cm, dehiscent basipetally. Seeds not seen. Fl. Sep, fr. Dec.

Forests on limestone mountain slopes; 1800–1900 m. Guangxi, S Yunnan [Vietnam].

**21. *Aristolochia saccata*** Wallich, Pl. Asiat. Rar. 2: 2. 1829.

管兰香 guan lan xiang

*Aristolochia cathcartii* J. D. Hooker.

Shrubs climbing. Stems slightly complanate, striate, brown-tomentose. Petiole 8–10 cm, tomentose to glabrescent; leaf blade ovate, rounded-cordate, or ovate-lanceolate, 20–35 × 15–30 cm, leathery, abaxially densely white tomentose, adaxially glabrate, veins palmate, 5–6 pairs from base, base cor-

date, sinus 1–4 cm deep, apex acute. Racemes on old woody stems, 3–5-flowered, 3–4 cm. Pedicel 2–4 cm, pendulous, brown villous; bractlets subulate, ca.  $10 \times 2\text{--}3$  mm. Calyx yellow-green with purple veins and blotches, limb dark purple; tube geniculately curved, abaxially villous; basal portion of tube saccate, ca.  $30 \times 10$  mm, orifice nearly quadrate; limb obliquely trumpet-shaped, ca. 3 cm in diam., 3-lobed; lobes unequal, upper 2 distinctly recurved, deltoid, lower one broadly deltoid. Anthers oblong, 3–4 mm. Gynostemium 3-lobed. Capsule ovoid, ca.  $5 \text{ cm} \times 3\text{--}4$  cm, dehiscent basipetally. Seeds not seen. Fl. May–Jun, fr. Aug–Sep.

Dense forests in valleys. Xixang, Yunnan [Bhutan, NE India, Myanmar, Nepal, Sikkim].

This species is used medicinally in Xizang.

**22. *Aristolochia hainanensis*** Merrill, Philipp. J. Sci. 21: 341. 1922.

海南马兜铃 hai nan ma dou ling

*Aristolochia carinata* Merrill & W. Y. Chun; *Hocquartia hainanensis* (Merrill) Migo.

Shrubs climbing. Stems terete, striate, densely brown tomentose. Petiole 4–8 cm, densely brown villous; leaf blade ovate or ovate-lanceolate to narrowly ovate,  $12\text{--}20\text{--}(30) \times 10\text{--}17$  cm, leathery, both surfaces densely villous when young, then abaxially yellowish or brownish villous, adaxially glabrescent except villous along veins, veins palmate, 5–7 pairs from base, base rounded, apex shortly acuminate or acute. Racemes in axils of leafy shoots or on old woody stems, 3–6-flowered, ca. 3 cm. Pedicel pendulous, 3.5–4 cm, densely villous; bractlets subulate, ca.  $2 \times 1$  mm. Calyx yellowish with dark purple lobes; tube geniculately curved, abaxially sparsely villous; basal portion of tube saccate,  $20\text{--}30 \times 10\text{--}25$  mm, orifice nearly orbicular; limb obliquely trumpet-shaped, ca. 3 cm in diam., 3-lobed; lobes unequal, densely papillate, upper 2 oblong, lower one broadly deltoid. Anthers oblong, 2–2.5 mm. Gynostemium 3-lobed. Capsule narrowly cylindrical,  $7\text{--}10 \text{ cm} \times 2.5\text{--}3$  cm, dehiscent basipetally. Seeds ovoid, ca.  $6 \times 4$  mm. Fl. Oct–Feb, fr. Jun–Jul.

• Forests in valleys; 800–1200 m. Guangxi, Hainan.

**23. *Aristolochia forrestiana*** J. S. Ma, Acta Bot. Yunnan. 11: 321. 1989.

大囊马兜铃 da nang ma dou ling

Shrubs climbing. Stems terete, striate, glabrous. Petiole 2–3 cm, glabrous; leaf blade ovate to narrowly ovate,  $9\text{--}13 \times 3\text{--}5$  cm, leathery, both surfaces glabrous, veins palmate, 6–8 pairs from base, base cordate, sinus  $1.5\text{--}2 \times 1\text{--}2$  cm, apex acute. Flowers in axils of leafy shoots, solitary. Peduncle pendulous, 5–7 cm, pubescent; bractlets ovate or subulate, inserted near middle of peduncle. Calyx purple; tube geniculately curved, abaxially pubescent; basal portion of tube  $15\text{--}20 \times 5$  mm; limb saccate, asymmetric, ca.  $6 \times 1.5$  cm, 3-lobed; lobes lanceolate, ca.  $25 \times 10$  mm. Anthers not seen. Gynostemium 3-lobed. Fruit not seen.

• Yunnan.

**24. *Aristolochia utriformis*** S. M. Hwang, Acta Phytotax. Sin.

19: 228. 1981.

囊花马兜铃 nang hua ma dou ling

Shrubs climbing [or herbaceous]. Stems slightly angled, glabrous. Petiole 4–8 cm, glabrate; leaf blade ovate-lanceolate,  $10\text{--}17 \times 4\text{--}5\text{--}6$  cm, papery, abaxially sparsely gray villous, adaxially glabrous, veins palmate, 4–5 pairs from base, base auriculate, sinus 1–1.5 cm deep, apex acute. Flowers in axils of leafy shoots, solitary. Pedicel pendulous, 4–6 cm, sparsely pilose; bractlets ovate-lanceolate, ca.  $5 \times 2$  mm, inserted above middle of peduncle. Calyx yellow-green; tube geniculately curved, abaxially sparsely pilose to glabrous; basal portion of tube  $15\text{--}20 \times 3\text{--}4$  mm; limb saccate, ovoid, asymmetric,  $1\text{--}2 \times 0.3\text{--}1.5$  cm, 3-lobed; lobes ovate-deltate, ca.  $4 \times 5$  mm, erect, papillate. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Fruit not seen. Fl. Apr.

• Forests; ca. 1900 m. Yunnan.

**25. *Aristolochia thwaitesii*** J. D. Hooker, Bot. Mag. 82: t. 4918. 1856.

海边马兜铃 hai bian ma dou ling

Subshrubs erect. Stems terete to angled, villous, with condensed nodes. Petiole ca. 1 cm, villous; leaf blade spatulate, narrowly oblanceolate, or oblong-oblanceolate,  $10\text{--}15 \times 2.5\text{--}3$  cm, leathery, abaxially densely brown villous, adaxially glabrate, veins palmate, 12–16 pairs from base, base attenuate to subcuneate, apex acute to shortly acuminate. Racemes from woody base of plant, 3–7-flowered, 4–8 cm. Pedicel ca. 3 cm, recurved, villous; bractlets lanceolate, ca.  $5 \times 2$  mm. Calyx yellow-green; tube geniculately curved, abaxially densely brown villous; basal portion of tube  $15\text{--}25 \times 5\text{--}10$  mm; limb subcylindric to conic, symmetric, 1.5–3 cm in diam., 5- or 6-dentate. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule ovoid-globose,  $3\text{--}5 \times 2\text{--}2.5$  cm, dehiscent basipetally. Seeds ovoid, ca.  $4 \times 3$  mm. Fl. Apr–May, fr. Aug–Sep.

• Thickets, bamboo forests, on mountain slopes, rock fissures. Guangdong (Hong Kong, Zhuhai).

**26. *Aristolochia transsecta*** (Chatterjee) C. Y. Wu ex S. M. Hwang, Acta Phytotax. Sin. 19: 231. 1981.

粉花马兜铃 fen hua ma dou ling

*Isotrema transsectum* Chatterjee, Kew Bull. 3: 64. 1948.

Shrubs climbing. Stems angled, villous, with elongate internodes. Petiole 4–5 cm, villous; leaf blade ovate or oblong,  $12\text{--}19 \times 3.5\text{--}6$  cm, leathery, abaxially glabrous, adaxially sparsely villous, veins palmate, 5–6 pairs from base, base deeply cordate, sinus 0.5–3 cm deep, apex acute. Flowers in axils of leafy shoots, solitary. Pedicel recurved, 4–5 cm, brown tomentose; bractlets subulate, ca.  $5 \times 1$  mm, inserted near base of peduncle. Calyx dark brown; tube geniculately curved, abaxially sparsely pubescent; basal portion of tube ca.  $25 \times 10$  mm; limb conic, symmetric, ca. 1.5 cm in diam., shallowly 2- or 3-lobed; lobes unequal, upper 2 large, oblong, lower 1 small, broadly ovate. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Fruit not seen. Fl. May–Jun.

Yunnan [Myanmar].

**27. *Aristolochia ovatifolia*** S. M. Hwang, Acta Phytotax. Sin. 19: 226. 1981.

卵叶马兜铃 luan ye ma dou ling

Shrubs climbing. Stems terete, striate, densely yellow-brown villous, with elongate internodes. Petiole 3–5 cm, yellow-brown villous; leaf blade ovate, 5–13 × 4–8 cm, leathery, abaxially densely gray or yellow-brown villous, adaxially densely gray or yellow-brown villous when young, glabrescent, veins palmate, 3–5 pairs from base, base deeply cordate, sinus 5–10 × ca. 0.5 cm, apex acute. Flowers in axils of leafy shoots, solitary. Pedicel pendulous, 3–6 cm, grayish pilose; bractlets ovate, 3–5 × 3–4 mm, inserted on basal 1/2 of peduncle. Calyx purple-red; tube geniculately curved, abaxially villous to glabrous; basal portion of tube 10–15 × 7–10 mm; limb subcylindric, 1.5–2.5 × 1–1.5 cm, 3-lobed; lobes slightly unequal, subrounded or lower lobe nearly truncate. Anthers oblong, ca. 2 mm. Gynostemium 3-lobed. Capsule cylindric, undulately 6-angled, ca. 6 × 2 cm, dehiscing basipetally. Seeds narrowly ovoid, ca. 6 × 4 mm. Fl. Apr–May, fr. Jun–Aug.

• Thickets, forests; 1000–1600 m. Guizhou, Sichuan, Yunnan.

**28. *Aristolochia cucurbitoides*** C. F. Liang, Acta Phytotax. Sin. 13(2): 15. 1975.

葫芦叶马兜铃 hu lu ye ma dou ling

Herbs twining. Stems terete, sparsely villous. Petiole 3–5 cm, sparsely villous; leaf blade trullate-lanceolate, ovate-lanceolate, or lanceolate, 12–22 × 2.5–4.5 cm, papery, both surfaces sparsely pubescent or abaxially glabrescent, veins palmate, 7–10 pairs from base, base auriculate, sinus 1–2 cm deep, apex long acuminate. Flowers in axils of leafy shoots, solitary. Pedicel pendulous, 5–7 cm, sparsely villous; bractlets ovate, ca. 3 × 2 mm, inserted on basal 1/2 of peduncle. Calyx tube geniculately curved, abaxially sparsely villous; basal portion of tube ca. 20 × 8 mm; limb cylindric ca. 2 × 0.2–0.3 mm, lobes 3, lanceolate-acuminate, 5–7 × 2–3 mm. Anthers oblong, 1.5–2 mm. Gynostemium 3-lobed. Capsule cylindric, 5–7 × 2–3 cm, dehiscing basipetally. Seeds triangular, ca. 6 × 4 mm. Fl. May–Jun.

Forests; 800–2400 m. Guangxi, Guizhou, Yunnan [Myanmar].

**29. *Aristolochia austrochinensis*** C. Y. Cheng & J. S. Ma, Acta Phytotax. Sin. 27: 293. 1989.

华南马兜铃 hua nan ma dou ling

Herbs twining. Stems terete, glabrous. Petiole 2–3.5 cm, glabrous; leaf blade triangular-lanceolate to sagittate, 7–14 × 2–2.5 cm, leathery, abaxially puberulous, hairs along veins forming closely foveolate reticulation, adaxially glabrous, veins palmate, 5–7 pairs from base, base auriculate, sinus 1–1.5 cm deep, lateral lobes parallel or spreading, apex narrowly acuminate. Racemes in axils of leafy shoots, 3- or 4-flowered or flowers almost fascicled, 2–3 cm. Pedicel ascending, 1–1.5 cm; bractlets ovate or lanceolate, 10–12 × 3–5 mm. Calyx dark purple; tube rectilinear, abaxially glabrous; utricle globose, ca. 6 mm in diam., sessile; tube ca. 10 × 2.5 mm; limb unilateral, ligulate, ovate-lanceolate, 0.8–1.2 × ca. 1 cm. Anthers elliptic,

ca. 1 mm. Gynostemium 6-lobed. Capsule cylindric to obovoid, 2–2.5 × ca. 1.5 cm, dehiscing acropetally. Seeds ovoid-deltoid, ca. 5 × 4 mm. Fl. Apr–Jun, fr. Jul–Oct.

• Thickets on mountain slopes; 400–600 m. Fujian, Guangdong, Guangxi, Hainan.

**30. *Aristolochia foveolata*** Merrill, Philipp. J. Sci., C, 13: 280. 1918.

蜂窝马兜铃 feng wo ma dou ling

*Aristolochia kaoi* T. S. Liu & M. J. Lai.

Herbs twining. Stems terete, glabrous. Petiole 3–6 cm, glabrous; leaf blade ovate-lanceolate to lanceolate, 5–15 × 2–3 cm, leathery, abaxially densely puberulous along closely reticulate veinlets, adaxially glabrous, veins palmate, 2–3 pairs from base, base deeply cordate or auriculate, sinus 1–2.5 cm deep, lateral lobes overlapping or slightly incurved, apex acuminate. Racemes in axils of leafy shoots, 3- or 4-flowered or flowers almost fascicled, 2–3 cm. Pedicel ascending, 1–1.5 cm, sparsely villous; bractlets ovate or lanceolate, 4–5 × 2–3 mm. Calyx purple-brown; tube rectilinear or slightly curved, abaxially glabrous; utricle globose, ca. 6 mm in diam., sessile; tube ca. 20 × 6 mm; limb unilateral, ligulate, ovate-oblong, ca. 2 × 1–1.6 cm. Anthers elliptic, ca. 1 mm. Gynostemium 6-lobed. Capsule cylindric to obovoid, 2–2.5 × 1.5 cm, dehiscing acropetally. Seeds ovoid-deltoid, ca. 5 × 4 mm. Fl. Jul–Aug, fr. Aug–Oct.

Thickets on mountain slopes; 500–1000 m. Taiwan [Philippines].

**31. *Aristolochia chlamydephylla*** C. Y. Wu ex S. M. Hwang, Acta Phytotax. Sin. 19: 223. 1981.

苞叶马兜铃 bao ye ma dou ling

Herbs twining. Stems terete, striate, glabrate. Petiole 6–10 cm, glabrous; leaf blade ovate to ovate-deltate, 6–16 × 5–11 cm, leathery or papery, aromatic-punctate, abaxially puberulous, hairs on veinlets forming closely foveolate reticulation, adaxially glabrous, veins palmate, 2–3 pairs from base, base deeply cordate, sinus 1.5–2 cm deep, apex acute. Racemes in axils of leafy shoots, 8–10-flowered, 4–6 cm. Pedicel ascending to slightly pendulous, 0.8–1.2 cm, glabrous; bractlets ovate, ca. 1.5 × 1 cm, base cordate and slightly amplexicaul. Calyx yellowish green, limb dark purple; tube rectilinear or slightly curved, abaxially glabrous; utricle globose, ca. 3 mm in diam., sessile; tube ca. 10 × 1.5 mm; limb unilateral, ligulate, ovate-lanceolate, ca. 1.5 × 0.5 cm. Anthers elliptic, ca. 0.5 mm. Gynostemium 6-lobed. Fruit not seen. Fl. Mar–Apr.

• Forests on mountain slopes; 1000–1300 m. Guangxi, Yunnan.

**32. *Aristolochia fordiana*** Hemsley, J. Bot. 23: 286. 1885.

通城虎 tong cheng hu

Herbs twining. Stems 6-angled, glabrous. Petiole 2–4 cm, glabrous; leaf blade ovate-cordate to ovate-triangular, 10–12 × 5–10 cm, leathery, abaxially densely puberulous, hairs on veinlets forming closely foveolate reticulation, adaxially glabrous, veins palmate, 2–3 pairs from base, base cordate, sinus 1–1.5 cm deep, apex acute or acuminate. Racemes in axils of leafy shoots, 3- or 4-flowered, 3–5 cm. Pedicel ascending, ca. 0.8 cm,

glabrous; bractlets subulate to lanceolate-ovate, 3–10 × 1–4 mm, base rounded to cuneate. Calyx yellowish green, limb dark purple; tube rectilinear or slightly curved, abaxially glabrous; utricle globose, ca. 3.5 mm in diam., sessile; tube ca. 15 × 2 mm; limb unilateral, ligulate, ovate-oblong, 1–1.5 × ca. 0.5 cm. Anthers elliptic, ca. 0.3 mm. Gynostemium 6-lobed. Capsule cylindrical or obovoid, 3–4 × 1.5–2 cm, dehiscent acropetally. Seeds ovoid-triangular, ca. 5 × 5 mm. Fl. Mar–Apr, fr. May–Jul.

• Thickets, in valleys, rock fissures; 500–700 m. Guangdong, Guangxi.

This species is used medicinally.

**33. *Aristolochia fujianensis*** S. M. Hwang, *Guihaia* 3: 81. 1983.

福建马兜铃 *fu jian ma dou ling*

Herbs twining. Stems angled, densely white or brown villous. Petiole 2–8 cm, densely villous; leaf blade cordate to ovate-cordate, 4–11 × 4–11 cm, papery, both surfaces white or brown villous, veins palmate, 2–3 pairs from base, base cordate, sinus 1–1.2 cm deep, apex acute. Racemes in axils of leafy shoots, 3- or 4-flowered, 1–3 cm. Pedicel erect to ascending, 0.5–1.5 cm, sparsely pilose; bractlets ovate or ovate-cordate, 5–10 × 5–7 mm. Calyx green with green veins, limb dark purple; tube rectilinear or slightly curved, abaxially sparsely pilose; utricle globose, ca. 4 mm in diam., sessile; tube ca. 2.5 × 2 mm; limb unilateral, ligulate, ovate-lanceolate, 0.8–1.6 × ca. 0.5 cm, apex long acuminate with twisted cauda 1–1.5 cm. Anthers elliptic, ca. 0.5 mm. Gynostemium 6-lobed. Capsule cylindrical to obovoid, ca. 2 × 1 cm, dehiscent acropetally. Seeds ovoid-triangular, ca. 3 × 3 mm. Fl. Mar–Apr, fr. May–Aug.

• Thickets, on mountain slopes, roadsides. Fujian, Zhejiang.

**34. *Aristolochia longganensis*** C. F. Liang, *Guihaia* 2: 143. 1982.

弄岗马兜铃 *nong gang ma dou ling*

Herbs twining. Stems 6-angled, glabrous. Petiole 2–8 cm, glabrous; leaf blade ovate-cordate to cordate or subrotund, 8–13 × 9–12 cm, papery, abaxially densely pubescent, adaxially glabrous, veins palmate, 3 pairs from base, base cordate, sinus 1–2 cm deep, apex abruptly acuminate. Racemes in axils of leafy shoots, 2–6-flowered, 3–4 cm. Pedicel ascending, 1–2 cm, glabrous; bractlets ovate or ovate-cordate, 5–7 × ca. 3 mm. Calyx brownish purple with dark purple veins; tube rectilinear, abaxially sparsely pubescent; utricle globose, ca. 4 mm in diam., sessile; tube ca. 10 × 2 mm; limb unilateral, ligulate, deltate-lanceolate, ca. 3.5 × 0.5 cm, apex long acuminate with twisted cauda 1–3 cm. Anthers elliptic, ca. 0.5 mm. Gynostemium 6-lobed. Capsule elliptic, ca. 7 × 2.5 cm, dehiscent acropetally. Seeds ovoid-cordiform, ca. 5 × 4 mm. Fl. Feb–Apr, fr. Sep.

Thickets on limestone mountain slopes; 100–200 m. Guangxi [Vietnam].

**35. *Aristolochia contorta*** Bunge, *Enum. Pl. China Bor.* 58. 1833.

北马兜铃 *bei ma dou ling*

Herbs twining. Stems terete, striate, glabrous. Petiole 2–7 cm, glabrous; leaf blade narrowly deltate to deltate-cordate, 3–13 × 3–10 cm, papery, both surfaces glabrous, veins palmate, 2–3 pairs from base, base cordate, sinus ca. 1.5 cm deep, apex acute or obtuse. Racemes in axils of leafy shoots, 2–8-flowered, nearly fasciculate. Pedicel ascending, 1–2 cm, glabrous; bractlets ovate, ca. 1.5 × 1 cm. Calyx yellow-green with purple veins; tube rectilinear or slightly curved, abaxially glabrous; utricle globose, ca. 6 mm in diam., sessile; tube ca. 14 × 3 mm; limb unilateral, ligulate, ovate-lanceolate, ca. 3.5 × 1 cm, apex long acuminate with twisted cauda 1–3 cm. Anthers elliptic, ca. 0.5 mm. Gynostemium 6-lobed. Capsule broadly obovoid to ellipsoid-obovoid, 3–6.5 × 2.5–4 cm, dehiscent acropetally. Seeds deltoid-cordiform, 3–5 × 3–5 mm, with membranous wing. Fl. May–Jul, fr. Aug–Oct.

Thickets, mountain slopes, valleys; 500–1200 m. Fujian, Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Shaanxi, Shandong, Shanxi [Japan, Korea, Russia (Siberia)].

**36. *Aristolochia debilis*** Siebold & Zuccarini, *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 4(3): 197. 1846.

马兜铃 *ma dou ling*

*Aristolochia recurvilabra* Hance; *A. sinarum* Lindley.

Herbs twining. Stems terete, smooth, glabrous, with elongate internodes. Petiole 1–2 cm, glabrous; leaf blade ovate or oblong-ovate to sagittate, 3–6 × 1.5–3.5 cm, papery, both surfaces glabrous, veins palmate, 2–3 pairs from base, base cordate, sinus 1–1.5 cm deep, apex acute or obtuse. Flowers axillary, solitary or paired. Pedicel 1–1.5 cm, ascending, glabrous; bractlets deltoid, 2–3 × 2–3 mm, inserted near base of pedicel. Calyx yellow-green, throat dark purple; tube rectilinear, abaxially glabrous; utricle globose, 3–5 mm in diam., sessile; tube 20–25 × 2–3 mm; limb unilateral, ligulate, ovate-lanceolate, 2–3 × ca. 1 cm, apex obtuse. Anthers elliptic, ca. 0.5 mm. Gynostemium 6-lobed. Capsule subglobose, 4–6 cm in diam., dehiscent acropetally. Seeds obtusely deltoid, ca. 4 × 4 mm, with membranous wing. Fl. Jul–Aug, fr. Sep–Oct.

Thickets, mountain slopes, moist valleys; 200–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Zhejiang [Japan].

This very important medicinal plant was first identified by Thunberg as *Aristolochia longa* Linnaeus.

**37. *Aristolochia delavayi*** Franchet, *J. Bot. (Morot)* 12: 315. 1898.

山草果 *shan cao guo*

*Aristolochia delavayi* var. *micrantha* W. W. Smith.

Herbs twining (type appears erect), pungently odorous. Stems pruinose, terete, shallowly striate, glabrous, densely nodose. Leaves sessile or subsessile; leaf blade ovate, 2–8 × 1.5–5 cm, papery, densely punctate, both surfaces glabrous, veins palmate, 2–3 pairs from base, base cordate, amplexicaul, apex acute or obtuse. Flowers in axils of leafy shoots, solitary. Pedicel ascending, 1–1.5 cm, glabrous; bractlets early deciduous (not seen). Calyx yellowish, throat dark purple; tube rectili-

near or slightly curved, abaxially glabrous; utricle globose, 4–5 mm in diam., sessile; tube ca. 15 × 2 mm; limb unilateral, ligulate, ovate-oblong, 2–3.5 × ca. 1 cm, apex acute. Anthers elliptic, ca. 0.3 mm. Gynostemium 6-lobed. Capsule nearly globose, 1.2–1.5 cm in diam., dehiscent acropetally. Seeds ovoid-cordiform, ca. 3 × 3 mm. Fl. Aug–Oct, fr. Dec.

• Thickets on limestone mountain slopes; 1600–1900 m. Sichuan, Yunnan (Lijiang).

**38. *Aristolochia zhongdianensis*** J. S. Ma, Acta Phytotax. Sin. 27: 339. 1989.

中甸马兜铃 *zhong dian ma dou ling*

Herbs twining. Stems terete, striate, glabrous. Petiole ca. 1 cm, glabrous; leaf blade deltate-cordate, 0.5–3 × 0.5–2 cm, papery, both surfaces glabrous, veins palmate, 2 pairs from base, base auriculate, sinus to 1.5 cm deep, apex acute. Flowers in axils of leafy shoots, solitary. Peduncle ascending, ca. 1 cm, glabrous; bractlets subulate, 1–2 × ca. 1 mm, inserted near base of peduncle. Calyx yellowish green; tube rectilinear or slightly curved, abaxially glabrous; utricle globose, ca. 5 mm in diam., sessile; tube ca. 5 × 2.5 mm; limb unilateral, lanceolate, ca. 1.2 × 0.3 cm, apex long acuminate or shortly tailed. Anthers elliptic, 0.3–0.4 mm. Gynostemium 6-lobed. Capsule ellipsoid, 1.5–2 × 1–1.2 cm, dehiscent acropetally. Seeds ovoid-cordiform, ca. 4 × 3 mm. Fl. May, fr. Oct–Dec.

• Thickets, grasslands, rock fissures; 1200–1400 m. NW Yunnan (Zhongdian).

**39. *Aristolochia gentilis*** Franchet, J. Bot. (Morot) 12: 314. 1898.

优贵马兜铃 *you gui ma dou ling*

?*Aristolochia chuandianensis* Z. L. Yang; *A. gracillima* Hemsley.

Herbs twining. Stems terete, glabrous. Petiole 3–4 cm, glabrous; leaf blade rounded-cordate or cordate-reniform, 3–4 × 4–5 cm, submembranous, both surfaces glabrous, veins palmate, 2–3 pairs from base, base shallowly cordate or slightly concave, sinus to 1.5 cm deep, apex acute. Flowers in axils of leafy shoots, solitary. Peduncle ascending, 0.5–1 cm, glabrous; bractlets subulate, 3–5 × 2–3 mm, inserted near base of peduncle. Calyx greenish with reddish brown limb; tube rectilinear, abaxially glabrous; utricle globose, ca. 5 mm in diam., sessile; tube ca. 5 × 2.5 mm; limb unilateral, ligulate, ovate-oblong, 0.8–1 × 0.4–0.5 cm, apex acute. Anthers elliptic, 0.3–0.4 mm. Gynostemium 6-lobed. Capsule subglobose, 1.5–2 cm in diam., dehiscent acropetally. Seeds not seen. Fl. and fr. May–Oct.

• Thickets, grasslands, shady areas; 1200–2700 m. Sichuan, Yunnan.

*Aristolochia chuandianensis* is included here on the basis of the protologue; further research is needed to clarify its position and status.

**40. *Aristolochia tubiflora*** Dunn, J. Linn. Soc., Bot. 38: 364. 1908.

辟蛇雷 *bi she lei*

?*Aristolochia longilingua* C. Y. Cheng & W. Yu; *A. triangulifolia* W. Yu.

Herbs twining; roots linear or terete. Stems terete, striate, glabrous; branchlets and petiole with red juice when broken. Petiole 2–10 cm, glabrous; leaf blade ovate-cordate, 3–15 × 3–16 cm, papery, densely punctate, both surfaces glabrous, rarely abaxially pubescent, veins palmate, 3 pairs from base, often red when dry, base cordate, sinus 2–4 cm deep, apex obtuse. Flowers axillary, solitary or paired. Peduncle ascending, 1–2 cm, glabrous; bractlets ovate, 3–8 × 2–4 mm, inserted near base of peduncle. Calyx dark purple; tube rectilinear, abaxially glabrous; utricle globose, ca. 5 mm in diam., sessile; tube 4–5 × 1–2 mm; limb unilateral, ligulate, ovate-oblong, 0.8–1 × 0.4–0.5 cm, apex obtuse or emarginate and apiculate. Anthers elliptic, 0.3–0.4 mm. Gynostemium 6-lobed. Capsule cylindrical, ca. 2.5 × 1.5 cm, dehiscent acropetally. Seeds ovoid or ovoid-deltoid, ca. 4 × 3.5 mm. Fl. Apr–Aug, fr. Oct–Dec.

• Forests, moist mountain slopes; 100–1700 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Sichuan, Zhejiang.

*Aristolochia longilingua* is included here on the basis of the protologue; further research is needed to clarify its position and status.

This species is a well-known medicine for the treatment of snake bites.

**41. *Aristolochia tuberosa*** C. F. Liang & S. M. Hwang, Acta Phytotax. Sin. 13(2): 17. 1975.

背蛇生 *bei she sheng*

?*Aristolochia cinnabarina* J. L. Wu & Z. L. Yang.

Herbs twining; roots fusiform or globose. Stems angled, glabrous. Petiole 7–10 cm, glabrous; leaf blade cordate, 8–14 × 5–11 cm, both surfaces glabrous, veins palmate, 2–3 pairs from base, base cordate, sinus 1–2.5 cm deep, apex obtuse. Flowers 1–3 per axil. Peduncle ascending, ca. 1.5 cm, glabrous; bractlets ovate, ca. 5 × 6 mm, inserted near base of peduncle. Calyx yellow-green, throat dark purple; tube rectilinear, abaxially glabrous; utricle globose, ca. 5 mm in diam., sessile; tube ca. 9 × 1.5 mm; limb unilateral, ligulate, oblong, ca. 2 × 0.4 cm, apex obtuse or mucronulate. Anthers elliptic, 0.3–0.4 mm. Gynostemium 6-lobed. Capsule obovoid, ca. 3 × 2.5 cm, dehiscent acropetally. Seeds ovoid, ca. 4 × 3 mm. Fl. Nov–Apr, fr. Jun–Oct.

• Thickets, valleys, limestone mountain slopes; 100–1600 m. Guangxi, Guizhou, Hubei, Hunan, Sichuan, Yunnan.

*Aristolochia cinnabarina* is included here on the basis of the protologue; further research is needed to clarify its position and status.

The tuber is used medicinally, known as 珠砂莲 (*zhu sha lian*); the species is also used for treating snake bites.

**42. *Aristolochia polymorpha*** S. M. Hwang, Acta Phytotax. Sin. 19: 222. 1981.

多型马兜铃 *duo xing ma dou ling*

Herbs twining. Stems terete, striate, glabrous. Petiole 1–2 cm, glabrous; leaf blade polymorphic, ovate or ovate-deltate to sagittate, 2.5–5.5 × 2–6 cm, papery, both surfaces glabrous or abaxially villous, veins palmate, 1–2 pairs from base, base cordate or broadly cuneate, usually deeply 3-lobed, lateral lobes obovate or semiround, 7–20 × 5–15 mm, middle lobe rhombic

or ovate-lanceolate to linear-lanceolate, 1.5–5 × 0.5–1.5 cm, apex acute. Racemes in axils of leafy shoots, 2–4 flowered, 2–4 cm. Pedicel ascending, 0.2–0.5 cm, sparsely pilose; bractlets ovate-deltoid, 2–5 × 2–4 mm, inserted near base of pedicel. Calyx dark purple; tube rectilinear, abaxially glabrous; utricle globose, ca. 4 mm in diam., with stipe 2–3 mm; tube 5–7 × 1.5–2 mm; limb unilateral, ligulate, oblong, ca. 1.5 × 0.4 cm, apex obtuse. Anthers elliptic, 0.3–0.4 mm. Gynostemium 6-lobed. Capsule subglobose, ca. 1.5 cm in diam., dehiscent acropetally. Seeds ovoid, 2.5 × 2 mm. Fl. Oct–Dec, fr. Jun–Aug.

- Forests; below 100–200 m. Hainan.

**43. *Aristolochia tagala*** Chamisso, *Linnaea* 7: 207. 1832.

耳叶马兜铃 *er ye ma dou ling*

*Aristolochia roxburghiana* Klotzsch.

Herbs twining. Stems terete, slightly furrowed, glabrous. Petiole 2.5–4 cm, glabrous; leaf blade ovate-cordate or oblong-ovate, 8–12(–24) × 4–14(–22) cm, papery, both surfaces glabrous, veins palmate, 3–5 pairs from base, base deeply cordate, lateral lobes subrounded, sinus 1–3 cm deep, apex acute or acuminate. Racemes in axils of leafy shoots, 2- or 3-flowered, 2–6 cm. Pedicels ca. 1 cm, sparsely hairy, glabrescent; bractlets ovate-lanceolate, to ca. 8 mm. Calyx pale yellowish or greenish, throat dark purple, 4–6 cm; tube rectilinear or slightly curved; utricle globose, 5–8 mm in diam., with stipe 1–3 mm; tube 5–10 × 2–3 mm; limb ligulate, oblong, 2–3 × 0.5–0.6 cm, apex obtuse. Anthers ovoid, ca. 1 mm. Gynostemium 6-lobed. Capsule obovoid-globose to ovoid-cylindric, 3.5–5 × 2–3.5 cm, dehiscent acropetally. Seeds triangular to subcordiform, ca. 8 × 8 mm. Fl. May–Aug, fr. Oct–Dec.

Forests, mountain slopes; below 100–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Nepal, Malaysia, Myanmar, Philippines, Sikkim, Thailand, Vietnam].

**44. *Aristolochia impressinervis*** C. F. Liang, *Acta Phytotax. Sin.* 13(2): 15. 1975 [*“impressinervia”*].

凹脉马兜铃 *ao mai ma dou ling*

Herbs twining. Stems 6-angled, pubescent. Petiole 1.5–2 cm, glabrate; leaf blade ovate-lanceolate to lanceolate, 8–20 ×

4–5 cm, subleathery, abaxially densely pubescent along veinlets, adaxially glabrous, veins palmate, 1–2 pairs from base, base auriculate, sinus 0.4–0.6 cm deep, apex acuminate. Racemes in axils of leafy shoots, 3–7-flowered, 1–4 cm. Pedicel ascending, ca. 1.5 cm, sparsely hairy, glabrescent; bractlets lanceolate, ca. 10 × 3 mm. Calyx pale yellowish or greenish, throat purple, 2.5–3 cm; tube rectilinear or slightly curved; utricle globose, ca. 4 mm in diam., with stipe 2–3 mm; tube 5–10 × 1.5–2 mm; limb ligulate, elliptic, 2–2.5 × 0.5–1 cm, apex obtuse. Anthers ovoid, 3–4 mm. Gynostemium 6-lobed. Capsule obovoid to subglobose, ca. 1.7 × 1.3 cm, dehiscent acropetally. Seeds cordiform to deltoid, 2.5 × 2.5 mm. Fl. May–Jun, fr. Aug–Oct.

- Forests, thickets, limestone mountain slopes; ca. 400 m. Guangxi.

The specific epithet was spelled *“impressinervia”* on p. 15 of the protologue and *“impressinervis”* on pp. 11, 12, and [26].

This species is used medicinally.

**45. *Aristolochia zollingeriana*** Miquel, *Fl. Ned. Ind.* 1(1): 1066. 1858.

港口马兜铃 *gang kou ma dou ling*

*Aristolochia kankauensis* Sasaki; *A. roxburghiana* subsp. *kankauensis* (Sasaki) T. Yamazaki; *A. tagala* var. *kankauensis* (Sasaki) T. Yamazaki [*“kankaoensis”*].

Herbs twining. Stems 6-angled, glabrous. Petiole 1.5–3.5 cm, glabrous; leaf blade triangular-ovate to rhombic-cordate, 5–7 × 5–7.5 cm, abaxially densely puberulous, adaxially glabrous, veins palmate, 2–3 pairs from base, base shallowly cordate, apex acute. Racemes in axils of leafy shoots, 3- or 4-flowered, 1–4 cm. Pedicel ascending, ca. 1 cm, glabrous; bractlets ovate, ca. 1.5 × 1 mm. Calyx brownish purple, 3–5 cm; tube rectilinear or slightly curved; utricle globose, ca. 5 mm in diam., with stipe 2–3 mm; tube 8–10 × 3–5 mm; limb ligulate, oblong, 1.5–2.5 × 0.3–0.5 cm, apex obtuse. Anthers ovoid, ca. 1 mm. Gynostemium 6-lobed. Capsule cylindric, 5–6 × ca. 2 cm, dehiscent acropetally. Seeds ovoid-deltoid, ca. 7 × 6 mm, winged. Fl. Jul, fr. Aug.

Dense forests. Taiwan [Indonesia, Japan, Malaysia].

ARISTOLOCHIACEAE