

33. MARSDENIA R. Brown, Prodr. 460. 1810.

牛奶菜属 niu nai cai shu

Lianas. Inflorescences terminal or extra-axillary, umbel-like, paniculate, or racemelike, pedunculate. Sepals overlapping, basal glands or scales often present. Corolla urceolate or campanulate, throat often hairy; lobes twisted to right. Corona lobes 5, erect, acuminate, fleshy, attached to gynostegium. Filaments connate into a tube; anthers erect, appendages inflexed; pollinia 2 per pollinarium, often oblong, erect. Stigma head flat, convex, or beaked. Follicles mostly thick, acuminate, smooth or longitudinally winged.

About 100 species: Asia, America, tropical Africa; 25 species in China.

- 1a. Inflorescences very congested, bracts and bracteoles leaflike, hiding rachis and flowers; calyx twice as long as corolla; apex of corolla lobes incised 1. *M. incisa*
- 1b. Inflorescences relatively lax, bracts and bracteoles small and not hiding rachis and flowers; calyx much shorter than corolla; apex of corolla lobes entire.
 - 2a. Stigma head produced into long, threadlike to cylindrical beak exerted from anther appendages.
 - 3a. Corona lobes as long as anthers; stems short yellowish tomentose.
 - 4a. Corolla tube uniformly pilose inside; follicles densely tomentose 10. *M. oreophila*
 - 4b. Corolla throat with a dense reflexed pubescence, interior of tube glabrous toward base; follicles glabrous 11. *M. officinalis*
 - 3b. Corona lobes shorter than anthers; stems glabrous to minutely puberulent or pubescent along two lines.
 - 5a. Corolla tube longer than lobes; peduncle 1.5–3 cm 7. *M. yunnanensis*
 - 5b. Corolla tube shorter than lobes; peduncle 2.5–6 cm.
 - 6a. Corolla ca. 12 mm; pollinia reniform 8. *M. griffithii*
 - 6b. Corolla 5–6 mm; pollinia slender 9. *M. formosana*
 - 2b. Stigma head depressed, hemispherical or short conical, not long beaked.
 - 7a. Corolla tube not longer than lobes.
 - 8a. Corolla lobes 9–12 mm.
 - 9a. Leaf blade 5.5–10 cm wide; inflorescences 7–15 cm; corolla interior pubescent; sepals ca. 8 × 6 mm 14. *M. koi*
 - 9b. Leaf blade 2–3 cm wide; inflorescences 4–4.5 cm; corolla glabrous; sepals 3–4 × 2–2.5 mm 12. *M. medogensis*
 - 8b. Corolla lobes 3–7 mm.
 - 10a. Base of leaf blade rounded to truncate; inflorescences unbranched.
 - 11a. Plants tomentose; corolla yellowish white, 6–8 mm; back of corona lobes rounded 19. *M. tenii*
 - 11b. Plants glabrous; corolla violet or purple, 10–15 mm; back of corona lobes winged or with a hooklike spur at base.
 - 12a. Peduncle to 10 cm; corona lobes as long as anthers, dorsiventrally compressed, with a hooklike dorsal spur at base 2. *M. longipes*
 - 12b. Peduncle to 3 cm; corona lobes reaching base of anthers, laterally compressed without spur at base 3. *M. brachyloba*
 - 10b. Base of leaf blade cordate; inflorescences usually obviously branched.
 - 13a. Corolla very densely hairy outside; corona lobes exerted from corolla tube, apex 2(–4)-toothed 5. *M. tenacissima*
 - 13b. Corolla glabrous outside; corona lobes included within corolla tube, apex entire.
 - 14a. Peduncle to 16 cm; corolla interior pilose; corona lobes shorter than corolla tube 15. *M. hainanensis*
 - 14b. Peduncle ca. 1.5 cm; corolla interior glabrous; corona lobes longer than corolla tube 13. *M. yuei*
 - 7b. Corolla tube longer than lobes.
 - 15a. Leaf blade palmately 3(–5)-veined at base, base deeply cordate; corona lobes with a hooklike spur at base of back.
 - 16a. Branches, petiole, abaxial leaf surface, and outside of corolla densely pubescent to tomentose; corolla lobes ca. 2 × 1 mm 4. *M. cavaleriei*
 - 16b. Branches, leaves, and corolla glabrous; corolla lobes 3–4 × 1.5–2 mm 6. *M. stanantha*
 - 15b. Leaf blade pinnately veined; corona lobes flattened or slightly curved at base of back, without a spur.
 - 17a. Corona lobes as long as or longer than anther appendages.
 - 18a. Leaf blade elliptic-oblong or oblong-lanceolate; inflorescences ca. 7 mm;

- peduncle ca. 0.2 cm; corolla ca. 1.5 mm 20. *M. pseudotinctoria*
- 18b. Leaf blade ovate to oblong or ovate-triangular; inflorescences more than 3 cm; peduncle 1–5 cm; corolla 3.5–13 mm.
- 19a. Leaf blade 1–2.5 × ca. 1 cm, papillate abaxially; petiole 0.5–1 cm; corolla tube sparsely retrorse pubescent inside; corona ringlike, as high as anthers and with undulating margin 21. *M. pulchella*
- 19b. Leaf blade 5–13 × ca. 2.7 cm, not papillate; petiole 1–4 cm; corolla tube with a ring of hairs or densely pubescent at throat; corona of separate subulate to ovate lobes.
- 20a. Corolla urceolate, 3.5–4(–6) mm; leaf blade papery, often blue when dry 22. *M. tinctoria*
- 20b. Corolla subcampanulate, ca. 9 mm; leaf blade membranous, not blue when dry 23. *M. glomerata*
- 17b. Corona lobes shorter than anther appendages.
- 21a. Corolla tube interior uniformly hairy; inflorescences branched; corolla throat densely long hairy; leaves without blue pigment.
- 22a. Leaf blade broadly ovate to suborbicular, approximately as long as wide 16. *M. tomentosa*
- 22b. Leaf blade ovate-cordate to oblong, distinctly longer than wide.
- 23a. Stems and undersides of leaves finely yellowish tomentose; corolla lobes hairy on both sides 17. *M. sinensis*
- 23b. Stems and leaves sparsely hairy when young, glabrescent; corolla lobes glabrous, contrasting sharply with prominently hairy throat 18. *M. lachnostoma*
- 21b. Corolla tube interior with hairs restricted to lines or patches; inflorescences unbranched; corolla throat with a thin ring of hairs only; leaves often with blue pigment when dried.
- 24a. Leaf blade abaxially tomentose; inflorescence rachis 3–7 cm, clearly spiral 24. *M. schneideri*
- 24b. Leaf blade abaxially glabrous to puberulent; inflorescence rachis mostly less than 1 cm, if longer then rachis straight.
- 25b. Corolla campanulate 22. *M. tinctoria*
- 25a. Corolla urceolate 25. *M. glabra*

1. *Marsdenia incisa* P. T. Li & Y. H. Li, Acta Bot. Yunnan. 4(2): 157. 1982.

裂冠牛奶菜 lie guan niu nai cai

Lianas to 9 m, most parts yellowish tomentose. Stems hollow when dry. Petiole 4–5 cm; leaf blade broadly ovate to ovate-oblong, 20–30 × 11–14 cm, papery, glabrescent, base cordate, apex acute; lateral veins 11 or 12 pairs, anastomosing before margin. Inflorescences very congested, enclosed within bracts at least when young, 6–9 cm; rachis forked; peduncle

2. *Marsdenia longipes* W. T. Wang ex Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 117. 1974.

百灵草 bai ling cao

Lianas slender, to 2 m; glabrous except for inflorescences. Petiole 1–1.5 cm; leaf blade oblong or oblong-lanceolate, 5–10 × 2–4 cm, base rounded, apex acuminate; lateral veins 4–6 pairs. Inflorescences congested, 10–15-flowered; peduncle to 10 cm. Corolla violet, ca. 1.2 cm; tube nearly as long as lobes; lobes lanceolate. Corona lobes oblong, base with a hooklike dorsal spur. Anthers oblong, appendages broadly elliptic, longer than corona lobes; pollinia oblong. Ovaries glabrous. Stigma head short conical. Follicles lanceolate in outline. Fl. Feb–Mar.

• Dense forests, humid thickets; below 2000 m. Guangxi, SW Yunnan.

as long as petiole; bracts and bracteoles leaflike, longer than flowers. Pedicel 1–1.7 cm. Sepals obovate-oblong, 1.5–1.7 cm × 5–10 mm, striate, pubescent; basal glands absent. Corolla yellowish, campanulate, hirsute outside, glabrous inside; tube ca. 5 mm; lobes broadly ovate, ca. 3.5 × 4 mm, apex incised, base auriculate, ciliate. Corona lobes ovate-oblong, obtuse. Pollinia oblong, ca. 6 mm. Follicles cylindrical-ellipsoid, 12(–16) × 3.5(–9) cm. Seeds ovate; coma ca. 2 cm. Fl. Feb–May, fr. Aug–Dec.

• Dense forests; 600 m. ?Guangxi, S Yunnan (Mengla).

The plant is used for the treatment of fractures and bleeding caused by injury. The roots are used as a medicine for bronchitis and asthma.

3. *Marsdenia brachyloba* M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 11. 1995.

短裂牛奶菜 duan lie niu nai cai

Lianas glabrous except for sepal and corolla margin. Nodes with distinct interpetiolar line. Petiole 2.5–4.5 cm; leaf blade elliptic, 10–14.5 × 5–7.5 cm, probably rather fleshy, abaxially very pale, adaxially dark with paler zone along midrib, base cuneate, apex acuminate; lateral veins 5 or 6 pairs, raised on both surfaces. Inflorescences umbel-like, up to 20-flowered; peduncle to 3 cm. Pedicel 1–1.7 cm. Sepals ± circular, ca. 1.5 × 1.5 mm, margin ciliate. Corolla campanulate with spreading lobes, purple, buds ca. 6 mm; tube ca. 2 mm, broader than long; lobes ca. 4 × 2 mm, apex rounded.

Corona lobes ca. as high as anthers, laterally compressed with almost hooked tip, basal half deeply grooved. Anther appendages oblong, rather fleshy toward base, half as high as stigma head. Stigma head ovoid, with acuminate divided beak, exserted from corolla tube. Follicles solitary, lanceolate in outline, ca. 16×4 mm, base narrowed into a stalk ca. 1 cm. Seeds ovate, ca. $1.7 \text{ cm} \times 7 \text{ mm}$; coma off-white, to 3 cm.

- Forests; 2100–2250 m. Yunnan (Feng Chen Lin).

4. *Marsdenia cavalieriei* (H. Léveillé) Handel-Mazzetti ex Woodson in Rehder, *J. Arnold Arbor.* 15: 318. 1934.

灵药牛奶菜 ling yao niu nai cai

Metaplexis cavalieriei H. Léveillé, *Fl. Kouy-Tchéou* 42. 1914/15.

Lianas to 6 m, densely velvety. Stems stout, yellowish brown. Petiole 5–9(–12) cm; leaf blade ovate-cordate, 7–18 \times 5–16 cm, papery, velvety to subglabrous adaxially, tomentose abaxially, base deeply cordate, with rounded lobes, apex acute; basal veins 3–5(–7), lateral veins 3 or 4 pairs. Inflorescences compound, rounded, 3–5(–15) cm, often shorter than subtending petiole, many flowered; peduncle up to 1 cm. Sepals oblong. Corolla purplish, campanulate to urceolate, pilose outside; tube longer than lobes, ca. 3.5 mm, lower part of interior with 5 longitudinal bands of long hairs; lobes oblong, ca. 2×0.8 mm, apex rounded. Corona lobes shorter than anthers, base with an erect, hooklike dorsal spur, apex bluntly acute. Anther appendages ovate-oblong; pollinia oblong. Stigma head conical, shorter than anther appendages. Follicles ovoid-oblong, 7–17 \times 1–6 mm. Seeds ovate-oblong; coma ca. 4 \times as long as seeds. Fl. Jun–Aug, fr. Sep–Dec.

- Open woods; 600–2200 m. Guangxi, Guizhou, Yunnan [India].

The bark is used in folk medicine for treating pneumonia and tumors in Yunnan and Guangxi.

5. *Marsdenia tenacissima* (Roxburgh) Moon, *Cat. Pl. Ceylon* 21. 1824.

通光藤 tong guang teng

flowered, probably pendent; peduncle to 2.5 cm. Pedicel 5–10 mm. Sepals lanceolate, ca. 4.5×2 mm, with basal glands. Corolla tubular, to 1.2 cm; tube 6–8 mm, 3–4 mm in diam.; lobes ovate, 3–4 \times 1.5–2 mm. Corona lobes linear-lanceolate, longer than or equalling anther appendages, ca. 4×1 mm, \pm flat. Stigma head short conical to cylindrical, sometimes exserted beyond anther appendages. Pollinia ellipsoid. Follicles ellipsoid-lanceolate, ca. $6 \text{ cm} \times 8 \text{ mm}$. Seeds spatulate, ca. 8×3 mm; coma 1–5 cm. Fl. Jun, fr. Aug–Nov.

- Open woods; 1500–2600 m. Sichuan, Yunnan.

7. *Marsdenia yunnanensis* (H. Léveillé) Woodson in Rehder, *J. Arnold Arbor.* 15: 317. 1934.

云南牛奶菜 yun nan niu nai cai

Gongronema yunnanense H. Léveillé, *Cat. Pl. Yun-Nan* 13. 1915; *Marsdenia carnea* Woodson; *M. xuanenensis* Z. E. Zhao & Y. M. Wang.

Asclepias tenacissima Roxburgh, *Pl. Coromandel* 3: 35. 1819; *Gymnema tenacissima* (Roxburgh) Sprengel.

Lianas robust, densely pilose to tomentose throughout except for interior of corolla. Petiole 5–6 cm, slender; leaf blade ovate, 8–10 \times 6–6.5 cm, base deeply cordate with rounded sinus, apex acuminate; basal veins 5–7, lateral veins 2 or 3 pairs. Inflorescences much branched, broader than long, to 8 \times 12 cm, many flowered; peduncle to 2 cm, shorter than first internode. Pedicel 6–8 mm. Sepals elliptic-lanceolate, ca. 3×1 –1.3 mm, tip rounded. Corolla “yellow,” campanulate, with spreading lobes, very densely pilose outside; tube ca. 3.5×2.5 mm, interior retrorsely pilose toward base; lobes oblong, ca. 4×2.2 mm, apex rounded, minutely velvety. Corona lobes exserted from corolla tube, oblong, apex truncate-emarginate with corners produced into short horns, sometimes toothed between these. Anther appendages oblong, slightly longer than corona lobes; pollinia curved cylindrical. Stigma head broadly cylindrical, concealed by anther appendages.

Cliffs; 1500 m. Yunnan (Szemoo) [Cambodia, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

The stems yield very strong fibers, reputedly among the strongest produced by any plant, that are used for making cords and strings.

6. *Marsdenia stenantha* Handel-Mazzetti, *Symb. Sin.* 7: 1003. 1936.

狭花牛奶菜 xia hua niu nai cai

Stephanotis nana P. T. Li; *S. yunnanensis* H. Léveillé (1915), not *Marsdenia yunnanensis* (H. Léveillé) Woodson (1934).

Lianas to 4 m, glabrous except for interior of corolla tube at base. Branchlets pale green. Petiole 1–4 cm; leaf blade ovate to ovate-oblong, 2–9.5 \times 1.5–5 cm, papery, base deeply cordate to subauriculate, apex acuminate; lateral veins 4 or 5 pairs, flat on both surfaces or slightly elevated abaxially, conspicuously pale abaxially. Inflorescences umbel-like, to 15-

Lianas. Stems to 5 m, pubescent along 2 lines, glabrescent. Petiole 1.5–2 cm; leaf blade elliptic or elliptic-oblong, 6–12 \times 1.5–4(–7) cm, subleathery, adaxially sparsely appressed-pubescent, abaxially pale and sparsely pubescent, base rounded to cuneate, apex caudate or short acuminate; lateral veins 6–8 pairs. Inflorescences umbel-like; peduncle 1.5–3 cm, pubescent. Pedicel 0.4–1 cm, pubescent. Sepals broadly ovate, 2–2.5 mm, pubescent. Corolla pink to white, narrowly campanulate; tube 5–7 \times 3–5 mm, glabrous outside, pilose inside, densely so opposite corona lobes; lobes broadly ovate, ca. 2×3 mm, glabrous or pilose at base, ciliate. Corona lobes adnate to gynostegium, \pm acute, basal half deeply grooved, shorter than anthers. Anthers longer than corona, base laterally compressed, apex subulate and membranous; pollinia reniform. Stigma head long beaked, ca. 3 mm. Follicles fusiform-ellipsoid, 9–12 \times ca. 2 cm, glabrous. Seeds ca. 11×5 mm; coma ca. 2 cm. Fl. Jul–Sep, fr. Sep–Dec.

- Forests, bushland; 1000–2000 m. Hubei, Sichuan, Yunnan.

8. *Marsdenia griffithii* J. D. Hooker, Fl. Brit. India 4: 36. 1883.

白药牛奶菜 bai yao niu nai cai

Lianas stout, woody, to 10 m. Branchlets pale green, glabrous or distal parts minutely puberulent, hollow when dry. Petiole 3–6 cm, pubescent; leaf blade ovate, 7–11 × 5–8 cm, glabrescent or sparsely hairy and denser along veins adaxially, base cuneate to subcordate, apex subacute and mucronate; lateral veins 4 or 5 pairs. Inflorescences glomerate, many flowered; peduncle ca. 2.5 cm, pubescent. Pedicel ca. 1 cm, pubescent. Sepals ovate, pubescent, margin translucent and ciliate; basal glands 5 or more. Corolla white, subcampanulate, ca. 1.2 cm; tube pilose opposite stamens, throat with dense reflexed pubescence; lobes oblong-lanceolate, longer than tube, pilose inside except at margin. Corona lobes subulate or lanceolate, base broadened and fleshy, shorter than anthers. Anther appendages rounded; pollinia subreniform. Stigma head produced into a long beak exerted from anthers. Follicles oblong-lanceolate, ca. 9 × 4 cm, smooth. Seeds ovate, flattened, ca. 1.7 × 0.8 cm, margin membranous; coma ca. 3 cm. Fl. summer to autumn.

Dense forests; 2000 m. Guizhou, Hunan, Yunnan [India].

9. *Marsdenia formosana* Masamune, J. Soc. Trop. Agric. 2: 241. 1930.

台湾牛奶菜 tai wan niu nai cai

Lianas to 3 m. Branches stout, pubescent along 2 longitudinal lines when young. Petiole 1.5–3(–7.5) cm; leaf blade ovate to ovate-oblong, 8–12(–22) × 4.5–7(–16) cm, papery, glabrous or sometimes sparsely puberulent adaxially, base shallowly cordate or rounded, apex acute and mucronate; lateral veins 4 or 5 pairs. Inflorescences umbel-like clusters of cymules, many flowered; peduncle 4–6(–7.5) cm. Pedicel 1–1.3 cm, appressed puberulent. Sepals elliptic to broadly ovate, 2–2.5 × ca. 2 mm, apex acute, pubescent; glands absent. Corolla pinkish white, ca. 5 mm, bowl-shaped with rotate lobes; lobes 3–3.5 × 1.8–2 mm, glabrous outside, stiffly white. Corona subcampanulate; tube shorter than lobes, throat with dense reflexed pubescence; lobes oblong, minutely tomentose inside. Corona lobes ca. as long as anthers; pollinia oblong. Stigma head long beaked. Follicles fusiform, ca. 10 × 3 cm, glabrous. Seeds ovate; coma to 4 cm. Fl. Jul–Aug, fr. Aug–Nov.

• Forests; 500–1000 m. Hubei, Hunan, Sichuan, Yunnan, Zhejiang.

A decoction of all parts is believed to stimulate blood circulation.

12. *Marsdenia medogensis* P. T. Li, Acta Phytotax. Sin. 23: 466. 1985.

墨脱牛奶菜 mo tuo niu nai cai

Lianas woody, to 5 m. Stems pale gray, nodes pilose. Petiole 1–1.6 cm, puberulent to glabrous; leaf blade oblong, 10–11 × 2–3 cm, papery, glabrous, base rounded, apex acute; lateral veins 7 or 8 pairs, flattened on both surfaces. Inflores-

pubescent inside except near margin. Corona lobes oblong-lanceolate, fleshy, shorter than anthers. Anthers nearly square, apical appendages orbicular; pollinia oblong. Stigma head produced into a long threadlike beak exerted from corolla tube. Follicles lanceolate, ca. 10 cm. Seeds ovate-oblong, 1–1.5 cm; coma to 4 cm. Fl. Mar–Jul.

Forests; low to middle altitudes; 2600 m. Taiwan, Yunnan [Japan (Ryukyu Islands)].

10. *Marsdenia oreophila* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 193. 1914.

喙柱牛奶菜 hui zhu niu nai cai

Lianas to 6 m, softly and densely short tomentose. Petiole 2–3 cm; leaf blade elliptic or oblong-elliptic, 6–15 × 4–7 cm, papery, adaxially sparsely pilose, abaxially short tomentose, base rounded, apex abruptly short acuminate; lateral veins 4 or 5 pairs. Inflorescences umbel-like, 7–15-flowered; peduncle 1.5–5 cm. Pedicel 1–2 cm. Sepals ovate; glands 10. Corolla white outside, deep maroon or orange inside, to 1 cm; lobes oblong-lanceolate, much longer than tube, glabrous outside, pilose inside. Corona lobes lanceolate, erect, as long as anthers. Stamens ca. 3 mm; anther appendages orbicular; pollinia oblong, ca. 1 mm. Stigma head produced into a threadlike beak 5–6 mm. Follicles fusiform ca. 13 × 3 cm, densely tomentose. Seeds oblong-ovate, ca. 1 × 0.5 cm; coma ca. 2 cm. Fl. Jul–Sep, fr. Sep–Nov.

• Dense forests; below 3000 m. Sichuan, Xizang, Yunnan.

11. *Marsdenia officinalis* Tsiang & P. T. Li, Acta Phytotax. Sin. 12: 115. 1974.

海枫藤 hai feng teng

Lianas woody, to 5 m, yellowish tomentose. Petiole ca. 2 cm; leaf blade ovate-oblong or ovate, 8–11 × 4–5 cm, adaxially puberulent, base rounded, apex obtuse; lateral veins 6–8 pairs. Inflorescences umbel-like, to 8 cm, ca. 10-flowered; peduncle to 5 cm. Pedicel to 2 cm. Calyx glands

cences umbel-like, 4–8-flowered, glabrous; peduncle 4–4.5 cm; bracteoles lanceolate or oblong, 3–6 mm. Pedicel 2–2.5 cm. Sepals ovate, ca. 4 × 2 mm, ciliate. Corolla white, campanulate, 1.5–2 cm in diam.; tube ca. 5 mm; lobes broadly ovate, ca. 9 × 9 mm, apex rounded. Corona lobes oblong, fleshy, as long as anther appendages. Pollinia falcate-reniform. Ovaries glabrous. Stigma head discoid, convex, slightly exerted from anther appendages. Fl. Sep.

• Mixed woods; 2200–2600 m. Xizang (Medog).

13. *Marsdenia yuei* M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, Novon 5: 12. 1995.

临沧牛奶菜 lin cang nai cai

Lianas glabrous except for flowers. Stems stout. Petiole ca. 4 cm; leaf blade ovate, ca. 9.5 × 5.8 cm, base shallowly cordate, apex bluntly cuspidate to short acuminate; lateral veins 4 or 5 pairs, flattened. Inflorescences umbel-like, up to 9-flowered; peduncle ca. 1.5 cm. Pedicel to 9 mm. Sepals

rounded, ca. 3 × 2.5 mm, finely appressed puberulent. Corolla white, ± campanulate, glabrous except for sparsely ciliate margin; tube 4.5–5 × ca. 4 mm; lobes rotate, oblong-obovate, ca. 5.5 × 2.5–3.2 mm, apex rounded. Corona lobes narrowly triangular, as long as anther appendages, apex rounded, exserted from corolla tube. Anther appendages ovate, membranous margin relatively narrow. Stigma head hemispherical, conspicuously exserted from anther appendages and corolla tube.

- Thickets; 2300 m. Yunnan (Mienning).

14. *Marsdenia koi* Tsiang, *Sunyatsenia* 3: 211. 1936.

大叶牛奶菜 da ye niu nai cai

Marsdenia tsaiana Tsiang.

Lianas stout, to 15 m, glabrous except for flowers. Stems and branches pale gray, hollow when dry. Petiole 3–10 cm; leaf blade broadly ovate to ovate-oblong, 8–20 × 5.5–10 cm, papery, base cordate, apex acute and mucronate; lateral veins 5–7 pairs, flattened. Inflorescences umbel-like to short branched, shorter than leaves; peduncle 7–9 cm. Pedicel 2–4 cm. Sepals suborbicular, (3–)8 × (2.5–)6 mm, ciliate; glands 10. Corolla subcampanulate, ca. 2.8 cm wide, glabrous outside, pubescent inside; tube ca. 1.1 × 1 cm; lobes broadly ovate, ca. 1.2 × 0.9 cm, margin usually reflexed and ciliate. Corona lobes ovate-lanceolate, base turgid, with a pair of longitudinal grooves defining a blunt dorsal wing, shorter than anthers. Anthers laterally compressed, appendages rounded; pollinia reniform. Stigma head conical, apex obtusely acute and 2-cleft. Follicles ellipsoid, 5–10 × 2.5–4 cm. Seeds ovate-oblong, ca. 1.5 cm × 7 mm; coma ca. 2.5 cm. Fl. Jul–Nov.

Mixed woods; 500–3200(?) m. Guangdong, Guangxi, Guizhou, Xizang, Yunnan [Myanmar, Vietnam].

15. *Marsdenia hainanensis* Tsiang, *Sunyatsenia* 3: 206. 1936.

海南牛奶菜 hai nan niu nai cai

Marsdenia alata Tsiang; *M. hainanensis* var. *alata*

17. *Marsdenia sinensis* Hemsley in F. B. Forbes & Hemsley, *J. Linn. Soc., Bot.* 26: 113. 1889.

牛奶菜 niu nai cai

Marsdenia yaungpienensis Tsiang & P. T. Li.

Lianas to 10 m, finely yellowish tomentose. Stems lenticellate, glabrescent, hollow when dry. Petiole 2.5–7.5 cm; leaf blade ovate-cordate to ovate-oblong, 7–17 × 4–10 cm, thick papery, base cordate, apex short acuminate; lateral veins 5 or 6 pairs. Inflorescences dichasial, 3–13 cm, 10–55-flowered; peduncle 2–4.5 cm. Pedicel 3–5 mm. Sepals ovate or elliptic, ca. 3 × 2 mm. Corolla exterior yellow or rose and puberulent on lobes only, otherwise glabrous, interior yellowish or yellow-white and densely tomentose, subcampanulate; tube ca. 2.5(–7) mm; lobes ovate, 2–3 × 2–3 mm, spreading and recurved, apex rounded. Corona lobes ovoid-lanceolate, fleshy, shorter than anthers. Pollinia curved cylindrical. Stigma head conical, apex 2-cleft, exserted from corolla tube. Follicles fusiform, 9–13 × 2–3 cm, rusty tomentose. Seeds ovate, 6–13 × 5–8 mm, margin membranous; coma ca. 3.5 cm. Fl. Apr–Jul, fr. Aug–Nov.

(Tsiang) Tsiang & P. T. Li

Lianas stout, to 6 m, rusty tomentose except for corolla. Petiole 3–10 cm, rather thick and fleshy; leaf blade broadly ovate to orbicular, 8–18 × 7–12 cm, papery, base shallowly cordate, apex short acuminate; lateral veins 5 or 6 pairs. Inflorescences 10–16 cm, forked at right angles to peduncle, sometimes rebranching; peduncle to 15 cm. Pedicel ca. 1 cm. Sepals ovate, ca. 3 × 2 mm, basal glands sometimes present. Corolla yellowish white, subcampanulate; tube ca. 4 × 2 mm, glabrous outside, pilose inside; lobes ovate, 3–4 × 2–3 mm. Corona lobes ovate or ovate-oblong, fleshy, shorter than anthers and corolla tube. Anther appendages large and rounded; pollinia reniform. Stigma head thick, conical to globose, exserted from anthers. Follicles fusiform, ca. 14 × 3 cm. Seeds ovate; coma ca. 5 cm. Fl. May–Oct, fr. Sep–Dec.

Open woods; thickets on hilltops; 500 m. Hainan, Hunan [Vietnam].

The winged petioles described for *Marsdenia alata* are an artifact of preservation.

16. *Marsdenia tomentosa* Morren & Decaisne, *Bull. Acad. Roy. Sci. Bruxelles* 3: 172. 1836.

假防己 jia fang ji

Lianas 1–3 m. Branchlets and petioles minutely tomentose when young, glabrescent. Petiole ca. 6 cm; leaf blade broadly ovate or orbicular, 6.5–15 × 6–13 cm, thick papery, base shallowly cordate to subtruncate, apex short acuminate, sparsely tomentose to glabrous. Inflorescences umbel-like or condensed paniclelike, 5–7 cm, many flowered; peduncle nearly as long as petiole. Pedicel 1–1.5 cm. Sepals ovate; glands 5. Corolla white, subcampanulate; tube tomentose inside; lobes oblong ca. 3 × 2 mm, ciliate. Corona lobes lanceolate, fleshy, shorter than anthers. Anthers ± square; pollinia oblong. Stigma head discoid, apex conical. Follicles fusiform, ca. 7 × 2 cm; pericarp woody, glabrous. Seeds ovate, ca. 1 cm; coma ca. 1 cm. Fl. Apr.

Thickets. Taiwan [Japan, Korea].

- Thickets, open woods, along humid valleys; below 800 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

A decoction of all parts is used to detoxify viper bites and to treat pain, traumatic injury, and swelling.

18. *Marsdenia lachnostoma* Bentham, *Fl. Hongk.* 226. 1861.

毛喉牛奶菜 mao hou niu nai cai

Marsdenia cambodiensis Costantin.

Vines suffrutescent, to 2 m, stems, petioles, and inflorescences thin pubescent, glabrescent. Petiole 0.6–1.7 cm; leaf blade ovate to oblong, 2.5–9 × 2–4 cm, base rounded or subcordate, apex acute or obtuse, abaxially pale or glaucous. Inflorescences umbel-like, branched, compact, much shorter than leaves; peduncle 1–1.5 cm. Pedicel 1.5–2 mm, ciliolate. Sepals ovate, ca. 2 mm. Corolla campanulate, 3.5–4 mm; tube longer than lobes, throat with a very dense tuft of woolly hairs, conspicuous in dried material, reflexed hairy in tube; lobes oblong, glabrous except at base. Corona lobes

ovate-lanceolate, shorter than anthers. Pollinia oblong or reniform. Stigma head short conical. Follicles ellipsoid, thick walled, 4.5–5.5 × 1.5–2 cm. Seeds ca. 0.9–1.3 cm × 6–8 mm; coma 2–2.5 cm. Fl. May.

Thickets. Hong Kong [Cambodia, Laos, Thailand].

19. *Marsdenia tenii* M. G. Gilbert & P. T. Li in M. G. Gilbert, W. D. Stevens, & P. T. Li, *Novon* 5: 11. 1995.

绒毛牛奶菜 rong mao niu nai cai

Lianas yellow-brown tomentose except for flowers. Petiole to 4 cm; leaf blade oblong-ovate, to 12.5 × 7.5 cm, more sparsely hairy than petiole, base cordate, apex acute; lateral veins ca. 5 pairs. Inflorescences with several umbel-like cymules along unbranched rachis; peduncle to 3 cm; rachis to at least 2 cm. Pedicel ca. 5 mm. Sepals elliptic, ca. 3 × 2 cm. Corolla white, ca. 6 mm; lobes rotate, ca. 3.5 × 2.5 mm, glabrous outside, glabrous at base inside; throat pilose with retrorse hairs; lobes densely appressed tomentose in center. Corona lobes to base of anthers, almost flat. Stigma head 2-cleft, conical, equalling anther appendages.

• Yunnan (Siu tchoang).

20. *Marsdenia pseudotinctoria* Tsiang, *Sunyatsenia* 3: 197. 1936.

假蓝叶藤 jia lan ye teng

Lianas to 2 m. Branches glabrescent. Petiole ca. 6 mm; leaf blade oblong to oblong-lanceolate, 3–6 × 1.5–2.5 cm, abaxially glabrous or puberulent when young, base rounded or rarely cuneate, apex obtuse; lateral veins 3 or 4 pairs, nearly flat. Inflorescences umbel-like; peduncle ca. 2 mm, tomentose. Pedicel ca. 2 mm, pubescent. Sepals ovate, ca. 1 × 0.5 mm, ciliate; without glands. Corolla subcampanulate, ca. 1.5 mm, ca. 2 mm in diam., glabrous outside; throat with many rows of short straight hairs; lobes ovate, ca. 0.5 × 0.5 mm. Corona lobes subulate. Anthers slightly shorter than corolla base rounded to cordate, apex acuminate; lateral veins 5–7 (–10) pairs. Inflorescences dense, globose to long racemelike clusters of cymules, (1.5–)3–15 cm; peduncle (0.5–)2.5–5 cm. Pedicel 3–5 mm. Sepals suborbicular, ca. 2 mm. Corolla yellowish white, dark blue when dry, urceolate, 3.5–4(–6) mm long, throat with a ring of hairs, otherwise glabrous; tube ca. 2.5 mm; lobes ovate, 1–1.5 mm, apex rounded. Corona lobes 5, lanceolate, as long as anthers. Pollinia narrowly oblong. Stigma head discoid, slightly convex at apex. Follicles oblong-lanceolate, 5–10 cm × 8–10 mm, pilose to subtomentose. Seeds ovate, ca. 10 × 3 mm; coma 1–2 cm. Fl. Mar–Nov, fr. Jul–Dec.

Humid mixed woods; 400–1000 m. Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

The bark, leaves, and flowers are used in making a blue dye.

As here delimited, *Marsdenia tinctoria* includes a wide range of forms which need more detailed investigation, and several taxa might be involved. There is also considerable variation in the relative length of corona to anthers and in the size, shape, and indumentum of fruits. The Chinese material has distinctly narrower and often paler leaves than Indian material and also lacks the very long spiral rachis of

rona lobes; pollinia ellipsoid. Stigma head lower than anthers. Follicles lanceolate, ca. 5 cm × 8 mm, glabrous. Fl. May–Jul, Jul–Oct.

• Thickets; 700–1000 m. Guangxi, Yunnan.

21. *Marsdenia pulchella* Handel-Mazzetti, *Symb. Sin.* 7: 1002. 1936.

美蓝叶藤 mei lan ye teng

Lianas to 1.5 m. Branches dark brown, lenticellate; branchlets slender, glabrous. Petiole 5–10 mm, with an apical adaxial group of subulate glands; leaf blade ovate-triangular, 1–2.5 × 1 cm, adaxially pubescent on veins, abaxially glabrous and densely papillate, base rounded to shallowly cordate, margin translucent, apex acuminate; lateral veins 3 or 4 pairs. Inflorescences umbel-like, 3–6-flowered; peduncle 1–1.5 cm; bracteoles lanceolate, 3–5 mm. Pedicel 5–6 mm. Sepals lanceolate, ca. 3 mm. Corolla urceolate, 5–6 mm; tube interior sparsely pubescent with reflexed hairs; lobes ovate-oblong. Corona ringlike, apex wavy, slightly longer than anthers. Anthers square, appendages triangular; pollinia large. Stigma head short conical, apex 2-cleft. Fl. May.

• Thickets on dry land; 2000–2500 m. Sichuan (Yanyuan).

22. *Marsdenia tinctoria* R. Brown, *Mem. Wern. Nat. Hist. Soc.* 1: 30. 1810.

蓝叶藤 lan ye teng

Marsdenia globifera Tsiang; *M. tinctoria* var. *brevis* Costantin; *M. tinctoria* var. *tomentosa* Masumune ex Tsiang & P. T. Li.

Lianas to 5 m, densely to sparsely pubescent when young, glabrescent. Petiole 1–4 cm; leaf blade oblong to broadly ovate, 5–13 × 2–7 cm, thin papery, bluish when dry,

typical *M. tinctoria*. *Marsdenia globifera* was based on material with diseased flowers.

23. *Marsdenia glomerata* Tsiang, *Sunyatsenia* 3: 203. 1936.

团花牛奶菜 tuan hua niu nai cai

Lianas slender, to 4 m. Branchlets grayish brown, puberulent, indumentum denser on nodes. Petiole to 2 cm, pubescent, apex with a group of adaxial glands; leaf blade obliquely ovate to ovate-oblong, 5–7 × 2.5–3.5 cm, base rounded, margin ciliate, apex acuminate; lateral veins 3–5 pairs, flattened, adaxially pubescent. Inflorescences glomerate, shorter than leaves, ca. 4 cm in diam.; peduncle ca. 2.5 cm. Pedicel ca. 1 cm. Sepals oblong, ca. 2 × 1 mm, pubescent. Corolla purplish, subcampanulate; tube ca. 9 × 2.5 mm, throat densely pilose; lobes narrowly oblong, ca. 5 × 2 mm. Corona lobes subulate, longer than anthers. Anther appendages rounded, covering stigma head; pollinia ellipsoid. Stigma head globose.

• Montane forests. Zhejiang.

24. *Marsdenia schneideri* Tsiang, *Sunyatsenia* 6: 141. 1941.

四川牛奶菜 si chuan niu nai cai

Marsdenia balansae Costantin 1912, non Baillon 1889.

Lianas to 5 m, brownish tomentose. Stems densely lenticellate. Petiole 1–2 cm; leaf blade ovate or broadly elliptic, 5–10 × 3.5–7 cm, base rounded to shallowly cordate, tip abruptly acuminate to attenuate; lateral veins 5 pairs, flattened. Inflorescences racemelike, many flowered; peduncle 1–3 cm, rachis clearly spiral, 3–7 cm. Pedicel 1–2 mm, tomentose. Sepals ovate, 1.5 mm, hispid. Corolla tubular, slightly constricted at throat, glabrous outside; tube 1.8–3 mm, with double hair bands inside, throat with a ring of brushlike hairs; lobes ovate, 1.5–1.8 × ca. 1.5 mm. Corona lobes broadly ovate, connate at base, tips free and long acuminate, as long as anther appendages. Anther appendages long acuminate, concealing stigma head; pollinia oblong, as long as retinaculum. Gynostegium as long as corolla tube. Stigma head subovoid, apex slightly depressed. Fl. Apr.

Bushland. Sichuan, Yunnan [Laos, Vietnam].

25. *Marsdenia glabra* Costantin in Lecomte, Fl. Indo-Chine 4: 96. 1912.

光叶蓝叶藤 guang ye lan ye teng

Lianas to 6 m, pubescent when young, glabrescent. Petiole 1–3.5 cm; leaf blade green, usually bluish when dry, ovate-oblong or elliptic, 4–13 × 1.5–7 cm, base rounded or cuneate, apex acute to acuminate; lateral veins 3–5 pairs, abaxially prominent. Inflorescences much shorter than leaves, with short thick rachis covered with pedicel scars; peduncle 0.8–1.5 cm. Pedicel 2–5 mm, pubescent. Sepals ovate, pubescent; glands absent. Corolla greenish white, urceolate; tube globose, ca. 5 × 4 mm, interior with a brush of yellowish hairs at throat and 5 narrow double longitudinal hair bands. Corona lobes oblong-ovate, shorter than anther appendages. Pollinia small, oblong, caudicles long. Stigma head short conical, base ringlike, dilated. Follicles lanceolate in outline, 5–7 cm × 6–10 mm, long acute, glabrous to pilose. Seeds ovate, 8–10 × 4–5 mm; coma to 4 cm. Fl. Sep-Oct, fr. Oct-Dec.

In montane forest; 500–800 m. Guangdong, Guangxi, Hainan, Yunnan [Laos, Vietnam].

The bark, leaves, and flowers are used for making a blue dye.

