

ACANTHACEAE

爵床科 jue chuang ke

Hu Jiaqi (胡嘉琪 Hu Chia-chi)¹, Deng Yunfei (邓云飞)²; John R. I. Wood³, Thomas F. Daniel⁴

Prostrate, erect, or rarely climbing herbs (annual or perennial), subshrubs, shrubs, or rarely small trees, usually with cystoliths (except in following Chinese genera: *Acanthus*, *Blepharis*, *Nelsonia*, *Ophiorrhizophyllum*, *Staurogyne*, and *Thunbergia*), isophyllous (leaf pairs of equal size at each node) or anisophyllous (leaf pairs of unequal size at each node). Branches decussate, terete to angular in cross-section, nodes often swollen, sometimes spinose with spines derived from reduced leaves, bracts, and/or bracteoles. Stipules absent. Leaves opposite [rarely alternate or whorled]; leaf blade margin entire, sinuate, crenate, dentate, or rarely pinnatifid. Inflorescences terminal or axillary spikes, racemes, panicles, or dense clusters, rarely of solitary flowers; bracts 1 per flower or dichasial cluster, large and brightly colored or minute and green, sometimes becoming spinose; bracteoles present or rarely absent, usually 2 per flower. Flowers sessile or pedicellate, bisexual, zygomorphic to subactinomorphic. Calyx synsepalous (at least basally), usually 4- or 5-lobed, rarely (*Thunbergia*) reduced to an entire cupular ring or 10–20-lobed. Corolla sympetalous, sometimes resupinate 180° by twisting of corolla tube; tube cylindric or funnelliform; limb subactinomorphic (i.e., subequally 5-lobed) or zygomorphic (either 2-lipped with upper lip subentire to 2-lobed and lower lip 3-lobed, or rarely 1-lipped with 3 lobes); lobes ascending or descending cochlear, quincuncial, contorted, or open in bud. Stamens epipetalous, included in or exerted from corolla tube, 2 or 4 and didynamous; filaments distinct, connate in pairs, or monadelphous basally via a sheath (*Strobilanthes*); anthers with 1 or 2 thecae; thecae parallel to perpendicular, equally inserted to superposed, spherical to linear, base mucicous or spurred, usually longitudinally dehiscent; staminodes 0–3, consisting of minute projections or sterile filaments. Disk annular and nectar-producing at base of ovary. Ovary superior, 2-locular, placentation axile, with 2 to many ovules per locule; style filiform, simple; stigma funnel-shaped or 2-lobed (one lobe sometimes suppressed), one or both lobes sometimes recurved or recoiled. Fruit a loculicidal, stipitate or not, 2-valved, explosively dehiscent capsule [rarely drupaceous], 2- to many seeded, apex with or without a beak; septa remaining attached to or separating from inner wall of mature capsule. Seeds usually borne on hooklike retinacula (attached to septa of capsule), or retinacula lacking (*Nelsonia*, *Ophiorrhizophyllum*, *Staurogyne*, *Thunbergia*), surface smooth or roughened, pubescent or lacking trichomes, sometimes with hygroscopic trichomes that expand when moistened.

About 220 genera and ca. 4,000 species: pantropical and subtropical, with a few species in temperate regions; 35 genera (one endemic) and 304 species (134 endemic, eight introduced) in China.

Pollen characters have traditionally been important in delimiting genera and higher taxa in the family; they are used sparingly in the key below.

Avicennia Linnaeus, usually placed in either Verbenaceae (and treated as such in Fl. China 17: 49. 1994) or Avicenniaceae, is now included in Acanthaceae on the basis of molecular phylogenetic studies (e.g., A. E. Schwarzbach & L. A. McDade, Syst. Bot. 27: 84–98. 2002).

The major economic importance of the family is horticultural. Species of *Acanthus*, *Aphelandra* R. Brown, *Barleria*, *Crossandra* Salisbury, *Eranthemum*, *Fittonia* Coemans, *Justicia*, *Odontonema* Nees, *Pachystachys* Nees, *Ruellia*, *Sanchezia* Ruiz & Pavon, *Thunbergia*, and numerous other genera are widely cultivated as ornamentals. Many species are cultivated in China but not treated in the present account. These include: *Aphelandra squarrosa* Nees, *Barleria lupulina* Lindley, *Crossandra infundibuliformis* (Linnaeus) Nees, *Eranthemum pulchellum* Andrews, *Fittonia albivenis* (Veitch) Brummitt, *Justicia betonica* Linnaeus, *J. brandegeana* Wasshausen & L. B. Smith, *J. carnea* Lindley, *Pachystachys lutea* Nees, *Ruellia elegans* Poir., *R. simplex* C. Wright, *Sanchezia parvibracteata* Sprague & Hutchinson, *Thunbergia erecta* (Benth.) T. Anderson, and *T. laurifolia* Lindley.

Hu Chiachi & Tsui Hongpin. 2002. Acanthaceae. In: Hu Chiachi, ed., Fl. Reipubl. Popularis Sin. 70: 1–309.

- 1a. Vines; calyx cupular with 10–20 lobes or reduced to an entire ring; capsule with a prominent apical sterile beak; seeds not borne on hooklike retinacula 4. *Thunbergia*
- 1b. Prostrate or erect herbs, shrubs, or rarely small trees; calyx 4- or 5-lobed; capsule lacking a prominent apical sterile beak; seeds borne on hooklike retinacula or not.
- 2a. Cystoliths absent; retinacula absent (except *Acanthus* and *Blepharis*).
- 3a. Seeds laterally compressed, borne on hooklike retinacula; corolla 1-lipped (upper lip absent), lobes not with descending cochlear aestivation; anthers 1-theous.
- 4a. Leaves opposite; flowers not subtended by up to 5 pairs of bracts; seeds lacking hygroscopic trichomes; lower filaments without an apical appendage 5. *Acanthus*
- 4b. Leaves usually in pseudo-whorl of 4; flowers subtended by up to 5 pairs of bracts; seeds with hygroscopic trichomes; lower filaments with an apical appendage 6. *Blepharis*
- 3b. Seeds subspherical or blocky, not borne on hooklike retinacula; corolla 2-lipped, lobes with descending cochlear aestivation; anthers 2-theous.

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- 5a. Prostrate herbs; bracteoles absent; calyx 4-lobed, anterior lobe 2-cleft at apex; stamens 2 1. *Nelsonia*
- 5b. Erect herbs; bracteoles present; calyx 5-lobed; stamens 2 or 4.
- 6a. Stamens 4, included or slightly exerted from mouth of corolla; anther thecae of a pair parallel; staminodes 0 or 1 2. *Staurogyne*
- 6b. Stamens 2, long exerted; anther thecae of a pair divergent toward apex; staminodes 2 3. *Ophiorrhizophyllon*
- 2b. Cystoliths present; retinacula present, hooklike.
- 7a. Calyx lobes heteromorphic, posterior lobe usually largest, anterior lobes connate to a greater degree than other lobes, lateral lobes smallest and innermost; corolla lobe aestivation quincuncial.
- 8a. Corolla large (mostly > 3 cm), upper lip usually appearing 4-lobed and lower lip appearing 1-lobed 29. *Barleria*
- 8b. Corolla small (< 3 cm), upper lip 2-lobed and lower lip 3-lobed.
- 9a. Corolla to 1 cm; anther thecae usually lacking basal appendages; capsule 4–7 mm 30. *Lepidagathis*
- 9b. Corolla ca. 2.5 cm; anther thecae spurred at base; capsule 12–16 mm 31. *Chroesthes*
- 7b. Calyx lobes homomorphic (or nearly so; sometimes partially fused to form a bipartite or tripartite calyx in *Strobilanthes*), not as described above; corolla lobe aestivation not quincuncial.
- 10a. Corolla lobes contorted in bud; stamens (or stamens + staminodes) 4.
- 11a. Style held in place by trichomes on one side of corolla tube; stamens monadelphous (by a sheath) at base 7. *Strobilanthes*
- 11b. Style not held in place by trichomes on one side of corolla tube; stamens not monadelphous at base.
- 12a. Inflorescence secund strobilate spikes with orbicular to reniform bracts; ovules 2 per locule; seeds to 4 per capsule; corolla ca. 0.6 cm; septa with attached retinacula separating from inner wall of mature capsule 8. *Phaulopsis*
- 12b. Inflorescence not as described above; ovules 4 to many per locule; seeds 4 or more per capsule; corolla 0.6–5.5 cm; septa with attached retinacula not separating from inner wall of mature capsule (except in *Ruellia blechum*).
- 13a. Corolla limb distinctly 2-lipped, lobes usually not equal; calyx tube often rupturing in weak hyaline regions between lobes; pollen 4-colporate, interapertural regions multistriate with pseudocolpi 9. *Hygrophila*
- 13b. Corolla limb nearly regular, lobes equal to subequal; mature calyx tube not rupturing in weak hyaline regions between lobes; pollen otherwise.
- 14a. Fertile stamens 2, staminodes 2 10. *Eranthemum*
- 14b. Fertile stamens 4.
- 15a. Anther thecae spurred at base 11. *Echinacanthus*
- 15b. Anther thecae mucicous at base.
- 16a. Stems short; leaves in a basal rosette; anther thecae usually widely separated by a broad connective 12. *Pararuellia*
- 16b. Stems elongate; leaves cauline; anther thecae not separated by a broad connective 13. *Ruellia*
- 10b. Corolla lobes ascending cochlear in bud; stamens 2 (except 4 in *Asystasia*), staminodes 0 or 2.
- 17a. Ovules 3 to many per locule; seeds 6 to many per capsule; pollen with apertural margins conspicuously thickened.
- 18a. Capsule compressed perpendicular to septum; seeds subglobose, glabrous 33. *Andrographis*
- 18b. Capsule linear and 4-angled, not compressed perpendicular to septum; seeds strongly compressed, glabrous or pubescent.
- 19a. Staminodes 0 32. *Gymnostachyum*
- 19b. Staminodes 2.
- 20a. Corolla tube cylindrical and slightly curved 34. *Phlogacanthus*
- 20b. Corolla tube abruptly inflated near middle and usually bent ca. 90° 35. *Cystacanthus*
- 17b. Ovules 2 per locule; seeds 4 per capsule; pollen with apertural margins not thickened.
- 21a. Stamens 4 14. *Asystasia*
- 21b. Stamens 2.
- 22a. Anthers 1-theous.
- 23a. Flowers subtended by a single pair of bracteoles; corolla not resupinate 180° by a twisting of corolla tube (i.e., upper lip entire to 2-lobed and lower lip 3-lobed), or if position of lips reversed then this by geniculation (without twisting) of corolla tube 18. *Clinacanthus*
- 23b. Flowers subtended by an involucre of 2 or more pairs of floral bracteoles; corolla resupinate 180° by twisting of corolla tube (i.e., lip in upper position 3-lobed and lip in lower position entire to 2-lobed) 28. *Hypoestes*

- 22b. Anthers 2-theous.
- 24a. Flowers subtended by involucre of 2 or more pairs of floral bracteoles; corolla resupinate 180° (i.e., lip in upper position 3-lobed and lip in lower position entire to 2-lobed).
- 25a. Septa with attached retinacula separating from inner wall of mature capsule 26. *Dicliptera*
- 25b. Septa with attached retinacula remaining attached to inner wall of mature capsule 27. *Peristrophe*
- 24b. Flowers subtended by a single pair of bracteoles (or bracteoles rarely lacking); corolla not resupinate 180° (i.e., upper lip entire to 2-lobed and lower lip 3-lobed).
- 26a. Staminodes 2.
- 27a. Corolla ± salverform (i.e., tube slender and cylindrical, limb spreading and inconspicuously 2-lipped), tube conspicuously longer than limb, not or only slightly widened distally 15. *Pseuderanthemum*
- 27b. Corolla ± campanulate to strongly 2-lipped (not salverform), tube not longer than limb, gradually widened distally.
- 28a. Corolla 3–4 cm; anther thecae 4–5 mm 16. *Mackaya*
- 28b. Corolla less than 2 cm; anther thecae less than 3 mm.
- 29a. Corolla campanulate, 6.5–10 mm, externally glabrous; pollen 4-aperturate 22. *Codonacanthus*
- 29b. Corolla strongly 2-lipped, 10–15 mm, externally pubescent (to subglabrous); pollen 3-aperturate 23. *Cosmianthemum*
- 26b. Staminodes absent.
- 30a. Upper lip of corolla lacking a stylar furrow on internal surface; anther thecae lacking basal appendages.
- 31a. Corolla 1.7–4.5 cm; anther thecae subequally to unequally inserted; pollen 2-aperturate 17. *Isoglossa*
- 31b. Corolla less than 10 mm; anther thecae equally to subequally inserted; pollen 3–5-aperturate.
- 32a. Corolla glabrous outside 19. *Kudoacanthus*
- 32b. Corolla pubescent outside 21. *Leptostachya*
- 30b. Upper lip of corolla rugulate (i.e., with a furrow on inner surface of lip in which style resides); anther thecae (at least lower theca) usually with a basal appendage.
- 33a. Septa with attached retinacula separating from inner wall of mature capsule; inflorescence often dense with imbricate bracts 2- or 4-ranked (but only 2 ranks fertile) 20. *Rungia*
- 33b. Septa with attached retinacula remaining attached to inner wall of mature capsule; inflorescence not as above.
- 34a. Corolla not with combination of characters noted below 24. *Justicia*
- 34b. Corolla white or greenish white, tube narrowly cylindrical, conspicuously longer than limb 25. *Rhinacanthus*

1. NELSONIA R. Brown, Prodr. 480. 1810.

瘤子草属 liu zi cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, pubescent, without cystoliths. Leaves opposite, shortly petiolate; leaf blade pinnately veined, margin entire. Inflorescences axillary or terminal spikes; bracts overlapping. Flowers ± spirally arranged, sessile, subtended by a bract; bracteoles absent. Calyx 4-lobed to base; lobes unequal, anterior lobe apically 2-cleft. Corolla tube slender, sometimes widening into a throat; limb 2-lipped; lower lip 3-lobed, upper lip 2-lobed; lobes ± equal, descending cochlear in bud. Stamens 2, included or slightly exerted; filaments basally pubescent; anthers 2-theous; thecae subspherical, muticous, opening at base by a pore that has a small flap; stami-

nodes absent. Ovary with 8–28 ovules in 2–4 rows per locule; stigma usually unequally 2-lobed. Capsule conical; retinacula absent. Seeds subspherical, small, flattened on 1 face, lacking trichomes.

Five species or fewer: widely occurring in tropical Africa, Asia, Australia, and South America (introduced elsewhere); one species in China.

A single species, *Nelsonia canescens*, is sometimes recognized (e.g., A. B. M. E. Hossain, Willdenowia 14: 397–403. 1984), but Vollesen (e.g., K. Vollesen in J. H. Seyani & A. C. Chikuni, eds., Proceedings of the XIII Plenary Meeting of AETFAT, Zomba, Malawi, 2–11 Apr 1991, 315–325. 1994) presented arguments for recognizing up to five species.

1. *Nelsonia canescens* (Lamarck) Sprengel, Syst. Veg. 1: 42. 1824.

瘤子草 liu zi cao

Justicia canescens Lamarck, Tabl. Encycl. 1: 41. 1791.

Herbs 10–20 cm tall, annual, creeping, sprawling, prostrate, or decumbent. Stems subterete, villous, often rooting at nodes. Petiole 0.2–3(–4) cm, villous; leaf blade elliptic to ovate, 1–2.2 × 0.4–1.2 cm but basal ones sometimes 6–12 × 3.5–5 cm, both surfaces villous, secondary veins 3–7 on each side of mid-vein, base cuneate, margin entire, apex acute. Spikes 1.5–4 cm;

bracts elliptic, 6–7.5 × 3–4 mm, 5–7-veined. Calyx abaxial lobe ca. 2 × 0.6 mm, apex 2-lobed; adaxial lobe ca. 3 × 1 mm; lateral lobes ca. 2 × 0.5 mm. Corolla bluish purple or white, externally glabrous; tube cylindric for ca. 1.5 mm, contracted near mid-point then expanded into throat; lower lip ca. 2.3 mm; upper lip ca. 2 mm. Stamens inserted at base of throat; filaments ca. 0.5 mm, glabrous. Ovary glabrous; ovules 4–8 per locule. Capsule ca. 5 × 2 mm, 8–16-seeded. Seeds broadly ellipsoid, granulate. Fl. Oct–Mar, fr. Mar–May. $2n = 34 + \beta$, 36.

Wet places, open forests; 400–2000 m. Guangxi, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam; Africa, Madagascar].

2. **STAUROGYNE** Wallich, Pl. Asiat. Rar. 2: 80. 1831.

叉柱花属 cha zhu hua shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Ebermaiera Nees.

Annual or perennial herbs or small shrubs, without cystoliths. Stems very short or elongate. Leaves in a basal rosette or cauline, opposite (or alternate, especially apically), petiolate or sessile; leaf blade margin entire or nearly so. Inflorescences terminal or axillary, racemes or spikes; bracts opposite or alternate, leaflike or usually well differentiated from leaves; bracteoles present. Calyx 5-lobed almost to base; lobes equal or unequal. Corolla tube cylindric or basally cylindric and apically expanding into a campanulate throat; limb subactinomorphic to 2-lipped, 5-lobed; lobes subequal, patent, descending cochlear in bud. Stamens 4, didynamous, included or anterior pair slightly exserted; filaments usually hairy; anthers 2-theous; thecae parallel, usually equal; staminode 1 or more, sometimes absent. Ovary with usually 12–60 ovules arranged in 2 or 4 rows per locule; style glabrous; stigmas 2-lobed, sometimes repeatedly 2-lobed. Capsule oblong, many seeded; retinacula absent. Seeds minute, subspherical or cuboid.

About 140 species: tropical regions worldwide; 17 species (eight endemic) in China.

1a. Bracts pinnately veined.

2a. Plants to 20 cm tall; leaf blade 2.5–6 × 1–2 cm; spikes ca. 1 cm 7. *S. paotingensis*

2b. Plants to 1 m tall; leaf blade 13–17 × 4.5–7 cm; racemes to 15 cm 8. *S. rivularis*

1b. Bracts not pinnately veined.

3a. Leaf blade base cordate 5. *S. chapaensis*

3b. Leaf blade base cuneate, rounded, or attenuate.

4a. Stems very short; leaves forming a basal rosette.

5a. Leaf blade oblanceolate, widest above middle 10. *S. concinnula*

5b. Leaf blade ovate-oblong, elliptic, oblong, ovate, or oblong-obovate, widest below middle.

6a. Leaf blade adaxially villous; corolla ca. 2 cm 6. *S. sinica*

6b. Leaf blade adaxially strigose; corolla ca. 5.5 mm 12. *S. strigosa*

4b. Stems elongate; leaves cauline.

7a. Calyx 1.8–2.4 cm; corolla 3–4 cm 4. *S. sesamoides*

7b. Calyx less than 1.5 cm; corolla less than 2.5 cm (corollas unknown in *S. sichuanica* and *S. yunnanensis*).

8a. Leaf blade linear, 5–9 mm wide, length/width greater than 5 13. *S. stenophylla*

8b. Leaf blade lanceolate, ovate-lanceolate, oblong, or elliptic, usually broader than 1 cm, length/width less than 3.

9a. Calyx lobes spatulate 15. *S. petelotii*

9b. Calyx lobes linear, lanceolate, or triangular.

10a. Longer pair of stamens slightly exserted 1. *S. hypoleuca*

10b. Stamens all included.

- 11a. Inflorescences all borne on axillary brachyblasts 2. *S. longicuneata*
 11b. Inflorescences not all borne on axillary brachyblasts.
 12a. Inflorescences terminal only; calyx lobes unequal.
 13a. Bracts adaxially densely pubescent 14. *S. yunnanensis*
 13b. Bracts glabrous or subglabrous 16. *S. vicina*
 12b. Inflorescences terminal and axillary; calyx lobes subequal or equal.
 14a. Stems suberect or ascending from a decumbent base 17. *S. debilis*
 14b. Stems erect.
 15a. Filaments glabrous 11. *S. hainanensis*
 15b. Filaments pubescent.
 16a. Peduncles, rachises, and pedicels puberulent 3. *S. sichuanica*
 16b. Peduncles, rachises, and pedicels glabrous 9. *S. brachystachya*

1. *Staurogyne hypoleuca* Benoist, Notul. Syst. (Paris) 2: 338. 1911.

灰背叉柱花 *hui bei cha zhu hua*

Ophiorrhizophyllon hypoleucum (Benoist) Benoist.

Herbs to 1 m tall. Stems glabrous, lenticellate. Petiole 3–6 cm; leaf blade oblong, elliptic, or lanceolate, 13–17 × 4.5–7 cm, both surfaces glabrous, abaxially glaucous, adaxially green, secondary veins 8–11 on each side of midvein, base cuneate and slightly decurrent onto petiole, margin entire or undulate, apex acuminate to sometimes acute. Racemes terminal or in axils of apical leaves, to 15 cm, unbranched or branched at base; rachis gland-tipped pilose; bracts linear, 4–4.5 × ca. 0.8 mm, apex acuminate; bracteoles linear, ca. 2 mm. Flowers alternate. Pedicel 2–3.5 mm. Calyx ca. 5 mm, outside pubescent with gland-tipped trichomes; lobes triangular-ovate, ca. 4 × 1 mm, unequal with lateral 2 lobes smaller, margin ciliate with gland-tipped trichomes. Corolla white, funnel-shaped, ca. 7 mm; lobes suborbicular, ca. 1.5 × 1.3 mm, subequal. Stamens with longer pair ca. 3 mm and shorter pair ca. 2 mm; filaments glabrous; anther thecae ca. 1 mm, those of longer pair of stamens slightly exerted. Ovary ellipsoid, ca. 2 mm; ovules in 2 rows per locule, 12 in each row; style ca. 3 mm, glabrous; stigma 2-cleft. Capsule cylindrical, 5–7 mm. Fl. Dec–Apr.

Forests; 300–1800 m. Yunnan [Vietnam].

2. *Staurogyne longicuneata* H. S. Lo, Bull. Bot. Res., Harbin 8(1): 2. 1988.

楔叶叉柱花 *xie ye cha zhu hua*

Herbs to 30 cm tall. Stems stout, 4-angled, pubescent. Petiole 2–5 cm, brown pubescent, soon glabrescent; leaf blade elliptic to elliptic-lanceolate, 10–20 × 5–7 cm, both surfaces brown or white pubescent, abaxially pale green, adaxially green, secondary veins 11–17 on each side of midvein, base cuneate and usually decurrent onto petiole, margin entire, apex acute to obtuse. Racemes borne on axillary brachyblasts, to 16 cm; rachis brownish pubescent with gland-tipped trichomes; bracts linear, 3–5 × ca. 1 mm; bracteoles linear, 3–4 × ca. 1 mm. Pedicels 2–5 mm. Calyx ca. 1 cm, outside brown pubescent, inside glabrous; lobes linear, ca. 9 × 1 mm, subequal. Corolla ca. 1.5 cm, outside pubescent; lobes oblong, ca. 2 × 1.5 mm, subequal. Staminal filaments pubescent; anther thecae ca. 1 mm. Style glabrous; stigma 3-lobed. Capsule ellipsoid, 5–6 mm. Seeds black, in 2 rows, pubescent. Fl. Mar–Apr.

• Forests or thickets by streams; 100–400 m. Yunnan.

3. *Staurogyne sichuanica* H. S. Lo, Bull. Bot. Res., Harbin 8(1): 2. 1988.

金长莲 *jin chang lian*

Herbs 10–30 cm tall. Stems purplish black, terete, sulcate, pubescent. Petiole purple, 1–2 cm, puberulent; leaf blade ovate-lanceolate to elliptic-lanceolate, 4–9 × 1.3–3 mm, both surfaces sparsely strigillose, secondary veins 6–11 on each side of midvein and abaxially inconspicuous, base cuneate to broadly cuneate and sometimes oblique, margin entire, apex acuminate. Racemes terminal or axillary, 3.5–6 cm, 2–5-flowered; peduncle and rachis slightly puberulent; bracts linear, ca. 5.5 × 0.5 mm, subglabrous, 1-veined, margin ciliate; bracteoles similar to bracts. Pedicel 4–7 mm. Calyx ca. 1.1 cm, subglabrous; lobes linear, 9–11 × 0.6–1.2 mm, subequal, 3-veined, margin ciliate. Corolla purplish blue in bud. Staminal filaments glabrous. Ovary glabrous. Capsule ca. 5 mm. Fl. Feb, fr. Jun–Jul.

• Forests; 500–600 m. Sichuan (Changning, Hejiang).

4. *Staurogyne sesamoides* (Handel-Mazzetti) B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 22: 310. 1958.

大花叉柱花 *da hua cha zhu hua*

Loxostigma sesamoides Handel-Mazzetti, Oesterr. Bot. Z. 85: 217. 1936; *Staurogyne dolichocalyx* E. Hossain.

Herbs to 40 cm tall, unbranched. Stems striate, tomentose, soon glabrescent. Petiole 1.5–4 cm, tomentose; leaf blade elliptic-lanceolate, 5–13 × 2–5.5 cm, abaxially pubescent along veins, adaxially glabrous, secondary veins 5–11 on each side of midvein, base cuneate, margin entire or sometimes irregularly undulate, apex acuminate to sometimes acute. Racemes terminal or axillary, densely flowered, elongated after flowering; peduncle and rachis pubescent; bracts lanceolate, 6–7 × 2–2.2 mm, pilose, 3-veined; bracteoles lanceolate, 8–8.5 × ca. 2 mm, pilose. Pedicel 0.8–1 mm but elongated to 5 mm in fruit, tomentose. Calyx 1.8–2.4 mm, outside sparsely pilose or glabrous; lobes lanceolate, 1.6–2.2 × 0.1–0.2 cm, subequal. Corolla white or pinkish on lobes, 3–4 cm; lobes suborbicular, ca. 1 cm in diam., subequal, 3-veined. Stamens with longer pair ca. 1.7 cm and shorter pair ca. 1.3 cm; filaments gland-tipped hairy and apically more densely hairy; anther thecae ca. 2.5 × 1.5 mm, with appendage, margin hispid. Ovary glabrous; ovules ca. 60 in 2 rows; style ca. 2 cm, sparsely pubescent; stigma triangular, 2-cleft; stigma lobes fimbriate on margin, posterior one

elliptic and ca. 3×2 mm, anterior one ca. 4×4 mm. Capsule narrowly ellipsoid. Seeds small, alveolate. Fl. Mar–May.

Moist places in forests; below 800 m. Guangdong, Guangxi [Vietnam].

5. *Staurogyne chapaensis* Benoist, Bull. Mus. Natl. Hist. Nat., sér. 2, 5: 172. 1933.

弯花叉柱花 wan hua cha zhu hua

Herbs to 10 cm tall. Stems short. Leaves in a basal rosette; petiole to 11 cm, brownish tomentose; leaf blade ovate to oblong, $2.5\text{--}14.5 \times 2\text{--}6$ cm, abaxially glaucous and densely hairy, adaxially green and sparsely hairy, secondary veins 7–9 on each side of midvein, base cordate, margin entire or slightly undulate, apex obtuse. Racemes terminal or axillary; peduncle ca. 4 cm, villous; rachis villous; bracts obovate to linear-spatulate, $2.5\text{--}3.5$ cm, abaxially villous, adaxially glabrous; bracteoles linear-spatulate, ca. 5×1.6 mm, abaxially villous, adaxially glabrous, margin ciliate, apex obtuse. Pedicel 1.5–7 mm, villous. Calyx ca. 1 cm, outside villous, inside glabrous; lobes unequal, margins ciliate, posterior one spatulate and ca. 8×2 mm, lateral 2 linear and ca. 5×0.5 mm. Corolla light bluish purple, ca. 1.5 cm; lobes orbicular, subequal. Stamens with longer pair ca. 2 mm and shorter pair ca. 1.1 mm; filaments glabrous; anther thecae subequal, base with a rectangular appendage. Ovary ellipsoid, ca. 2 mm, glabrous; style ca. 5.5 mm, glabrous. Capsule obovoid-ellipsoid, ca. 6 mm. Fl. Mar–May, fr. Jul–Aug.

Forests; 1000–2000 m. Guangdong, Guangxi, Hunan, Yunnan [Vietnam].

6. *Staurogyne sinica* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 590. 1974.

中华叉柱花 zhong hua cha zhu hua

Titanotrichum parviflorum X. B. Ye & W. T. Lin.

Herbs, annual. Stems very short, densely pubescent. Leaves in a basal rosette; petiole 0.5–3 cm; leaf blade ovate-oblong, $4\text{--}9 \times 1\text{--}4.5$ cm, papery, abaxially pale green and villous along veins, adaxially green and villous, secondary veins 5–7 on each side of midvein, base rounded to broadly cuneate, margin entire, apex rounded. Racemes terminal or axillary, 3–12 cm; peduncle hispid; bracts linear-spatulate, 3–4 mm, pubescent on both surfaces, 3-veined, apex rounded; bracteoles similar to bracts. Pedicel 4–5 mm, hispid. Calyx 6–9 mm, outside villous; lobes linear-lanceolate, unequal, anterior and posterior ones 6–8 mm and lateral ones 5–7 mm, 3-veined. Corolla whitish purple, tubular-campanulate, ca. 2 cm; tube basally cylindrical for ca. 8 mm; lobes oblong, $1.8\text{--}2.5 \times 1.5\text{--}2$ mm, slightly unequal, apex rounded. Stamens with longer pair ca. 7 mm and shorter pair ca. 6 mm; filaments glabrous; anther thecae ca. 1.8 mm; staminode ca. 1 mm. Ovary ellipsoid, ca. 1.8 mm, glabrous; style ca. 8 mm, glabrous. Capsule oblong-ovoid, ca. 6 mm, glabrous. Fl. Mar–May, fr. Aug.

• Dense forests; 500–1200 m. Guangdong, Hainan.

7. *Staurogyne paotingensis* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 589. 1974.

保亭叉柱花 bao ting cha zhu hua

Herbs 10–20 cm tall, annual. Stems erect, pubescent. Leaves cauline; petiole to 4 cm; leaf blade elliptic, elliptic-lanceolate, or rarely subovate, $2.5\text{--}6 \times 1\text{--}2$ cm, papery, abaxially green and glabrous, adaxially pale green and glabrous except slightly pubescent along midvein, secondary veins 6–9 on each side of midvein, base cuneate, margin entire, apex obtuse to rounded. Spikes borne on axillary brachyblasts, ca. 1 cm; peduncle and rachis pubescent; bracts elliptic to spatulate-elliptic, $6\text{--}7 \times$ ca. 3.5 mm, abaxially pubescent, pinnately veined, apex obtuse; bracteoles linear-oblong, ca. 6×1 mm, abaxially pubescent, 1-veined, apex acute. Pedicel short or absent. Calyx ca. 1 cm, outside pubescent; lobes linear, 8–9 mm, unequal, margin ciliate. Corolla purple, ca. 9 mm, outside pubescent, inside pubescent at base; tube basally cylindrical for ca. 2 mm; lobes suborbicular, 1.7–2 mm in diam., slightly unequal, apex rounded. Stamens with longer pair ca. 5 mm and shorter pair ca. 3 mm; filaments flattened, ciliate; anther thecae ca. 1 mm, base appendaged; staminode ca. 1 mm. Ovary oblong, glabrous; ovules ca. 24 in 2 rows per locule; style ca. 3 mm; stigma 2-lobed, lobes unequal with posterior one 2-dentate. Capsule ovoid-oblong, ca. 6 mm. Seeds orbicular, ca. 0.2 mm in diam. Fl. Dec.

• Wet places, paddy fields. Hainan (Baoting).

8. *Staurogyne rivularis* Merrill, Philipp. J. Sci., C, 7: 248. 1912.

瘦叉柱花 shou cha zhu hua

Herbs to 1 m tall, usually ascending from a decumbent base and rooting at nodes on lower portion. Stems striate and lenticellate, glabrous. Petiole 3–6 cm; leaf blade elliptic, oblong, or lanceolate, $13\text{--}17 \times 4.5\text{--}7$ cm, both surfaces glabrous, secondary veins 8–11 on each side of midvein, base cuneate and slightly decurrent onto petiole, margin entire or undulate, apex acuminate to acute. Racemes terminal or axillary from apical leaves, to 15 cm, unbranched or with 2 branches at base; rachis gland-tipped pubescent; bracts linear, $4\text{--}4.5 \times$ ca. 0.8 mm, pinnately veined, apex acuminate; bracteoles linear, ca. 2×0.5 mm. Pedicel 2–3.5 mm. Calyx ca. 5 mm, outside pubescent with gland-tipped trichomes. Corolla white, funnel-shaped, ca. 7 mm; lobes suborbicular, ca. 1.5×1.3 mm, subequal, apex rounded. Stamens with longer pair ca. 3 mm and shorter pair ca. 2 mm; filaments glabrous; anther thecae ca. 1 mm. Ovary ellipsoid, ca. 2×1 mm, glabrous; ovules 12 in 2 rows per locule; style ca. 3 cm, glabrous; stigma 2-lobed. Capsule cylindrical, 5–7 mm. Fl. Dec–May.

Forests along streams. Hainan, Yunnan [Vietnam].

9. *Staurogyne brachystachya* Benoist, Bull. Mus. Natl. Hist. Nat., sér. 2, 5: 174. 1933.

短穗叉柱花 duan sui cha zhu hua

Herbs to 80 cm tall. Stems subterete, sulcate, brown pubescent. Petiole 0.5–2 cm, brown pubescent; leaf blade lanceolate to ovate-lanceolate, $3\text{--}8 \times 1\text{--}1.6$ cm, both surfaces glabrous, abaxially pale green but brown when dry, adaxially green, secondary veins 8–10 on each side of midvein, base narrowly cuneate, margin irregularly undulate, apex acute. Racemes axil-

lary or terminal, 2–4 cm, 3–5-flowered; peduncle and rachis glabrous; bracts linear, 2.3–5 mm, thickened, 1-veined, glabrous; bracteoles linear, 2.3–3 mm, glabrous, 1-veined. Pedicel 1.2–1.6 cm, glabrous. Calyx 0.9–1.1 cm, glabrous except margin slightly ciliate with gland-tipped trichomes; lobes linear, 7.5–9 × ca. 1 mm, subequal, apex acuminate. Corolla white, 1–1.4 cm, glabrous; lobes orbicular, ca. 2 mm in diam. Stamens with longer pair 7–9 mm and shorter pair 6–8 mm; filaments pubescent (especially apically); anther thecae with a long tie-shaped appendage, apex hirsute; staminode small. Ovary glabrous; style ca. 1 cm, glabrous; stigma 2-lobed. Capsule not seen. Fl. Mar–Apr.

Forests; 800–1200 m. Guangxi, Yunnan [Vietnam].

10. *Staurogyne concinnula* (Hance) Kuntze, Revis. Gen. Pl. 2: 497. 1891.

叉柱花 *cha zhu hua*

Ebermaiera concinnula Hance, J. Bot. 6: 300. 1868.

Herbs to 15 cm tall, perennial. Stems generally short, partially subterranean, 0.5–6 cm, usually simple, rarely few branched, terete, densely shortly pubescent. Leaves in a basal rosette; petiole 0.3–3 cm, pubescent; leaf blade oblanceolate, 1.5–7 × 0.5–1.5 cm, scariosus, abaxially glaucous and pubescent along veins, adaxially green and sometimes pubescent along veins, secondary veins 5–8 on each side of midvein and abaxially prominent, base gradually attenuate, margin obscurely undulate, apex obtuse to rounded. Racemes 1–4, axillary, sometimes loosely branched and forming a panicle, 5–15 cm; branches slender, with 3–10 interrupted flowers; bracts linear to linear-oblanceolate, 2–4 mm, apex obtuse to subacute; bracteoles borne near middle of pedicel, linear, ca. 2 mm, apex obtuse. Pedicel 1–4 mm, pubescent. Calyx campanulate, 5-lobed almost to base, glabrous except for margin minutely pilose; lobes linear to linear-lanceolate, 5–6 mm but accrescent to 7 mm in fruit, unequal, apex acute. Corolla white, tubular-funnel-form, ca. 1 cm; tube ampliate, ca. 6 mm, ca. 4 mm wide; lobes orbicular, ca. 3 mm, subequal. Stamens with longer pair ca. 5 mm and shorter pair ca. 2.5 mm; filaments glabrous; anther thecae ca. 1.5 mm. Ovary ellipsoid, glabrous; style ca. 5 mm; stigma subulate. Capsule oblong, 4–5 × ca. 1.5 mm, glabrous, shorter than persistent calyx. Seeds suborbicular, ca. 0.2 mm. Fl. Mar–May, fr. Jul–Sep.

Forests along streams. Fujian, Guangdong, Hainan, Taiwan [Japan].

11. *Staurogyne hainanensis* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 589. 1974.

海南叉柱花 *hai nan cha zhu hua*

Herbs to 30 cm tall, perennial. Stems terete, villous. Leaves cauline, crowded at apex of branches; petiole 1–3 cm, densely villous; leaf blade oblong to oblong-lanceolate, 3–10 × 1.3–3 cm, subleathery, abaxially adpressed villous, adaxially glabrous except midvein slightly villous, secondary veins 6–10 on each side of midvein, base cuneate to broadly cuneate, margins entire or irregularly undulate, apex rounded. Racemes terminal or axillary, to 16 cm; rachis pubescent; bracts linear-spat-

ulate to linear, ca. 2.5 mm, 1-veined; bracteoles similar to bracts. Pedicel ca. 3 mm. Calyx 6–7 mm, subglabrous; lobes linear, unequal, 3-veined, apex acuminate. Corolla purple, ca. 8 mm; lobes ovate-oblong, 1.2–1.4 × ca. 1 mm, apex rounded. Stamens with longer pair ca. 5 mm and shorter pair ca. 3 mm; filaments glabrous; anther thecae of longer stamens unequal and of shorter stamens equal; staminode ca. 0.7 mm. Ovary ovoid, ca. 1 mm, glabrous; style ca. 6 mm. Capsule ovoid-oblong, ca. 5 mm, glabrous. Fl. Feb–May, fr. Jul–Aug.

• Streamsides; 600–900 m. Hainan.

12. *Staurogyne strigosa* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 590. 1974.

琼海叉柱花 *qiong hai cha zhu hua*

Herbs, annual. Stems very short, villous. Leaves in a basal rosette; petiole 0.5–2.2 cm, strigose; leaf blade elliptic, oblong, ovate, or oblong-obovate, 1–1.5 × 0.8–2.5 cm, papery, abaxially villous, adaxially strigose, secondary veins 5–7 on each side of midvein, base cuneate to rounded, margin entire, apex rounded to obtuse. Raceme terminal or axillary, to 6 cm, simple or rarely branched; peduncle villous; bracts spatulate-linear, ca. 6 mm, abaxially villous, apex obtuse, rounded, or acute; bracteoles similar to bracts. Pedicel 1–3 mm, villous. Calyx 6–8 mm, abaxially villous; lobes linear, 3-veined, apex acuminate. Corolla ca. 5.5 mm; lobes orbicular, ca. 1 mm in diam. Staminal filaments glabrous; anther thecae of longer stamens ca. 0.7 mm and of shorter stamens ca. 0.2 mm; staminode ca. 1 mm. Ovary glabrous; stigma 2-lobed. Capsule ovoid-oblong, ca. 6 mm, glabrous. Fl. Feb–Mar, fr. Jul–Aug.

• Forests; below 200 m. Hainan (Qionghai).

13. *Staurogyne stenophylla* Merrill & Chun, Sunyatsenia 2: 322. 1935.

狭叶叉柱花 *xia ye cha zhu hua*

Herbs, perennial. Stems short, densely villous. Leaves usually crowded at apex of branches (but not forming a basal rosette); petiole ca. 1 cm, pubescent; leaf blade linear to lanceolate-linear, 6–12 × 0.5–0.9 cm, papery, abaxially paler and villous especially along veins, adaxially dark green, densely white papillose, and subglabrous except for margin slightly pubescent, secondary veins 8–13 on each side of midvein, base attenuate, margin entire or undulate, apex obtuse. Racemes axillary, 5–10 cm, unbranched or with 1 or 2 branches at base; peduncle and rachis villous; bracts linear, 3.8–4.5 mm, abaxially pubescent, 1-veined; bracteoles linear, ca. 3.7 mm, abaxially pubescent. Pedicel 2–3.5 mm. Calyx ca. 6 mm, abaxially slightly villous; lobes linear-triangular, 4.5–5.1 × 0.5–0.6 mm, unequal, margin ciliate. Corolla pink, ca. 8 mm; tube basally cylindrical for ca. 1.5 mm then gradually widened, convex at one side; lobes orbicular to suborbicular, 2.2–2.5 × ca. 2 mm, unequal. Stamens 4 with longer pair ca. 4.5 mm and shorter pair ca. 3 mm; filaments glabrous; staminode ca. 0.7 mm. Ovary ellipsoid, ca. 2 × 1 mm, glabrous; style unequally 3-lobed. Capsule ovoid-oblong, ca. 3 mm. Fl. Mar–May, fr. Aug–Sep.

• Dense forests; 1000–2000 m. Hainan.

14. *Staurogyne yunnanensis* H. S. Lo, Bull. Bot. Res., Harbin 8(1): 3. 1988.

云南叉柱花 yun nan cha zhu hua

Herbs to 0.7 m tall. Stems densely pubescent. Leaves cauline; petiole 1.5–2 cm; leaf blade ovate-lanceolate, elliptic-lanceolate, or lanceolate, 4.5–10.5 × 2–3.5 cm, abaxially villous along veins, adaxially glabrous, secondary veins 9–14 on each side of midvein, abaxially conspicuous, and adaxially inconspicuous, base cuneate, margin undulate or inconspicuously dentate, apex obtuse. Racemes terminal only, to 8–15 cm in fruit; peduncle and rachis densely hirsute; bracts linear, 2.5–3 × ca. 0.5 mm, adaxially densely pubescent, 1-veined, apex acuminate to acute; bracteoles linear, ca. 1.2 mm, glabrous, apex acuminate. Pedicel 2–3 mm in fruit. Calyx ca. 4 mm, glabrous; lobes extremely unequal, anterior one triangular, 2.5–3 × ca. 0.5 mm, and apex acuminate, posterior and lateral ones subtriangular and ca. 1 mm. Corolla not seen. Capsule ± oblong, 3.5–4 mm. Seeds light brown. Fr. Jul.

• Forests. Yunnan (Hekou).

15. *Staurogyne petelotii* Benoist, Arch. Bot. Bull. Mens. 4: 75. 1930.

中越叉柱花 zhong yue cha zhu hua

Herbs 10–30 cm tall, ascending from a decumbent base. Stems erect, densely pubescent, unbranched or rarely branched in apical part, base with 1.5–3 cm internodes. Leaves cauline; petiole 2–4 cm, pubescent; leaf blade ovate to oblong, 3–6 × 2–3.5 cm, membranous, abaxially glabrous, adaxially darker and sparsely pubescent, secondary veins 4–6 on each side of midvein, base broadly cuneate to rounded, margin entire, apex obtuse. Raceme terminal, ca. 5 cm; bracts obovate, ca. 8 × 4 mm, abaxially sparsely pubescent, base attenuate, margin distally ciliate, apex rounded; bracteoles oblong, ca. 6 × 1 mm, abaxially pubescent especially apically, base gradually attenuate, apex rounded. Calyx ca. 6 mm; lobes spatulate with apex slightly enlarged and rounded, unequal, anterior one ca. 5 × 0.5 mm and others ca. 3 × 0.2 mm. Corolla 1.5–1.7 cm, slightly curved; lobes orbicular, ca. 5 × 5 mm. Staminal filaments glabrous. Ovary glabrous; style 1.8–2 mm, glabrous; stigma 2-cleft. Capsule ellipsoid, ca. 7 mm, glabrous. Fl. Jan–Apr.

Forests along ravines or on slopes; 1400–1700 m. Yunnan [Vietnam].

16. *Staurogyne vicina* Benoist, Bull. Mus. Natl. Hist. Nat., sér. 2, 5: 171. 1933.

密花叉柱花 mi hua cha zhu hua

Herbs to 50 cm tall. Stems erect, 4-angled, sulcate, tuberculate on basal part, pubescent on apical part. Leaves cauline; petiole 2–4 cm, pubescent; leaf blade elliptic, 6–15 × 3–7 cm, both surfaces glabrous except for pubescence along veins, abaxially glaucous, adaxially green, secondary veins 10–12 on each side of midvein, base acute, margin entire or serrate, apex acute to shortly acuminate. Racemes terminal only, unbranched or sometimes branched, 10–16 cm; peduncle 2–5 cm, glabrous; bracts linear, 4–7 × ca. 1 mm, glabrous, apex acute; bracteoles lanceolate, 2–3 × ca. 1 mm, glabrous, apex acute. Pedicel 2–3 mm, glabrous. Calyx 5–7 mm, glabrous; lobes linear, unequal, apex obtuse. Corolla white, 1.8–2.2 cm, outside glabrous; lobes oblong, ca. 4 × 3 mm, subequal, apex rounded. Staminal filaments glabrous; anther thecae spherical, ca. 1 mm in diam. Ovary glabrous; style glabrous; stigma 2-cleft. Capsule oblong, ca. 8 mm, glabrous. Fl. Apr.

Yunnan [Vietnam].

17. *Staurogyne debilis* (T. Anderson) C. B. Clarke ex Merrill, Philipp. J. Sci., C, 2: 302. 1907.

菲律宾叉柱花 fei lü bin cha zhu hua

Ebermaiera debilis T. Anderson, J. Linn. Soc., Bot. 9: 452. 1866.

Herbs 10–15 cm tall, somewhat succulent. Stems terete, ascending, unbranched or rarely branched, pubescent. Leaves cauline; petiole 5–8 mm, pubescent; leaf blade elliptic, oblong, or oblong-ovate, 2.5–4 × 0.8–1.7 cm, abaxially pale green and glabrous except pubescent along veins, adaxially green and glabrous, secondary veins 6 or 7 on each side of midvein, base cuneate to rounded, margin undulate, apex obtuse. Racemes terminal or axillary, to 7 cm, 4–7-flowered; rachis sometimes branched at base, slightly pubescent; bracts linear, ca. 2 × 0.4 mm; bracteoles subulate, ca. 1 × 0.3 mm. Pedicel ca. 2 mm. Calyx 5–6 mm; lobes linear, subequal, margin sparsely hirsute. Corolla white, ca. 1 cm, glabrous; lobes oblong, ca. 2 × 2 mm, subequal. Stamens with longer pair ca. 3 mm and shorter pair ca. 2 mm; filaments strigose; anther thecae ellipsoid, ca. 1 × 0.7 mm. Ovary ca. 1.8 mm, glabrous; style ca. 8 mm, glabrous; stigma 2-cleft. Capsule oblong, ca. 6 mm, compressed, glabrous. Fl. Feb–Mar, fr. Aug.

Evergreen broad-leaved forests; 300–400 m. Taiwan [Philippines].

3. OPHIORRHIZIPHYLLON Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 76. 1871.

蛇根叶属 she gen ye shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Phyllophiorhiza Kuntze.

Herbs, erect, without cystoliths. Leaves opposite, petiolate; leaf blade pinnately veined, margin entire. Inflorescence terminal spikes to racemes, unbranched or branched at base; bracts subopposite to alternate; bracteoles present. Calyx subequally 5-lobed. Corolla tube expanded apically, annular hairy at throat or glabrous; limb 2-lipped; lower lip 3-lobed; upper lip 2-lobed; lobes descending cochlear in bud. Stamens 2, exserted; anthers 2-theous; thecae ellipsoid to oblong, divergent toward apex; staminodes 2. Ovary ovoid-spherical; ovules 13–18 per locule, arranged in 2 rows per locule; style exserted; stigma 2-lobed. Capsule ovoid, with numerous seeds; retinacula absent. Seeds subglobose.

Two species: China, Laos, Myanmar, Thailand, Vietnam; one species in China.

Other species previously treated in this genus pertain to other genera. *Ophiorrhizophyllum hypoleucum* (Benoist) Benoist = *Staurogyne hypoleuca* Benoist and *O. laxum* Lindau = *Justicia* sp., according to Hossain (A. B. M. E. Hossain, Studies in the Classification and Affinities of Acanthaceae (Ph.D. Dissertation), University of Edinburgh, United Kingdom. 1971).

1. Ophiorrhizophyllum macrobotryum Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 76. 1871.

蛇根叶 she gen ye

Ophiorrhizophyllum poilanei Benoist.

Herbs to 1 m tall, erect. Young branches terete to 4-angled, brown pubescent. Petiole 3–8 cm, sulcate, pubescent; leaf blade oblong-ovate, oblong-elliptic, or lanceolate, (8–)15–17 × (2–)5–7 cm, abaxially pale green and pubescent along veins, adaxially green and glabrous, secondary veins 7–10 on each side of midvein, base cuneate to subrounded and sometimes decurrent onto petiole, margin entire, apex acute. Rachises, peduncles, pedi-

cels, bracts, and bracteoles brown pubescent with gland-tipped trichomes. Spikes or racemes terminal, unbranched or branched at base; peduncle 0–2 mm; bracts subulate to lanceolate, ca. 4 × 1 mm; bracteoles linear, ca. 1 mm. Pedicel 0–1 mm. Calyx ca. 5 mm, outside sparsely pubescent with gland-tipped trichomes; lobes triangular, ca. 2 mm, margin ciliate with gland-tipped trichomes. Corolla yellowish white, ca. 7 mm; lobes suborbicular, ca. 2 × 2 mm. Staminal filaments ca. 8 mm, glabrous; staminal nodes included. Ovary glabrous; style ca. 8 mm, glabrous. Capsule 3.5–5.5 mm. Fl. Oct–Feb, fr. Mar.

Dense forests, along streams; 100–1300 m. S Yunnan [Laos, Myanmar, Thailand, Vietnam].

4. THUNBERGIA Retzius, Physiogr. Sölsk. Handl. 1(3): 163. 1780, nom. cons., not Montin (1773).

山牵牛属 shan qian niu shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Vines [or shrubs], lacking cystoliths. Leaves petiolate; leaf blade margin entire to lobed to dentate. Flowers solitary or paired in leaf axils, or in terminal dichasiate thyrses, pedunculate; bracteoles leaflike, paired, enclosing calyx and most or all of corolla tube, distinct or fused along one side, persistent. Calyx much shorter than bracteoles, cupular with 10–20 subulate lobes or reduced to an entire ring. Corolla funnel-shaped, large; tube with short cylindrical base then widened; limb ± equally 5-lobed. Stamens 4, often didynamous, inserted near base of corolla tube, included; anthers 2-theous; thecae oblong or ovoid, parallel, spurred or not at base, sometimes bearded. Disk shortly annular or pulvinate. Ovary fleshy; ovules 2 per locule, collateral; style glabrous or pubescent; stigma 2-cleft, entire, or fringed. Capsule basally subglobose, apically prominently beaked, 2–4-seeded; retinacula absent. Seeds compressed to spherical, lacking trichomes.

More than 100 species: Old World tropical regions; six species (one introduced) in China.

Some species of *Thunbergia* are naturalized in the New World tropics.

Thunbergia erecta (Bentham) T. Anderson and *T. laurifolia* Lindley, both cultivated in gardens, are not treated here.

1a. Calyx reduced to an entire ring.

2a. Leaves glabrous 3. *T. eberhardtii*

2b. Leaves pubescent.

3a. Corolla bluish; capsule pubescent 1. *T. grandiflora*

3b. Corolla red; capsule glabrous 2. *T. coccinea*

1b. Calyx bearing 10–20 slender subulate lobes.

4a. Leaves pinnately veined 4. *T. lutea*

4b. Leaves palmately 3–5-veined.

5a. Petiole conspicuously winged; corolla orange with throat dark purple internally 5. *T. alata*

5b. Petiole wingless; corolla entirely white 6. *T. fragrans*

1. Thunbergia grandiflora Roxburgh, Bot. Reg. 6: 495. 1820.

山牵牛 shan qian niu

Thunbergia adenophora W. W. Smith; *T. chinensis* Merrill; *T. lacei* Gamble.

Vines to 10 m or longer, woody. Stems 4-angled, sulcate, pubescent. Petiole 1–7 cm, grooved, pubescent; leaf blade ovate to triangular-ovate, 5–10 × 4–8 cm, papery, both surfaces pubescent, palmately 3–7-veined, base subcordate to truncate, mar-

gin undulate, irregularly angular on basal half, or rarely entire, apex acuminate to acute. Flowers solitary, paired in leaf axils, or arranged in terminal racemes with 2–4 flowers per node; peduncle 4–7 cm, sulcate, pubescent; rachis pubescent with large cyathiform glands; apical inflorescence bracts subulate to linear-subulate, 2–6 × 1–1.5 mm, pubescent; bracteoles oblong to ovate, 2.5–4 × 1.5–2.2 cm, both surfaces pubescent, 5–7-veined, base truncate, margin entire or ciliate, apex acute with a short mucro. Calyx ca. 2 mm, annular, unlobed, densely pubescent. Corolla bluish with a yellowish throat, 4–6 cm, outside

glabrous; tube basally cylindrical and ca. 3 mm wide for ca. 7 mm then gradually widened to ca. 5 cm at throat; limb subactinomorphic; lobes ovate, ca. 3 × 2.5 cm. Staminal filaments 7–9 mm; anther thecae pubescent, basally appendaged. Style glabrous; stigma with 2 subequal lobes. Capsule 1.2–1.5 cm, pubescent, basal part 1.3–1.8 cm in diam., beak ca. 2.5 cm. Seeds ovate in outline, compressed, verrucose. Fl. Aug–Jan, fr. Nov–Mar. $2n = 56$.

Thickets; 400–1500 m. Fujian, Guangdong, Guangxi, Hainan, Yunnan [India, Myanmar, Thailand, Vietnam].

Thunbergia grandiflora is naturalized in tropical regions worldwide.

2. *Thunbergia coccinea* Wallich, Tent. Fl. Nepal. 1: 48. 1826.

红花山牵牛 hong hua shan qian niu

Hexacentris coccinea (Wallich) Nees.

Vines, woody. Stems 9-angled, subglabrous, pubescent at nodes. Petiole 2–7 cm, grooved; leaf blade broadly ovate, ovate, or lanceolate, 8–15 × 3.5–11 cm, both surfaces pubescent, palmately 3–5-veined, base rounded to cordate, margin undulate or remotely toothed, apex acuminate. Racemes axillary or terminal, to 35 cm, pendulous; peduncle 3–4 cm, pubescent; bracts lanceolate, abaxially pubescent, adaxially glabrous; bracteoles oblong, 2.2–2.6 × 1.1–1.5 cm, apex acute. Calyx ca. 2 mm, reduced to a minute rim. Corolla red; tube basally cylindrical for 5–6 mm, throat 1.5–1.6 cm; lobes suborbicular, ca. 7 mm in diam. Staminal filaments 1.2–1.5 cm, glabrous but with a tuft of trichomes at base; anther thecae parallel, unequal with longer one ca. 5.5 mm and shorter one ca. 4.5 mm, spurred at base. Ovary glabrous; style glabrous, exerted; stigma 2-cleft. Capsule glabrous, basal part 1–1.2 × 1.5–2 cm, beak 1.5–2.3 cm. Seeds compressed, ovate in outline, verrucose. Fl. Sep–Jan, fr. Jan–May. $2n = 20$.

Forested montane slopes; 800–1000 m. SE Xizang, Yunnan [Laos, Myanmar, Thailand].

3. *Thunbergia eberhardtii* Benoist, Bull. Mus. Natl. Hist. Nat. 27: 543. 1921.

二色山牵牛 er se shan qian niu

Vines to 12 m, woody. Stems 4-angled, sulcate, pubescent, soon glabrescent, pilose at nodes. Petiole 3–4 cm; leaf blade broadly ovate to ovate-lanceolate, ca. 10 × 5 cm, both surfaces glabrous, palmately 5–7-veined, base cordate, margin remotely dentate or sometimes entire, apex acuminate to acute. Racemes axillary or terminal, erect; peduncle pubescent; bracts lanceolate, pubescent, 1–3-veined, margin dentate, apex acute; bracteoles ovate-lanceolate, 1–1.4 × 0.8–1 mm, abaxially tomentose, apex acuminate. Calyx annular, unlobed. Corolla to 2 cm; tube yellowish brown; lobes ovate-elliptic, ca. 1.1 cm, subequal, lower lobes red, upper lobes yellow. Anther thecae glabrous, those of lower pair of stamens long spurred at base, those of upper pair of stamens spurred at base of only one theca per anther. Ovary pubescent. Capsule basal part 1–1.5 cm in diam., beak ca. 1.6 cm. Seeds hemispherical, verrucose. Fl. Aug–Nov, fr. Jan–Apr.

Dense forests; 300–800 m. Hainan [Vietnam].

4. *Thunbergia lutea* T. Anderson, J. Linn. Soc., Bot. 9: 448. 1866.

羽脉山牵牛 yu mai shan qian niu

Thunbergia salweenensis W. W. Smith.

Vines to 5 m or longer, climbing. Stems glabrous except for a circle of trichomes on nodes. Petiole 5–7.5 cm, glabrous; leaf blade ovate to lanceolate-ovate, 4–13 × 2–6 cm, abaxially subglabrous, adaxially pubescent or setose, base rounded to broadly cuneate and decurrent onto petiole, margins obscurely toothed to sometimes irregularly denticulate, apex acuminate. Flowers axillary, solitary; bracteoles elliptic, 2.1–2.4 × 1.5–1.7 cm, abaxially glabrous, adaxially gland-tipped hairy, palmately 7-veined, apex mucronate. Calyx minute, 10-toothed. Corolla pinkish or white; tube basally cylindrical for ca. 7 mm, throat ca. 3.5 cm; lobes orbicular, ca. 1.2 cm in diam., equal. Staminal filaments glabrous, ca. 1 cm; anther thecae ca. 7 mm, barbate, spurred at base, spurs hairlike. Ovary glabrous; style ca. 2.5 cm, glabrous; stigma funnel-shaped, 2-cleft. Capsule glabrous, basal part ca. 1 × 1.8 cm, beak ca. 1.8 cm. Seeds reniform, ca. 8 × 5 mm. Fl. Aug–Dec, fr. Mar–May.

Forests or thickets; 1000–2500 m. SE Xizang, Yunnan [Bhutan, India, Myanmar].

5. *Thunbergia alata* Bojer ex Sims, Bot. Mag. 52: t. 2591. 1825.

翼叶山牵牛 yi ye shan qian niu

Vines, herbaceous. Stems ± 4-angled to flattened, bisulcate, pubescent. Petiole 1.5–3 cm, winged, sparsely pubescent; leaf blade sagittate to deltoid ovate, 2–7.5 × 2–6 cm, abaxially hirsute, adaxially sparsely strigose, palmately 5-veined, base hastate to cordate, margin entire or undulate, apex acute. Flowers axillary, solitary; peduncle 2.5–3 cm, sparsely strigose; bracteoles ovate, 1.5–1.8 × 1–1.4 cm, abaxially hirsute, 5–7-veined, apex acute, acuminate, or obtuse. Calyx annular, unequally 10–13-lobed. Corolla orange with dark purple glandular “eye” in throat, 2.5–4.5 cm; tube basally cylindrical for 2–4 mm, throat 1–1.5 cm; lobes obovate, apically truncate. Staminal filaments ca. 4 mm, glabrous; anther thecae 3.5–4 mm, unequal, pubescent at margin and base. Ovary glabrous; style ca. 8 mm, glabrous; stigma funnel-shaped, unequally 2-lobed, lower lobe spreading, upper lobe erect. Capsule pubescent, basal part ca. 7 × 10 mm, 2-seeded; beak ca. 1.4 cm, ca. 3 mm wide at base. Seeds reticulate on dorsal surface. Fl. Oct–Mar, fr. Feb–May. $2n = 18$.

Cultivated in gardens and naturalized along roads. Guangdong, Yunnan [native to Africa].

Thunbergia alata is widely cultivated and naturalized in tropical regions.

6. *Thunbergia fragrans* Roxburgh, Pl. Coromandel 1: 47. 1795.

碗花草 wan hua cao

Flemingia grandiflora Rottler; *Thunbergia bodinieri* H. Léveillé; *T. fragrans* subsp. *hainanensis* (C. Y. Wu & H. S. Lo) H. P. Tsui; *T. hainanensis* C. Y. Wu & H. S. Lo.

Vines, herbaceous. Stems almost 4-angled to flattened, sulcate, hirsute. Petiole 0.5–4.5 cm, hirsute; leaf blade oblong-ovate to ovate to broadly ovate to oblong-lanceolate to lanceolate, 3–14 × 1.8–7 cm, both surfaces puberulent to subglabrous except for trichomes along veins or rarely glabrous, palmately 3–5-veined, base rounded to sometimes cuneate or cordate, margin entire, irregularly sinuate, or shallowly coarsely dentate, apex acute to acuminate. Flowers axillary, solitary; peduncle 1.5–5.5 cm; bracteoles ovate, 1.5–2.5 × 0.8–1.5 cm, puberulent, apex acute. Calyx 3–5 mm, unequally 10–17-dentate, glabrous. Corolla white, 3–5 cm, sparsely puberulent; tube basally cylindrical for 4–7 mm, throat 1.8–2.3 cm; lobes obovate, 1.3–2.5 × 1.5–2.3 cm. Stamens included; filaments 6–10 mm, glabrous;

anther thecae ca. 3 mm, divergent, glabrous. Ovary glabrous; style 1.5–2 cm, exerted; stigma funnel-shaped, ca. 2 mm. Capsule glabrous, basal part ca. 7 × 10–13 mm, beak 1.5–1.9 cm. Seeds 4–5 mm in diam., smooth or with scales. Fl. Aug–Jan, fr. Nov–Mar.

Thickets, roadsides; 800–2300 m. Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Philippines, Sri Lanka, Thailand, Vietnam].

Variation in the shape, size, pubescence, and margin form of the leaves is extensive in *Thunbergia fragrans*, and taxa have been recognized based on these characters. Additional studies of the species from throughout its range are needed to determine whether these should be accorded formal taxonomic status.

5. ACANTHUS Linnaeus, Sp. Pl. 2: 639. 1753.

老鼠筋属 lao shu le shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Acanthodus Rafinesque.

Shrubs or perennial herbs, erect or decumbent, without cystoliths. Leaves opposite [whorled or in a basal cluster], petiolate; leaf blade margin entire, pinnatifid, or spinously toothed. Inflorescences in terminal [or axillary], uninterrupted spikes; bracts imbricate, ovate, growing in size as plant matures, margin spiny; bracteoles 2 or sometimes absent. Calyx 4-lobed, posterior and anterior lobes larger, lateral pair of lobes smaller. Corolla tube very short, horny; limb of a single (lower) lip (upper lip sometimes rudimentary); lip elongate, obtusely 3-lobed. Stamens 4, paired, inserted at top of corolla tube, exerted; filaments stout, thickened, bony; anthers 1-theous; theca linear-oblong, usually densely bearded, lacking basal appendages; staminodes absent. Ovary with 2 ovules per locule; style slender; stigma 2-cleft. Capsule not stipitate, ellipsoid, shiny, 4-seeded; retinacula present. Seeds ± compressed.

About 20–25 species: tropical and subtropical regions of Old World; three species in China.

Acanthus mollis Linnaeus is cultivated in Chinese gardens so is not treated here.

- 1a. Bracteoles absent 1. *A. ebracteatus*
 1b. Bracteoles 2.
 2a. Bracts broadly ovate, margin entire 2. *A. ilicifolius*
 2b. Bracts ovate to obovate, margin apically spiny 3. *A. leucostachyus*

1. *Acanthus ebracteatus* Vahl, Symb. Bot. 2: 75. 1791.

小花老鼠勒 xiao hua lao shu le

Acanthus ilicifolius Linnaeus var. *ebracteatus* (Vahl) Benoist; *Dilivaria ebracteata* (Vahl) Persoon.

Shrubs 1–3 m tall. Stems terete, stout, glabrous, often with stipulelike spines at nodes. Petiole 1–4 cm, glabrous; leaf blade oblong to obovate-oblong, 5–12 × 3–5 cm, rigid, subleathery, glabrous, secondary veins 3 or 4 on each side of midvein and spreading to spinose teeth, base cuneate, margin 3- or 4-toothed or irregularly pinnatifid, apex truncate to slightly mucronate and obtuse. Inflorescences terminal spikes to 4 cm; bracts broadly ovate, 6–7 × 4–5 mm; bracteoles absent. Calyx posterior and anterior lobes broadly ovate and 8–12 × 5–9 mm, lateral lobes elliptic and ca. 10 × 4 mm. Corolla white [blue or purple], ca. 2.5 cm; tube basally cylindrical and ca. 2.5 mm wide for 5–8 mm; lip oblong, ca. 2.2 cm; lobes oblong, outside glabrous, inside appressed pubescent. Stamens subequal; filaments ca. 9 mm; anther theca oblong, ca. 8 mm, with a line of trichomes on both sides of suture. Capsule ca. 1.8 cm. Seeds yellow, ca. 10 × 7 mm, rugose. Fl. Apr–May, fr. Aug–Sep. *2n* = 44.

Mangrove swamps; near sea level. Guangdong, Hainan [Cambodia, India, Indonesia, Myanmar, Papua New Guinea, Thailand, Vietnam; Australia, Pacific islands].

2. *Acanthus ilicifolius* Linnaeus, Sp. Pl. 2: 639. 1753.

老鼠筋 lao shu le

Acanthus ebracteatus Vahl var. *xiamenensis* (R. T. Zhang) C. Y. Wu & C. C. Hu; *A. ilicifolius* var. *xiamenensis* (R. T. Zhang) Y. F. Deng, N. H. Xia & Heng B. Chen; *A. xiamenensis* R. T. Zhang; *Dilivaria ilicifolia* (Linnaeus) Jussieu.

Shrubs to 2 m tall, erect. Stems stout, scarcely branched, glabrous, often with stipulelike spines at nodes. Petiole 3–6 mm, thick, glabrous; leaf blade oblong to oblong-lanceolate, 6–14 × 2–5 cm, glabrous, secondary veins 5–7 on each side of midvein, base cuneate, margin pinnatifid and with few large spines, serrate, or subentire, apex truncate. Spikes terminal, to 16.5 cm; bracts broadly ovate, 7–8 mm, caducous; bracteoles ovate, ca. 5 mm, leathery. Calyx posterior and anterior lobes 1–1.3 cm, margin scarious and sometimes crispate, apex emarginate; lateral lobes ovate, ca. 1 cm, margin entire. Corolla

white [bluish to pinkish], 3–4 cm; tube ca. 6 mm; lip obovate, 2.2–3 cm, thinly leathery, outside with soft trichomes, apex 3-cleft. Stamens equal; filaments ca. 1.5 cm; anther theca with a line of trichomes on both sides of suture. Style ca. 2.2 cm. Capsule 2.5–3 cm. Seeds light yellow, reniform. Fl. Feb–Mar, fr. Aug–Sep. $2n = 44, 48$.

Mangrove swamps, marshes; near sea level. Fujian, Guangdong, Guangxi, Hainan [Cambodia, India, Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Australia, Pacific islands].

This species is used medicinally.

3. *Acanthus leucostachyus* Wallich ex Nees, *Pl. Asiat. Rar.* 3: 98. 1832.

刺苞老鼠簕 *ci bao lao shu le*

Herbs to 1 m tall, erect, unbranched. Stem brown, ca. 4 mm in diam., hairy. Petiole 0.8–2.5 cm; leaf blade elliptic, ovate-lanceolate, oblanceolate, or lanceolate, 9–23 × 2–4.5 cm, abaxially glabrescent or brown pubescent along veins, adaxially glabrous, secondary veins 5–8 on each side of midvein and

netted near margin, tertiary veins inconspicuous, base rounded to subcordate, margin slightly spinose-dentate but sometimes inconspicuously dentate or occasionally entire, apex acute. Inflorescences terminal spikes, to 16 cm, 4-ranked; rachis grayish pubescent; bracts ovate to obovate, 1–1.5 × 0.5–0.8 cm, abaxially pubescent, palmately veined, base rounded, margins apically spiny, apex acute to acuminate; bracteoles lanceolate to oblanceolate, 1.3–2 × 0.2–0.4 cm, abaxially pubescent, base rounded, margin entire and ciliate, apex rounded with a short tip. Calyx ca. 2 cm, pubescent; lobes unequal, margin ciliate, anterior lobe ca. 1.7 × 0.4 cm, lateral lobes lanceolate and ca. 1.5 × 2.5 mm, posterior lobe oblong-lanceolate and ca. 2 × 0.5 cm. Corolla white, ca. 2.1 cm, villous; lobes orbicular, ca. 5 × 5 mm, apex emarginate. Staminal filaments ca. 8 mm, glabrous, upper pair curved (S-shaped); anther theca ca. 4.5 mm, pilose. Ovary ca. 3 mm; style ca. 1.1 cm. Capsule ca. 10 × 3 mm, glabrous. Seeds reniform, ca. 2 × 2.5 mm, glabrous. Fl. Feb–May, fr. Aug–Sep.

Dense forests, wet places; 600–1200 m. Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

6. BLEPHARIS Jussieu, *Gen. Pl.* 103. 1789.

百箭花属 *bai le hua shu*

Hu Jiaqi (胡嘉琪 *Hu Chia-chi*), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, perennial [annual herbs or shrubs], without cystoliths, anisophyllous. Leaves usually in pseudo-whorls of 4 [or opposite], sessile to subsessile; leaf blade margin entire to dentate. Flowers axillary and solitary or many in terminal dense headlike spikes; bracts often clustered in up to 5 pairs, imbricate, leathery, margin often bristly dentate with bristles barbed; bracteoles absent [or 2]. Calyx included in bracts or ± exserted, 4-lobed; lobes in 2 unequal opposite pairs, thickened-horny at base, posterior and anterior lobes larger and 2–7-veined, lateral pair smaller and 1-veined. Corolla tube shorter than limb, expanded from base and constricted near apex; limb a single (lower) lip; lip elongate, 3[–5]-lobed. Stamens 4, didynamous, inserted at or near apex of corolla tube; filaments bony, with lower pair straight and upper pair curved, broad, flattened, usually bifurcate apically into a branch bearing an anther and a toothlike appendage; anthers 1-theous; theca bearded. Ovary glabrous, with 2 ovules per locule; style linear; stigma 2-cleft. Capsule not stipitate, oblong to ellipsoid, 2(–4)-seeded; retinacula present. Seeds discoid, covered with long branched hygroscopic trichomes.

About 130 species: Old World tropical and subtropical regions; one species in China.

Blepharis was recently revised by K. Vollesen (*Blepharis* (Acanthaceae): A Taxonomic Revision, 1–342. 2000).

1. *Blepharis maderaspatensis* (Linnaeus) B. Heyne ex Roth, *Nov. Pl. Sp.* 320. 1821.

百勒花 *bai le hua*

Acanthus maderaspatensis Linnaeus, *Sp. Pl.* 2: 639. 1753; *Blepharis boerhaviifolia* Persoon, nom. illeg. superfl.; *B. boerhaviifolia* var. *maderaspatensis* (Linnaeus) Nees.

Herbs to 30 cm tall, perennial. Stems trailing or scrambling to decumbent, sometimes elongate, scabrous or pubescent. Leaves usually 4 per pseudo-whorl of 2 unequal pairs; petiole ca. 2 mm, puberulent; leaf blade elliptic to obovate-lanceolate, 2.5–5 × 1–2 cm, puberulent, secondary veins 3–5 on each side of midvein, base cuneate, margin undulate or dentate, apex acute. Flowers axillary and solitary or in clusters of few-

flowered spikes; bracts paired, broadly spatulate to obovate-oblong, 4–13 × 2–6 mm, unequal with inner pairs larger than outer ones, strongly 3-veined, margin bristly ciliate. Calyx puberulent, unequally lobed; posterior and anterior lobes oblong, 1.2–1.8 × 0.4–0.6 cm, 3-veined, apex of anterior lobe often 2-cleft; lateral lobes linear-lanceolate, 9–12 × 2–3 mm, margin ciliate. Corolla whitish, often with pink or purple; lip obovate, 1.6–1.7 × ca. 0.8 cm, spreading; lobes ovate-oblong. Staminal filaments ca. 5 mm. Style ca. 1.2 cm. Capsule ellipsoid, ca. 8 mm, glabrous. Seeds ca. 3 × 2 mm. Fl. Dec. $2n = 16, 22, 24, 26, 28, 30$.

Limestone cliffs or rocks; ca. 800 m. Hainan [Bangladesh, Cambodia, India, Myanmar, Pakistan, Sri Lanka, Thailand, Vietnam; tropical and subtropical Africa, SW Asia, Madagascar].

7. STROBILANTHES Blume, Bijdr. 781, 796. 1826.

马蓝属 ma lan shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); John R. I. Wood

Adenacanthus Nees; *Aechmanthera* Nees; *Apolepsis* (Blume) Haasskarl; *Baphicacanthus* Bremekamp; *Championella* Bremekamp; *Difflugossa* Bremekamp; *Goldfussia* Nees; *Gutzlaffia* Hance; *Hemigraphis* Nees; *Hymenochlaena* Bremekamp; *Lepidagathis* sect. *Apolepsis* Blume; *Parachampionella* Bremekamp; *Paragutzlaffia* H. P. Tsui; *Perilepta* Bremekamp; *Pseudaechmanthera* Bremekamp; *Pseudostenosiphonium* Lindau; *Pseudostonium* Kuntze; *Pteracanthus* (Nees) Bremekamp; *Pteroptychia* Bremekamp; *Pyrrothrix* Bremekamp; *Semnostachya* Bremekamp; *Sericocalyx* Bremekamp; *Strobilanthes* subg. *Pteracanthus* Nees; *S.* subg. *Sympagis* Nees; *Sympagis* (Nees) Bremekamp; *Tarphochlamys* Bremekamp; *Tetraglochidium* Bremekamp; *Tetragoga* Bremekamp.

Herbs, subshrubs, shrubs, [or small trees], isophyllous or weakly to strongly anisophyllous, woody species commonly pliestesial (living for several years then dying after flowering and fruiting). Stems and branches usually 4-angled, often sulcate, basally becoming woody and hollow with age. Leaves opposite, petiolate or sessile; leaf blade adaxially usually with prominent linear cystoliths and sometimes also abaxially, margin variously dentate, serrate, crenate, undulate, or entire. Inflorescences axillary and/or terminal, bracteate heads, headlike clusters, spikes (sometimes distinctly secund), or less commonly of pedicellate flowers forming an open panicle; sterile bracts usually resembling reduced leaves and often present in compound inflorescences; floral bracts usually different from leaves, persistent or caducous as flowers open, very variable in size and shape, sometimes of two types with basal sterile bracts (outermost bracts in a capitate inflorescence) differing from inner or apical fertile ones; bracteoles 2 per pedicel, usually small, sometimes absent. Calyx usually 5-lobed to base, commonly accrescent in fruit; lobes equal or with middle one distinctly longer than others, sometimes partially fused to form a bipartite or tripartite calyx. Corolla nearly always bluish, rarely white, yellow, or pink, tubular or funnel-shaped, inside glabrous apart from trichomes retaining style except in *Strobilanthes parvifolia*, *S. oresbia*, and related species; tube either gradually widened from base or narrowly cylindrical and then abruptly widened, campanulate or gibbous; limb 5-lobed; lobes usually ovate, equal or subequal, spreading, contorted in bud. Stamens usually 4 and didynamous (rarely 2, 2 fertile with 2 staminodes, or 4 fertile with a central staminode), basally monadelphous; usually 2 filaments distinctly longer than other 2; anthers included or exserted, 2-theous; thecae oblong or subspherical, parallel, erect or incurved, glabrous, basally mucicous, rarely with connective extended to a mucronate tip; pollen spherical or ellipsoid, echinulate and/or variously ribbed, usually tricolporate. Ovary oblong to obovoid, 2-locular, with 2(–8) ovules per locule; style filiform, long, slender, simple, sometimes persistent after corolla falls, retained in place by trichomes on one side of corolla tube; stigma 2-cleft with one branch longer. Capsule characteristically oblong to narrowly obovoid but sometimes fusiform to narrowly ellipsoid, (2–)4(–16)-seeded; retinacula strong, curved. Seeds usually ovate or orbicular in outline and lenticular by being flattened, usually pubescent with appressed mucilaginous trichomes which become spreading when wetted, trichomes caducous in a very few species with seed glabrescent; areola usually very small but occasionally extending as a glabrous area over much of seed surface.

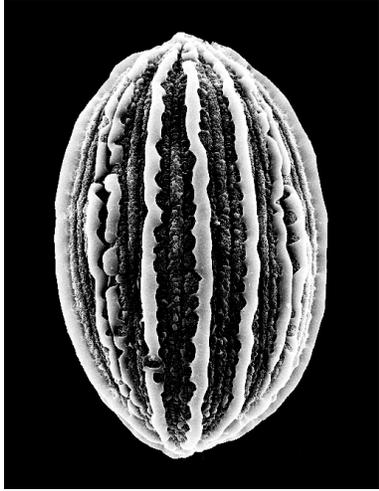
About 400 species: tropical Asia; 128 species (57 endemic) in China.

Note on indumentum: in many species the young inflorescence, even when a few capsules are present, is glabrous or nearly so. As the inflorescence matures, sessile glands become stipitate and older inflorescences become gland-tipped pilose, a process parallel to the development of glands and trichomes as the ovary matures into the capsule. The calyx is also accrescent in many species and the apex appears to continue growing, so calyx lobes, which are linear-oblong at anthesis, may become subpatulate in fruit. There is also a tendency for the corolla indumentum to fall as the corolla opens. Corolla indumentum is most easily observed on buds.

Note on pollen: fig. 1 and fig. 2 show 18 pollen types found in Chinese *Strobilanthes*. It should be noted that the pollen of some 20% of Chinese species is unknown and the types shown here could be construed as an oversimplification. However, the images do show the range of variation found in the genus. Two important caveats should be taken into account. Many publications illustrating *Strobilanthes* pollen from China are marred by the use of misidentified material. This is the explanation for cases where a different pollen type is given to that in a published source. A second problem relates to the degree of infraspecific variation in pollen morphology. This is largely unstudied but it is known that some of the more widespread and variable species are somewhat diverse in their pollen morphology although all plants sampled have pollen of one general type. Species known to have somewhat variable pollen include *S. atropurpurea*, *S. echinata*, *S. speciosa*, and *S. tomentosa*.

Attempts to divide *Strobilanthes* (*Strobilanthininae* sensu Bremekamp) into segregate genera have proved unsatisfactory largely because the level of homoplasy displayed by morphological characters has to date rendered subdivision impossible. Molecular studies have not yet greatly clarified the situation because of insufficient sampling, and this too is likely to prove problematic because many species are known only from the type collection or from material inadequate for molecular study. Clusters of related species are clearly discernible, but insufficient information is currently available to produce a satisfactory infrageneric classification. Species in the following account are grouped with morphologically similar and presumably related species, but the linear sequence and lack of adequate data implies that the order of species is at least partially arbitrary.

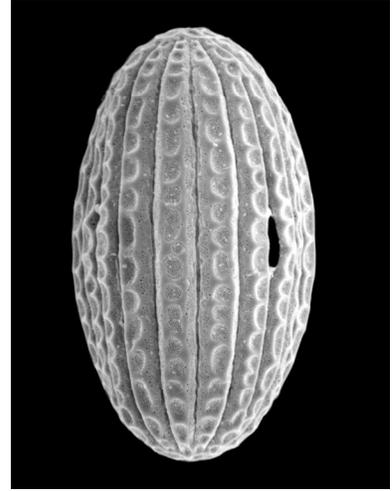
Strobilanthes lactucifolia H. Léveillé is not treated in the present account because no material has been traced. It is probably not a species of *Strobilanthes*. *Strobilanthes straminea* W. W. Smith (*Goldfussia straminea* (W. W. Smith) C. Y. Wu & C. C. Hu) from N Myanmar, included in FRPS (70: 169. 2002), is excluded from the present account because no Chinese specimen can be traced. *Strobilanthes deutziifolia* H. Léveillé is *Abelia macrotera* (Graebner & Buchwald) Rehder in the Linnaeaceae (see p. 645). *Strobilanthes gentiliana* H. Léveillé is *Sesamum indicum* Linnaeus in the Pedaliaceae (see Fl. China 18: 226. 1998). *Strobilanthes hypericifolia* H. Léveillé is *Abelia uniflora* R. Brown in the Linnaeaceae (see p. 645).



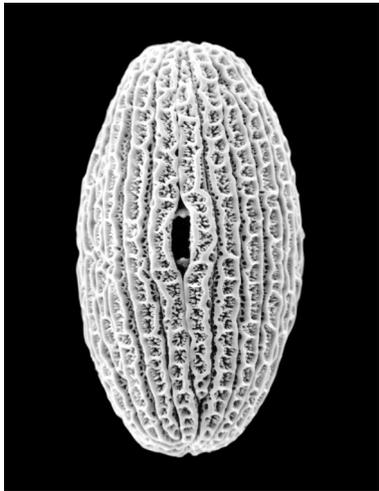
Type 1. *S. bantonensis* from Balansa 4273.



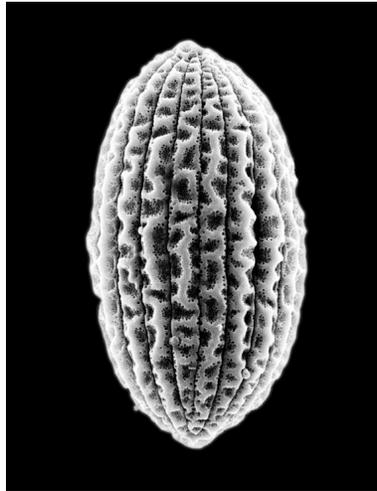
Type 2. *S. anamitica* from Maclure 8578.



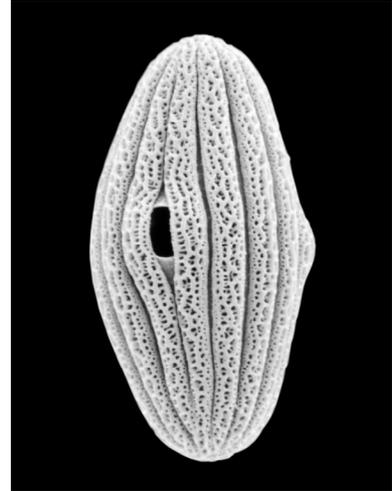
Type 3. *S. hupehensis* from Wilson 6627.



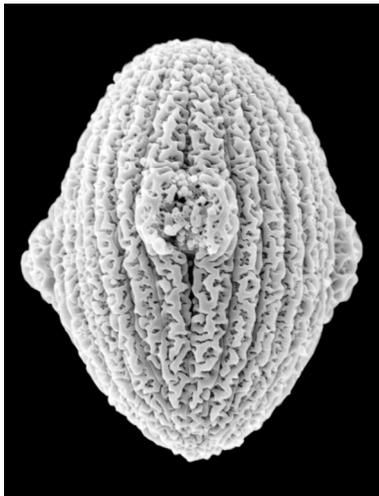
Type 4. *S. cusia* from Kingdon Ward 21622.



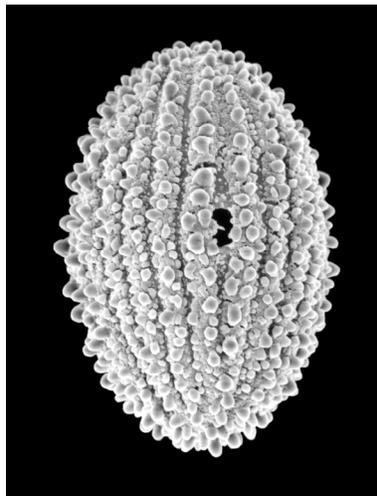
Type 5. *S. pinetorum* from Forrest 8385.



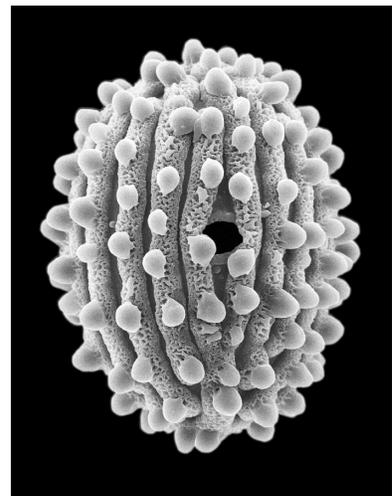
Type 6. *S. tomentosa* from Polunin 3304.



Type 7. *S. reptans* from Alston 16886.

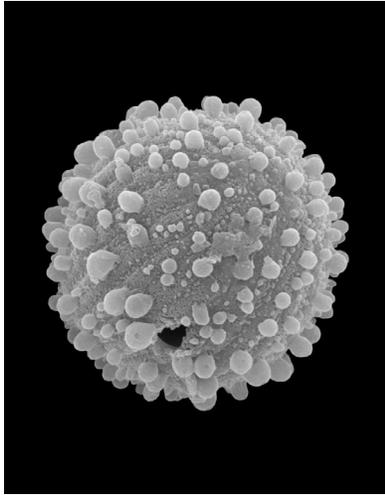


Type 8. *S. cumingiana* from Merrill 9510.

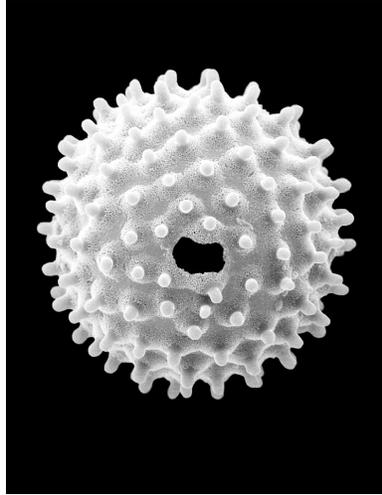


Type 9. *S. vallicola* from Xuan Xujie 74.

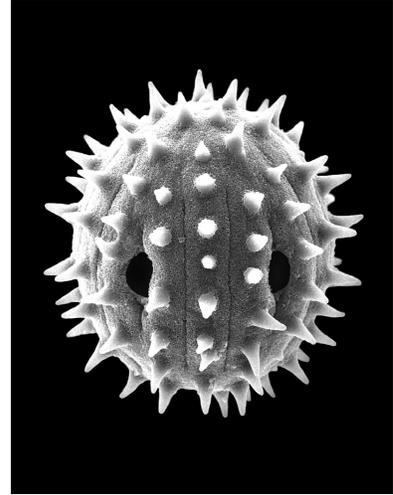
Figure 1. *Strobilanthes* pollen. SEM images of species with prolate (ellipsoid) pollen types.



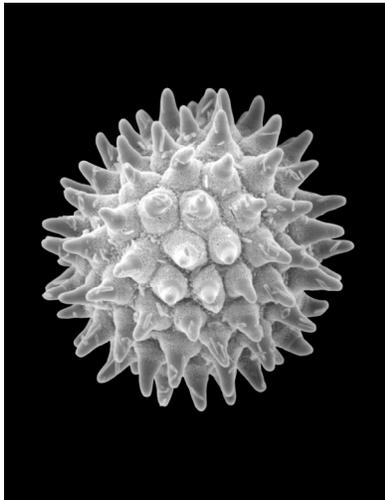
Type 10. *S. tetrasperma* from Li Zhiyu 1218.



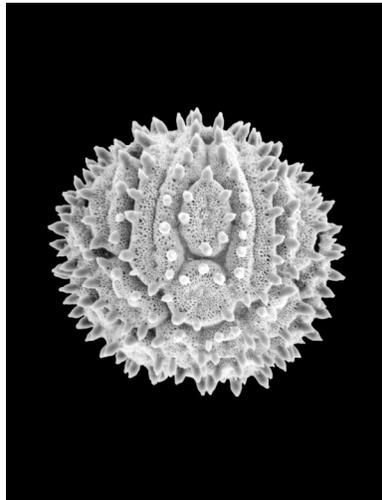
Type 11. *S. labordei* from Henry 7421.



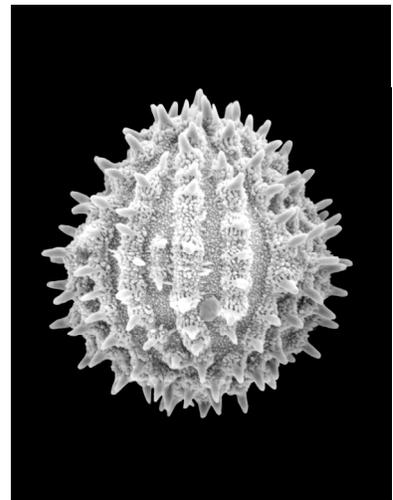
Type 12. *S. truncata* from Qin Dehai 79901.



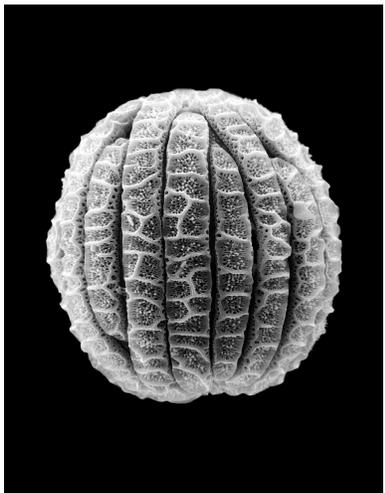
Type 13. *S. dalzielii* from Ying Hu-Shiu 12402.



Type 14. *S. affinis* from Wilson 4302.



Type 15. *S. henryi* from Hancock 57.



Type 16. *S. parvifolia* from Kingdon Ward 8718.



Type 17. *S. cyclus* from Maire 730.



Type 18. *S. serrata* from Lace 6019.

Figure 2. *Strobilanthes* pollen. SEM images of species with spheroidal (globose) pollen types.

- 1a. Low herbs, sometimes trailing, always isophyllous; corolla less than 2.5 cm and often less than 2 cm, not obviously curved.
- 2a. Inflorescences of solitary flowers in leaf axils.
- 3a. Calyx 2-lipped, upper 3 calyx lobes partially fused 43. *S. rankanensis*
- 3b. Calyx not 2-lipped, subequally 5-lobed to base.
- 4a. Leaf blade oblong to lanceolate, 7 mm wide or less; capsule glabrous 7. *S. sinica*
- 4b. Leaf blade ovate to obovate, 8 mm wide or more; capsule apically pilose 8. *S. szechuanica*
- 2b. Inflorescences of terminal or sometimes axillary heads or spikes.
- 5a. Corolla outside glabrous; capsule 6–16-seeded.
- 6a. Leaves sessile; corolla yellow 4. *S. fluviatilis*
- 6b. Leaves petiolate; corolla blue or white.
- 7a. Leaf blade pubescent, base abruptly truncate to slightly cordate; corolla blue 5. *S. reptans*
- 7b. Leaf blade subglabrous, base cuneate to rounded; corolla white 6. *S. cumingiana*
- 5b. Corolla outside pubescent; capsule 4-seeded.
- 8a. Stems, leaves, and inflorescences white pilose 10. *S. labordei*
- 8b. Stems, leaves, and inflorescences glabrous or very sparsely hirsute.
- 9a. Corolla less than 1 cm 9. *S. wilsonii*
- 9b. Corolla 1.5–2 cm.
- 10a. Leaf blade ovate to oblong-elliptic, 2–3 × as long as broad; ovary and capsule apically pubescent 11. *S. tetrasperma*
- 10b. Leaf blade lanceolate, ca. 4 × as long as broad; ovary and capsule glabrous 12. *S. japonica*
- 1b. Herbs or subshrubs, never trailing, usually greater than 50 cm tall, anisophyllous or isophyllous; corolla greater than 2 cm, often strongly curved.
- 11a. Inflorescences subcapitate or capitellate, with flowers densely clustered in groups of 4 or more, heads occasionally becoming subspicate in fruit.
- 12a. Anthers incurved but shorter ones sometimes reflexed, ± as broad as long so subspherical or ellipsoid; bracts and bracteoles if present caducous except in *S. cuneata*, *S. kingdonii*, *S. glomerata*, and sometimes *S. capitata* and *S. speciosa*.
- 13a. Bracts greater than 1.5 cm, outermost commonly infertile, persistent, or if caducous then ovate.
- 14a. Plants isophyllous; flowers in subsessile axillary clusters; leaf blade obovate 100. *S. cuneata*
- 14b. Plants anisophyllous; flowers in pedunculate heads; leaf blade ovate to oblong-elliptic.
- 15a. Indumentum of somewhat rigid purplish trichomes 101. *S. glomerata*
- 15b. Indumentum of soft whitish trichomes.
- 16a. Outermost bracts linear-oblong to lanceolate, margin often dentate, apex obtuse; isolated flowers sometimes present below main head 104. *S. kingdonii*
- 16b. Outermost bracts lanceolate or ovate, margin entire, apex acute or acuminate; inflorescences strictly capitate.
- 17a. Bracts ovate, equaling or shorter than head; heads relatively stout, 1–3 cm broad; plants weakly anisophyllous 102. *S. capitata*
- 17b. Bracts lanceolate, commonly overtopping head; heads relatively slender, 1–1.5 cm broad; plants usually strongly anisophyllous 103. *S. speciosa*
- 13b. Bracts less than 1 cm, all normally flower-bearing, often scarious and early caducous.
- 18a. Corolla outside glabrous even on lobes and in bud.
- 19a. Leaf blade abaxially whitish; bracts fugacious; calyx in fruit with lobes subequal 114. *S. discolor*
- 19b. Leaf blade abaxially paler but not whitish; bracts usually present at anthesis; calyx in fruit with one lobe longer than others.
- 20a. Calyx without gland-tipped trichomes 107. *S. ningmingensis*
- 20b. Calyx with gland-tipped trichomes.
- 21a. Apex of bracts acute to acuminate 108. *S. dimorphotricha*
- 21b. Apex of bracts rounded or obtuse.
- 22a. Bracts glabrous; inflorescences strictly capitellate; plants weakly anisophyllous 106. *S. penstemonoides*
- 22b. Bracts gland-tipped pubescent; some flower pairs usually present below capitulum; plants strongly anisophyllous 116. *S. multidentis*
- 18b. Corolla pubescent or gland-tipped pubescent at least on lobes or in bud.
- 23a. Inflorescences subterminal, arising only from apical leaf axils; leaf blade abaxially whitish, falcate 117. *S. oligocephala*
- 23b. Inflorescences not subterminal; leaf blade if abaxially whitish then not falcate.
- 24a. Bracts fugacious, usually absent at anthesis; calyx lobes subequal.
- 25a. Plants isophyllous or weakly anisophyllous; leaves petiolate; leaf blade apex acuminate; corolla tube and lobes gland-tipped pubescent 113. *S. oxycalycina*

- 25b. Plants strongly anisophyllous; leaves sessile; leaf blade apex acute; corolla pilose only on lobes 115. *S. rhombifolia*
- 24b. Bracts usually present; calyx with one lobe longer than others.
- 26a. Apex of bracts obtuse or rounded.
- 27a. Peduncle longer so inflorescence exceeding subtending leaves 110. *S. formosana*
- 27b. Peduncle very short so inflorescence shorter than subtending leaves 111. *S. ovatibracteata*
- 26b. Apex of bracts acute or acuminate.
- 28a. Bracts gland-tipped pubescent 109. *S. glandibracteata*
- 28b. Bracts not gland-tipped pubescent.
- 29a. Plants anisophyllous 108. *S. dimorphotricha*
- 29b. Plants isophyllous 112. *S. hupehensis*
- 12b. Anthers erect, oblong, ca. 2 × as long as broad; bracts persistent at least until fruit is formed.
- 30a. Flowers arranged in small clusters along an axis forming a spike or panicle of capitula.
- 31a. Capsule 6–8-seeded; calyx lobes linear-lanceolate; anthers apiculate with an excurrent connective 1. *S. tomentosa*
- 31b. Capsule 4-seeded; calyx lobes ovate and abruptly narrowed to an apiculate apex; anthers muticous 70. *S. congesta*
- 30b. Flowers arranged in axillary or terminal capitula.
- 32a. Capsule 6-seeded or more; calyx hirsute inside at least near apex.
- 33a. Corolla blue, bracts obtuse to acute 2. *S. quadrifaria*
- 33b. Corolla yellow, bracts apically beaked 3. *S. chinensis*
- 32b. Capsule 2–4-seeded; calyx glabrous inside (except in *S. cruciata*, *S. oligantha*, and *S. wangiana*).
- 34a. Calyx 2-lipped, upper 3 lobes partially fused.
- 35a. Fertile stamens 2; leaf blade margin entire 38. *S. aprica*
- 35b. Fertile stamens 4; leaf blade margin serrate.
- 36a. Lower calyx lip with 2 lobes, lobes distinct to base; capsule 2-seeded 30. *S. cyclus*
- 36b. Lower calyx lip 2-dentate, lobes connate for most of length; capsule 4-seeded 95. *S. bipartita*
- 34b. Calyx subequally 5-lobed to base.
- 37a. Corolla completely glabrous even on lobes and tube and in bud.
- 38a. Isophyllous herbs; corolla purple 16. *S. sarcorrhiza*
- 38b. Anisophyllous subshrubs; corolla white or rarely blue.
- 39a. Stems winged; leaves sessile; anthers muticous 96. *S. retusa*
- 39b. Stems unwinged; leaves petiolate; anthers apiculate.
- 40a. Outer bracts sessile, ovate 99. *S. echinata*
- 40b. Outer bracts with a broad petiolar base, pandurate in outline.
- 41a. Petiolar base of bracts forming a rigid involucre, lamina spreading and ovate 97. *S. cruciata*
- 41b. Petiolar base not forming an involucre, bracts pandurate, apical portion narrowly lanceolate 98. *S. simonsii*
- 37b. Corolla pubescent at least on lobes or tube or in bud.
- 42a. Bracts oblanceolate, obovate, subrhomboidal, or spatulate, broadest near apex, pilose with reddish or white trichomes.
- 43a. Bracts with reddish or brownish trichomes.
- 44a. Leaves and stem reddish brown setose 20. *S. hossei*
- 44b. Leaves and stem without reddish brown trichomes.
- 45a. Bracts subrhomboidal-obovate, tips erect; pollen type 3 21. *S. torrentium*
- 45b. Bracts obovate, tips commonly recurved; pollen type 2 22. *S. anamitica*
- 43b. Bracts with white trichomes.
- 46a. Bracts distinct from leaves, obovate, with gland-tipped trichomes, apex rounded 18. *S. lihengiae*
- 46b. Bracts oblanceolate to obovate, with a few marginal teeth, densely white pilose, without gland-tipped trichomes, apically narrowed to an obtuse apex.
- 47a. Corolla 2.2–2.8 cm; plants drying dark green; inflorescences often becoming spicate in fruit 15. *S. austrosinensis*
- 47b. Corolla 2.8–3.2 cm; plants not drying dark green; inflorescences not becoming spicate in fruit 17. *S. procumbens*
- 42b. Bracts linear, lanceolate, or oblong-elliptic, widest below middle.
- 48a. Bracts commonly yellowish, overtopping capitula and giving a characteristic eared appearance 19. *S. esquirolii*
- 48b. Bracts with white trichomes, not overtopping capitula which do not have an eared appearance.
- 49a. Heads strictly terminal; calyx lobes with trichomes apically on inner surface.
- 50a. Leaf blade abaxially glabrous except on veins; corolla 3.5–4 cm 13. *S. wangiana*
- 50b. Leaf blade usually pubescent or rarely glabrous; corolla less than 3.5 cm 14. *S. oligantha*

- 49b. Heads arising from apical leaf axils; calyx glabrous inside.
- 51a. Leaf blade glabrous 24. *S. fengiana*
- 51b. Leaf blade pilose or pubescent on both surfaces.
- 52a. Corolla straight or nearly so; heads clearly axillary; plants isophyllous 23. *S. yunnanensis*
- 52b. Corolla strongly bent; heads from apical leaf axils only; plants anisophyllous.
- 53a. Heads slightly elongate; floral bracts lanceolate to oblong, pilose but margin not ciliate 25. *S. lamiium*
- 53b. Heads very compact; floral bracts elliptic, margin ciliate 26. *S. cyphantha*
- 11b. Inflorescences spicate or flowers in leaf axils or arranged singly or in opposite pairs in a panicle.
- 54a. Leaf blade pinnatifid 34. *S. pinnatifida*
- 54b. Leaf blade margin dentate or serrate but never pinnatifid.
- 55a. Bracts decurrent as a wing on peduncle 48. *S. pteroclada*
- 55b. Bracts not decurrent on peduncle.
- 56a. Anthers incurved and shorter ones sometimes reflexed, subspherical or ellipsoid, \pm as broad as long; bracts and bracteoles if present caducous except in *S. longgangensis* and cultivated forms of *S. hamiltoniana* and sometimes in *S. lamiifolia*.
- 57a. Inflorescences an open panicle; flowers not arranged in opposite pairs.
- 58a. Corolla arcuate, less than 3 cm; inflorescence branches with non-glandular trichomes 126. *S. euantha*
- 58b. Corolla straight, greater than 3 cm; inflorescence branches glabrous or with gland-tipped trichomes.
- 59a. Inflorescences branching at a narrower angle from axis, ultimate branches relatively stout and similar to primary branches 124. *S. hamiltoniana*
- 59b. Inflorescences branches at 90° from axis, ultimate branches very slender 125. *S. tenuiflora*
- 57b. Inflorescences spicate; flowers in opposite pairs, sometimes aggregated into a panicle.
- 60a. Inflorescences a terminal panicle of spikes.
- 61a. Leaf blade ovate, base rounded to broadly cuneate; basal leaves shortly petiolate, apical ones sessile 122. *S. mastersii*
- 61b. Leaf blade narrowly oblong-elliptic, base narrowly cuneate; leaves all petiolate 123. *S. tenax*
- 60b. Inflorescences terminal or axillary but spikes never paniculate.
- 62a. Inflorescences terminal or from apical leaf axils only.
- 63a. Inflorescences a short terminal spike; bracts mostly 1.5–2.5 cm, relatively persistent 105. *S. lamiifolia*
- 63b. Inflorescences of flower pairs scattered along axis but often crowded and subcapitellate near apex; bracts mostly less than 1.5 cm, caducous.
- 64a. Corolla glabrous; bracts gland-tipped pilose 116. *S. multidentis*
- 64b. Corolla gland-tipped pubescent on lobes; bracts not gland-tipped pilose 117. *S. oligocephala*
- 62b. Inflorescences axillary spikes.
- 65a. Corolla outside pubescent.
- 66a. Calyx less than 1.3 cm; bracts often present at least on young parts; leaf blade margin serrate 119. *S. thomsonii*
- 66b. Calyx 1.6–2 cm; bracts very caducous; leaf blade margin entire or sinuate 121. *S. secunda*
- 65b. Corolla outside glabrous.
- 67a. Leaf blade ovate, base rounded to cordate; anthers slightly exerted 118. *S. medogensis*
- 67b. Leaf blade narrowly elliptic, base cuneate; anthers included 120. *S. longgangensis*
- 56b. Anthers erect, oblong, ca. 2 \times as long as broad; bracts persistent at least until fruit is formed.
- 68a. Corolla outside glabrous but pubescent inside; leaves subentire; inflorescences leafy or 1–3-flowered axillary spikes.
- 69a. Leaf blade abaxially whitish; inflorescences paniculate 127. *S. parvifolia*
- 69b. Leaf blade abaxially reddish brown; inflorescences 1–3-flowered axillary spikes 128. *S. ferruginea*
- 68b. Corolla pubescent, or if outside glabrous then also inside glabrous except for trichomes retaining style; inflorescences not as above.
- 70a. Flowers in axillary spikes, with basal persistent expanded leaflike bracts; flowers not imbricate; spikes sometimes reduced so flowers are solitary in leaf axils, not aggregated into a terminal panicle.
- 71a. Calyx 2-lipped with upper three calyx lobes distinctly connate for half their length.
- 72a. Corolla blue, not resupinate 62. *S. flexicaulis*
- 72b. Corolla white, resupinate 63. *S. lanyuensis*
- 71b. Calyx subequally 5-lobed to base.
- 73a. Corolla outside glabrous.
- 74a. Leaf blade large with some greater than 10 cm, drying blackish; corolla straight, 3.5–5 cm 61. *S. cusia*
- 74b. Leaf blade mostly less than 6 cm, not drying blackish; corolla bent at mouth, 2.5–3.5 cm.

- 75a. Calyx lobes linear, 1–1.5 mm wide, apex acute or rarely obtuse 64. *S. atropurpurea*
 75b. Calyx lobes ovate-elliptic, 3–5 mm wide, apex obtuse 65. *S. latisepala*
- 73b. Corolla outside pubescent.
 76a. Rachis of inflorescences strongly winged.
 77a. Calyx less than 2 cm; capsule glabrous 66. *S. tibetica*
 77b. Calyx 2.5–3.6 cm; capsule comose 67. *S. pterygorrhachis*
 76b. Rachis of inflorescences not winged.
 78a. Bracts margin entire, apex obtuse; plants subglabrous 68. *S. urophylla*
 78b. Bracts margin dentate, apex acuminate; plants usually densely hirsute or rarely
 (in *S. inflata* var. *gongshanensis*) subglabrous 69. *S. inflata*
- 70b. Flowers in axillary or terminal spikes but if axillary without leaflike bracts (except sometimes
S. oresbia); flowers imbricate or not; spikes aggregated into a terminal panicle or not.
 79a. Flowers in axillary leafless spikes (sometimes from apicalmost axils); bracts distinct from leaves,
 often inconspicuous and merging into bracteoles and calyx lobes; spikes not aggregated into a
 leafless panicle except in *S. nobilis* and *S. rostrata*; corolla outside glabrous.
 80a. Calyx glabrous or with gland-tipped trichomes, margin never ciliate or ciliolate.
 81a. Inflorescences with flowers solitary on one side of spike; bracts linear, persistent.
 82a. Spikes strictly axillary; inflorescences glabrous 54. *S. helicta*
 82b. Spikes aggregated into a terminal panicle; inflorescences with gland-tipped trichomes 55. *S. rostrata*
 81b. Inflorescences with flowers paired and on two sides of spike; bracts ovate to
 oblong-elliptic, somewhat caducous.
 83a. Corolla bent; leaf blade abaxially whitish, margin entire to crenate 52. *S. rubescens*
 83b. Corolla straight; leaf blade abaxially green, margin coarsely serrate.
 84a. Apex of bracts acute to obtuse; stems winged 41. *S. pateriformis*
 84b. Apex of bracts truncate; stems not winged 42. *S. truncata*
- 80b. Calyx lobes sometimes also with gland-tipped trichomes, margin ciliate or ciliolate.
 85a. Bracts with a recurved tip; inflorescences reddish brown 92. *S. brunnescens*
 85b. Bracts with an erect tip; inflorescences greenish or rarely reddish brown.
 86a. Bracts ovate, obovate, or broadly elliptic, distinctly shorter than calyx.
 87a. Bracts abaxially with 2 raised eyelike structures 84. *S. biocullata*
 87b. Bracts abaxially without raised eyelike structures although sometimes with large
 sessile glands.
 88a. Spikes from apical axils; bracts obovate-spatulate 80. *S. pseudocollina*
 88b. Spikes not restricted to apical axils; bracts ovate to elliptic.
 89a. Bracts not abruptly narrowed and without a mucronate apex.
 90a. Spikes commonly branched; flower pairs close along rachis; calyx 2-lipped
 with 3 upper lobes partially fused 81. *S. longzhouensis*
 90b. Spikes simple; flower pairs distant along rachis; calyx subequally 5-lobed
 to base 82. *S. cystolithigera*
 89b. Bracts abruptly narrowed with a mucronate and sometimes caducous apex.
 91a. Plant drying olive-green; bracts abaxially with sessile glandular area, apex
 not fimbriate, lacking reddish brown trichomes 83. *S. abbreviata*
 91b. Plant drying blackish green; bracts abaxially without glandular area, apex
 often fimbriate with reddish brown trichomes 91. *S. fimbriata*
- 86b. Bracts lanceolate, ovate, or oblong, usually equaling or exceeding calyx.
 92a. Leaf blade often pandurate, base rounded; apical leaves sessile; spikes elongating
 beyond leaves and inflorescence often of paniculate spikes in fruit 93. *S. nobilis*
 92b. Leaf blade not pandurate, base cuneate; all leaves petiolate; inflorescence not paniculate
 in fruit.
 93a. Spikes only from terminal leaf axils.
 94a. Spikes 1–3 per axil; bracts abaxially with sessile black glands 89. *S. heteroclita*
 94b. Spikes 1 per axil; bracts abaxially lacking black glands 90. *S. mucronatoproducta*
 93b. Spikes not restricted to terminal axils.
 95a. Spikes 1–5 per leaf axil 94. *S. polyneuros*
 95b. Spike usually 1 per leaf axil.
 96a. Bracts 2–3 cm, much exceeding calyx 88. *S. compacta*
 96b. Bracts less than 1.5 cm, ± equaling calyx.
 97a. Stems, leaves, and bracts pubescent 87. *S. guangxiensis*
 97b. Plant completely glabrous except for ciliolate margin of calyx lobes.

- 98a. Spikes often branched, robust; leaf blade oblong, some greater than 15 cm 85. *S. longespicata*
- 98b. Spikes simple, slender; leaf blade elliptic, less than 12 cm 86. *S. myura*
- 79b. Inflorescences terminal or terminal and axillary, sometimes forming a panicle of spikes, branches bearing leaves below spikes, if apparently axillary then corolla outside pubescent or bracts expanded and clearly different from calyx.
- 99a. Fertile stamens 2.
- 100a. Spikes simple; capsule glabrous apart from a few apical glands 29. *S. henryi*
- 100b. Spikes branched forming a terminal panicle of spikes; capsule pubescent.
- 101a. Bracts broadly oblong-ovate to oblong-obovate, not imbricate so flowers clearly separate 31. *S. serrata*
- 101b. Bracts obovate, imbricate 32. *S. tubiflos*
- 99b. Fertile stamens 4.
- 102a. Bracts imbricate.
- 103a. Bracts greater than 1.5 cm.
- 104a. Bracts distinct from apical leaves, ca. 3 cm, margin without prominent white cilia.
- 105a. Bracts not sticky glandular; capsule 12-seeded 2. *S. quadrifaria*
- 105b. Bracts sticky glandular; capsule 4-seeded 60. *S. cognata*
- 104b. Bracts indistinct from apical leaves, less than 2 cm, margin with prominent white cilia.
- 106a. Bracts ovate to elliptic; corolla 3–3.5 cm 14. *S. oligantha*
- 106b. Bracts obovate; corolla 2.2–2.8 cm 15. *S. austrosinensis*
- 103b. Bracts less than 1.5 cm.
- 107a. Leaves sessile; leaf blade oblong; spikes axillary as well as terminal 35. *S. auriculata*
- 107b. Leaves petiolate; leaf blade ovate or elliptic; spikes all terminal on leafy branches or main stem.
- 108a. Anthers strongly exerted from corolla 33. *S. affinis*
- 108b. Anthers included in corolla.
- 109a. Corolla outside glabrous.
- 110a. Bracts linear-spatulate, broadest at apex 57. *S. tonkinensis*
- 110b. Bracts oblong or elliptic, broadest in middle or base.
- 111a. Bracts elliptic, 5–6 mm wide 27. *S. strigosa*
- 111b. Bracts oblong, 2–3 mm wide 58. *S. stolonifera*
- 109b. Corolla outside pubescent.
- 112a. Leaves glabrous 28. *S. longiflora*
- 112b. Leaves pubescent.
- 113a. Calyx 2-lipped, 3 upper lobes partially fused 36. *S. mogokensis*
- 113b. Calyx subequally 5-lobed to base 37. *S. argentea*
- 102b. Bracts not imbricate so flowers clearly separate apart from basalmost.
- 114a. Inflorescences a 15–25 cm uninterrupted spike from apicalmost leaf axils 59. *S. vallicola*
- 114b. Inflorescences a much shorter spike but if similar in length then basalmost flowers widely spaced.
- 115a. Corolla outside glabrous.
- 116a. Calyx subequally 5-lobed to base.
- 117a. Stems and leaves sparsely pubescent 51. *S. taoana*
- 117b. Stems and leaves completely glabrous.
- 118a. Inflorescences branched; calyx glabrous; leaf blade broadly ovate to suborbicular; floral bracts 7–11 mm 53. *S. pinetorum*
- 118b. Inflorescences of simple terminal spikes; calyx gland-tipped pilose; leaf blade elliptic; floral bracts 5–6.5 mm 56. *S. chrysodelta*
- 116b. Calyx 2-lipped, 3 upper lobes partially fused.
- 119a. Bracts 2–3 cm, much longer than calyx 46. *S. adpressa*
- 119b. Bracts less than 1.4 cm, equaling or shorter than calyx.
- 120a. Bracts ovate 49. *S. ovata*
- 120b. Bracts linear-lanceolate or oblong.
- 121a. Spikes with 1–3 flower pairs; bracts greater than 10 mm 47. *S. atroviridis*
- 121b. Spikes with 1–7 flower pairs; bracts less than 8 mm.
- 122a. Bracts linear-lanceolate; rachis unwinged; plant drying blackish green 44. *S. longispica*
- 122b. Bracts oblong-ovate; rachis winged; plant not drying blackish green 45. *S. dryadum*

- 115b. Corolla outside pubescent at least in bud, on lobes, or tube.
- 123a. Plants strongly anisophyllous; corolla densely white pubescent in bud; capsule glabrous.
- 124a. Bracts linear, attenuate; calyx lobes finely acute 39. *S. dalzielii*
- 124b. Bracts oblanceolate; calyx lobes obtuse 40. *S. bantonensis*
- 123b. Plants not strongly anisophyllous; corolla not densely white pubescent in bud; capsule gland-tipped pubescent at apex.
- 125a. Leaves sessile.
- 126a. Leaf blade ovate to suborbicular, \pm as long as broad, abaxially whitish; bracts orbicular to obovate, 5–8 mm 50. *S. tamburensis*
- 126b. Leaves narrowly ovate, ca. $3 \times$ as long as broad, abaxially green; bracts lanceolate, 7–10 mm 75. *S. forrestii*
- 125b. Leaves petiolate.
- 127a. Corolla ventricose and strongly bent just below mouth, pubescent over its whole length.
- 128a. Corolla inside pubescent especially on lobes.
- 129a. Bracts oblong, margin entire or with a few apical teeth; spikes 2-sided 71. *S. larium*
- 129b. Bracts broadly to narrowly ovate to lanceolate, margin mostly serrate; spikes often secund 72. *S. oresbia*
- 128b. Corolla inside glabrous even on lobes.
- 130a. Bracts much reduced even at base of spike; leaf blade mostly greater than 5 cm; petiole 2–5 cm 73. *S. flexa*
- 130b. Bracts leaflike almost to spike apex; leaf blade mostly less than 5 cm; petiole (0–)1–3 cm 74. *S. versicolor*
- 127b. Corolla gradually widened above base, curved but not very strongly so, pubescent on lips only.
- 131a. Spikes extremely lax, with apical flower pairs commonly separated by greater than 1 cm along rachis; bracts ovate; calyx lobes conspicuously spatulate in fruit 78. *S. extensa*
- 131b. Spikes apically relatively dense, with flower pairs becoming imbricate along rachis; bracts linear to lanceolate; calyx lobes not usually conspicuously spatulate.
- 132a. Inflorescences mostly of simple terminal spikes; leaf blade glabrous 79. *S. spiciformis*
- 132b. Inflorescences a panicle of spikes; leaf blade pubescent at least when young.
- 133a. Leaf blade ovate, obovate, or broadly elliptic, ca. $2 \times$ as long as broad ... 76. *S. lachenensis*
- 133b. Leaf blade narrowly oblong-elliptic, $3\text{--}4 \times$ as long as broad 77. *S. nemorosa*

1. *Strobilanthes tomentosa* (Nees) J. R. I. Wood, Kew Bull. 64: 16. 2009.

尖药花 jian yao hua

Aechmanthera tomentosa Nees in Wallich, Pl. Asiat. Rar. 3: 87. 1832; *A. gossypina* (Wallich) Nees; *A. tomentosa* var. *wallichii* C. B. Clarke; *A. wallichii* Nees, nom. illeg. superfl.; *A. wallichii* var. *gossypina* (Wallich) Nees; *A. wallichii* var. *tomentosa* (Nees) Nees; *Ruellia gossypina* Wallich; *Strobilanthes blinii* H. Léveillé; *S. bodinieri* H. Léveillé; *S. cavaleriei* H. Léveillé.

Subshrubs to 1 m tall, erect, isophyllous. Stems usually gray tomentose but sometimes thinly pilose and greenish. Petiole 1–3 cm, with yellow multicellular gland-tipped trichomes; leaf blade elliptic-ovate to elliptic-oblong, $3\text{--}13 \times 2\text{--}6.5$ cm, abaxially sericeous, adaxially densely covered with linear cystoliths, secondary veins 7–10 on each side of midvein, base subrounded, cuneate, or cordate and sometimes shortly decurrent onto petiole, margin crenate, apex acute. Inflorescences usually paniculate, to 30 cm, with 3–8-flowered clusters commonly on 3–8 cm axillary branches in axils of leaflike sterile

bracts, clusters sometimes aggregated to form axillary thyrses or more distant and forming an open panicle; floral bracts linear-ligulate, 0.8–1.2 cm, abaxially and marginally gland-tipped pubescent, apex obtuse; bracteoles narrowly ligulate, ca. 5 mm, similar to and smaller than or equaling calyx lobes. Calyx 0.8–1.2 cm, deeply 5-lobed to base; lobes linear, unequal with 2 longer and 3 shorter, slightly gland-tipped pilose, apex obtuse. Corolla blue, funnel-shaped, 2.5–3.5 cm, straight, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for 4–8 mm then gradually widened to ca. 1 cm at mouth; lobes ca. 5 mm, subequal, apex obtuse. Stamens 4, included; shorter filament pair ca. 6 mm, glabrous; longer filament pair 1.1–1.2 cm, pilose; anther thecae oblong, apex mucronate; connective minutely excurrent; pollen type 6. Ovary comose; style sparsely hairy. Capsule oblong, 7–10 mm, pubescent, 6–8-seeded. Seeds discoid, densely hairy, sometimes glabrescent. Fl. Jun–Dec, fr. Aug–Dec. $2n = 30$.

Grassy mountain slopes, open forests in relatively dry areas; 500–2300 m. Guangxi, Guizhou, Yunnan [Bangladesh, Bhutan, India, Laos, Myanmar, Nepal, Pakistan].

This is a distinctive and apparently isolated species on account of the excurrent anther connective combined with the 6–8-seeded capsule and seeds with caducous trichomes.

Strobilanthes tomentosa was incorrectly reported as *S. glutinosa* Nees (*Pseudaechmanthera glutinosa* (Nees) Bremekamp) by Handel-Mazzetti (Symb. Sin. 7: 894. 1936).

2. *Strobilanthes quadrifaria* (Wallich ex Nees) Y. F. Deng, Acta Phytotax. Sin. 45: 849. 2007.

四列马蓝 si lie ma lan

Ruellia quadrifaria Wallich ex Nees in Wallich, Pl. Asiat. Rar. 3: 83. 1832; *Hemigraphis quadrifaria* (Wallich ex Nees) T. Anderson; *Sericocalyx quadrifarius* (Wallich ex Nees) Bremekamp.

Subshrubs (0.2–)1–1.5 m tall, isophyllous. Stems hirsute with large-celled trichomes. Petiole (0.3–)1.5–4 cm, hirsute; leaf blade elliptic to ovate, 5–18 × 2–7 cm, both surfaces scabrous and rather sparsely pilose with large pustulose white trichomes especially on veins, adaxially darker and with cystoliths, base attenuate, margin crenate-dentate, apex acute. Inflorescences axillary or terminal, subcapitate to shortly spicate, 2–5 × ca. 2 cm, very compact, densely covered with long silky white large-celled trichomes; peduncle 0.5–1.5 cm, hirsute; bracts ovate, elliptic, or broadly lanceolate, 1.5–2.5 × 0.6–1 cm, pilose with white large-celled trichomes, apically obtuse to acute; bracteoles linear-lanceolate, ca. 10 × 2 mm, pilose with white large-celled trichomes. Calyx 8–11 mm, outside pilose, inside sericeous toward apex, subequally 5-lobed; lobes linear, apex acuminate. Corolla pale purple with a whitish tube, 3–3.2 cm, straight, subglabrous except for pubescent lobes; tube basally cylindrical and narrow for 8–10 mm then gradually widened to 8–9 mm at mouth; lobes ovate, ca. 4 × 4 mm, apex rounded. Stamens 4, included; shorter filament pair 2–3 mm, glabrous; longer filament pair 4–7 mm, pilose; anther thecae oblong, ca. 2 × 0.8 mm; pollen type 6. Ovary oblong, comose; style 2–2.2 cm, pilose. Capsule oblong, 1–1.2 cm, sparsely pubescent near apex, 12-seeded. Seeds ca. 1 mm in diam., pubescent. Fl. Oct–Jan.

Moist shaded places in forests; 500–900 m. Yunnan [Laos, Myanmar, Thailand].

3. *Strobilanthes chinensis* (Nees) J. R. I. Wood & Y. F. Deng, Bot. J. Linn. Soc. 150: 388. 2006.

黄球花 huang qiu hua

Ruellia chinensis Nees in A. Candolle, Prodr. 11: 147. 1847; *Hemigraphis chinensis* (Nees) T. Anderson ex Hemsley; *Sericocalyx chinensis* (Nees) Bremekamp.

Herbs or subshrubs, 30–50(–150) cm tall, isophyllous. Stems often procumbent and rooting at base, 4-angled when young, hirsute, basally slightly woody. Petiole 4–10 mm; leaf blade obovate, obovate-elliptic, or sometimes oblong-elliptic, 1.5–11 × 1–4.5 cm, both surfaces sparsely hispid, adaxially densely covered with cystoliths, midvein impressed, secondary veins 5 on each side of midvein, purplish, and scabrous, base attenuate and decurrent onto petiole, margin crenate to slightly dentate, apex acute to shortly acuminate. Inflorescences axillary

or terminal, subcapitate; bracts imbricate, broadly to narrowly ovate, 1.5–2 cm, hirsute, usually 3-veined, apically beaked to a subobtusate point; bracteoles linear, ca. 9 mm, resembling calyx lobes. Calyx 5–11 mm, subequally 5-lobed to base; lobes linear-lanceolate, ca. 10 × 0.5 mm, outside gland-tipped pilose, inside apically pubescent, apex attenuate. Corolla yellow, 1.6–2 cm, straight; tube basally cylindrical and ca. 1 mm wide for ca. 5 mm then gradually widened to ca. 1 cm at mouth, outside pubescent, inside villous; lobes orbicular, ca. 4 mm in diam. Stamens 4, included or longer pair slightly exserted; shorter filament pair ca. 2 mm; longer filament pair ca. 5 mm; anther thecae oblong, ca. 2 mm. Ovary pilose; style ca. 2 cm, villous; stigma pilose. Capsule ca. 1 cm, pubescent, 8-seeded. Seeds yellowish, broadly ovate in outline, ca. 2 × 2 mm, subglabrous; areole large. Fl. Oct–Mar, fr. Jun–Jul.

Moist hollows along streams; near sea level to 1300 m. Guangdong, Guangxi, Hainan [Cambodia, Laos, Vietnam].

4. *Strobilanthes fluviatilis* (C. B. Clarke ex W. W. Smith) Moylan & Y. F. Deng, Bot. J. Linn. Soc. 150: 389. 2006.

溪畔黄球花 xi pan huang qiu hua

Hemigraphis fluviatilis C. B. Clarke ex W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 182. 1918; *Sericocalyx fluviatilis* (C. B. Clarke ex W. W. Smith) Bremekamp.

Herbs to 20 cm tall, isophyllous. Stems decumbent, hirsute, basally woody. Petiole 1–5 mm, coarsely pilose; leaf blade oblong, narrowly oblong-elliptic, or elliptic, 1.5–5 × 1–1.5 cm, abaxially subglabrous to thinly but coarsely pilose with pustulose trichomes, adaxially darker green with prominent linear cystoliths and glabrous or strigose-pilose, secondary veins 4 or 5 on each side of midvein, base cuneate, margin crenulate, apex obtuse. Inflorescences terminal, spikes, ca. 2.5 cm; bracts oblong, 1–1.5 cm, persistent, pilose, base cuneate, apex obtuse; bracteoles narrowly linear-elliptic, ca. 7 × 1 mm, pilose. Calyx ca. 8 mm, pilose, subequally 5-lobed almost to base; lobes linear, apex acute. Corolla yellow, 0.9–1.1 cm, glabrous; tube basally cylindrical and narrow for ca. 3 mm then gradually widened to ca. 3 mm at mouth; lobes orbicular, ca. 2 mm in diam., spreading. Stamens 4, included; filaments with a few scattered trichomes, shorter pair ca. 1 mm, longer pair ca. 2 mm; anther thecae oblong; pollen type 6. Ovary oblong, comose; style glabrous or with a few trichomes. Capsule oblong, ca. 8 mm, comose, 8–14-seeded. Seeds ca. 0.8 mm, pubescent; areola large. Fl. Feb–May.

Along streams on rocks; 200–800 m. Guangxi, Guizhou, Yunnan [Myanmar, Thailand].

5. *Strobilanthes reptans* (G. Forster) Moylan ex Y. F. Deng & J. R. I. Wood, **comb. nov.**

匍匐半插花 pu fu ban cha hua

Basionym: *Ruellia reptans* G. Forster, Fl. Ins. Austr. 44. 1786; *Hemigraphis okamotoi* Masamune; *H. pacifica* Hosokawa; *H. primulifolia* (Nees) Fernández-Villar; *H. reptans* (G. Forster) T. Anderson ex Hemsley; *H. tawadana* Ohwi; *R. primulifolia* Nees.

Herbs to 50 cm tall, perennial, isophyllous. Stems some-

times rosette-forming but usually prostrate and rooting at nodes, sparsely to densely covered with multicellular trichomes. Petiole 0.5–8 cm, pubescent, glabrescent; leaf blade oblong, elliptic, oblong-ovate, or suborbicular, 1.5–8 × 1–4 cm, both surfaces pubescent with multicellular trichomes, secondary veins 4 or 5 on each side of midvein, base abruptly truncate to slightly cordate, margin crenate to subentire, apex acute to obtuse. Inflorescences terminal, spikes, elongating to 6–8 cm at maturity; bracts oblanceolate to elliptic, 8–12 × 2–5 mm, persistent, pubescent on veins, margin entire and ciliate; bracteoles absent. Calyx 6.5–10 mm, 5-lobed to base; lobes linear-lanceolate, ciliate and pubescent along veins, apex finely attenuate. Corolla white or pale violet with darker veins, 1.3–1.5 cm, glabrous; tube basally cylindrical for 4–6 mm; lobes orbicular, 2–5 mm, glabrous. Stamens 4, included; shorter filament pair ca. 1 mm, glabrous; longer filament pair ca. 2 mm, base slightly villous; anther thecae ca. 1 mm; pollen type 7. Ovary apex pubescent; style sparsely villous. Capsule 7–9 mm, apically pubescent, 8–16-seeded. Seeds orbicular in outline, ca. 1 mm in diam., pubescent. Fl. Apr–Sep, Dec.

Weed of roadsides, ponds, and streamsides; near sea level to 400 m. Taiwan [Indonesia, Japan, Malaysia, Papua New Guinea, Philippines; Australia, Pacific islands (New Caledonia)].

The apparent earlier homonym, “*Strobilanthes reptans* Bojer” (Nees in Candolle, Prodr. 11: 368. 1847) was merely cited as a synonym and was therefore not validly published (*Vienna Code*, Art. 34.1(e)); hence it does not preclude valid publication of the new combination made here. The apparent new combination “*Strobilanthes primulifolia*” (Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 483. 2010), based on *Ruellia primulifolia* Nees, was not validly published because a full and direct reference to the place of valid publication of the basionym was not provided (Art. 33.4; “in DC., Prodr. 11: 144. 1847” was cited, but that publication cited the actual place: Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 382. 1843).

Strobilanthes reptans is an ornamental plant.

6. *Strobilanthes cumingiana* (Nees) Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 483. 2010.

直立半插花 zhi li ban cha hua

Ruellia cumingiana Nees in A. Candolle, Prodr. 11: 148. 1847; *Hemigraphis cumingiana* (Nees) Fernández-Villar.

Herbs to 50 cm tall, erect, isophyllous. Stems 4-angled, thinly pubescent with multicellular trichomes. Petiole 0.8–2.5 cm, sulcate, pubescent; leaf blade ovate-lanceolate, ovate, or elliptic, 4–10 × 1.5–5 cm, both surfaces densely covered with cystoliths, abaxially strigose along veins, adaxially darker and glabrous, secondary veins 5 or 6 on each side of midvein, base cuneate to rounded and often oblique, margin shallowly crenate, apex shortly acuminate. Inflorescences axillary or terminal, spikes, to 4 cm; peduncle 0.3–2 cm, pubescent to puberulent; rachis glabrous; bracts ovate, persistent, margin slightly ciliate, apex obtuse; basalmost bracts sterile, leaflike, 1.5–2 × 0.6–1 cm, margin undulate; apical bracts fertile, ca. 10 × 6 mm, margin entire; bracteoles absent. Calyx 6.5–9.5 mm, subequally 5-lobed to base; lobes lanceolate, margin ciliate, apically attenuate. Corolla white, 1.3–1.8 cm, glabrous; tube basally cylindrical for 4–6 mm; lobes orbicular, ca. 2.5 mm in diam. Stamens 4,

included; shorter filament pair 1–1.5 mm, glabrous; longer filament pair 2–3 mm, villous; anther thecae oblong, ca. 1.5 mm; pollen type 8. Ovary comose; style ca. 1 cm, hirsute. Capsule ca. 9 mm, apically pubescent, 6–8-seeded. Seeds ca. 2 × 1.2–2 mm, pubescent. Fl. Feb–May.

Forests; 100–300 m. Taiwan (Lan Yu) [Indonesia, Malaysia, Philippines].

7. *Strobilanthes sinica* (H. S. Lo) Y. F. Deng, *comb. nov.*

安龙马蓝 an long ma lan

Basionym: *Dyschoriste sinica* H. S. Lo, Acta Phytotax. Sin. 17(4): 85. 1979.

Herbs to 10 cm tall, isophyllous. Stems prostrate, 4-angled, glabrous, internodes usually less than 1 cm, rooting at basal nodes. Leaves shortly petiolate or sessile; leaf blade oblong-lanceolate, 0.7–3 × 0.3–0.7 cm, both surfaces glabrous, secondary veins ca. 3 on each side of midvein, base cuneate, margin entire or apically inconspicuously serrate, apex obtuse. Flowers axillary, solitary. Bracts similar to leaves but smaller; bracteoles linear-spatulate, 4.5–5 mm, apex obtuse. Calyx 5.5–6 mm, 5-lobed almost to base; lobes lanceolate, margin sparsely ciliate. Corolla purple, ca. 1.1 cm, straight; tube basally cylindrical and narrow for ca. 4 mm then widened to ca. 4.5 mm at throat, outside reported, perhaps erroneously, to be glabrous; lobes ?obcordate, 2–2.5 mm, subequal. Stamens 4, included; filaments glabrous, shorter pair ca. 1.2 mm, longer pair ca. 3.5 mm; anther thecae parallel; pollen type 10. Ovary glabrous; style ca. 8 mm, slightly hairy. Capsule oblong, ca. 6.5 mm, glabrous, 4-seeded. Seeds ovate in outline, ca. 2 × 2 mm, densely appressed pubescent. Fl. Aug–Sep.

• Grassy slopes; ca. 1300 m. Guizhou (Anlong).

8. *Strobilanthes szechuanica* (Batalin) J. R. I. Wood & Y. F. Deng, Bot. J. Linn. Soc. 150: 375. 2006.

四川马蓝 si chuan ma lan

Hemigraphis szechuanica Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 384. 1894.

Herbs to 20 cm tall, isophyllous. Stems decumbent, 4-angled, subglabrous, rooting at basal nodes. Petiole 3–5 mm, puberulent; leaf blade ovate to obovate, becoming suborbicular toward branch tips, 1–2 × 0.8–1 cm, glabrous or margin with a few scattered cilia, both surfaces densely covered with whitish cystoliths, secondary veins 3 or 4 on each side of midvein, base broadly cuneate and decurrent onto petiole, margin entire, apex obtuse to rounded. Flowers axillary, solitary; bracteoles oblanceolate, 5–7 × ca. 1 mm, pilose and with abundant cystoliths, margin thinly ciliate. Calyx 8–10 mm, with abundant cystoliths, 5-lobed almost to base; lobes linear to linear-lanceolate, margin ciliate, apex obtuse. Corolla pale lilac, funnel-shaped, 1.8–2.3 cm, outside pubescent; tube basally cylindrical and narrow for ca. 5 mm then gradually widened to ca. 8 mm at mouth; lobes suborbicular, ca. 3 × 3 mm, margin ciliate. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 5 mm, pilose; anther thecae oblong, ca. 2 × 1.2 mm; pollen type 10 (requires confirmation). Ovary oblong, comose; style

1.4–1.8 cm, pilose. Capsule ca. 1 cm, pilose at tip, 4-seeded. Seeds ca. 2 mm in diam., pilose. Fl. Jul–Sep.

- Streamsides, on rocks; 700–1500 m. Sichuan.

9. *Strobilanthes wilsonii* J. R. I. Wood & Y. F. Deng, Bot. J. Linn. Soc. 150: 371. 2006.

乐山马蓝 le shan ma lan

Herbs to 30 cm tall, perennial, isophyllous. Stems procumbent, sulcate, glabrous, rooting at nodes; flowering branches arising in pairs from nodes, apparently erect, 3–20 cm, sparsely bifariously pilose especially apically, with reflexed whitish large-celled trichomes. Petiole 0.5–2 cm, bifariously hirsute with short reflexed whitish trichomes; leaf blade narrowly elliptic, broadly elliptic, or obovate-spatulate, 1.5–3 × 1–1.5 cm, glabrous except for a few marginal trichomes near petiole, adaxially with prominent cystoliths, secondary veins 3–5 on each side of midvein, base attenuate, margin serrate, apex very shortly acuminate to obtuse. Inflorescences axillary or terminal, headlike spikes, 1–1.5 cm, few flowered; peduncle 0.2–1.8 cm, pilose; bracts obovate-spatulate, 4–10 × 2–6 mm, apically diminishing in size, abaxially glabrous, adaxially with a few trichomes toward base, margin basally entire and ciliate with thick white spreading trichomes and apically toothed and not ciliate, apex ± obtuse; bracteoles oblanceolate to obovate-spatulate, 2–3 × ca. 0.5 mm, margin ciliate with a few large white trichomes to 2 mm, apex ± rounded. Calyx ca. 4 mm, subequally 5-lobed to ca. 1 mm above base; lobes pale but with a green tip, linear-oblong, ca. 3.2 × 1 mm, pilose with large-celled but mostly marginal trichomes, apex obtuse. Corolla blue, 7–8 mm, funnel-shaped, outside pilose; tube basally cylindrical and ca. 1 mm wide for ca. 2 mm then gradually widened to ca. 5 mm at mouth; lobes ovate, ca. 1.5 × 1.5 mm, apex acute. Stamens 4; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 4 mm and slightly exserted; anther thecae oblong, ca. 0.5 × 0.2 mm; central staminode present, ca. 1 mm; pollen type 9. Ovary pilose; style ca. 8 mm. Capsule (immature) ca. 2.5 mm, pilose with large-celled trichomes, 4-seeded. Seeds ovate in outline, lenticular, ca. 2 × 2 mm, densely covered with appressed trichomes; areola small, glabrous. Fl. Sep–Oct.

- Moist shaded places; 800–1100 m. Sichuan.

10. *Strobilanthes labordei* H. Lévillé, Repert. Spec. Nov. Regni Veg. 12: 20. 1913.

薄叶马蓝 bao ye ma lan

Acanthopale debilis C. B. Clarke ex S. Moore; *A. labordei* (H. Lévillé) Handel-Mazzetti; *Championella debilis* Bremekamp; *C. labordei* (H. Lévillé) E. Hossain; *Strobilanthes debilis* Hemsley (1890), not C. B. Clarke (1885).

Herbs, creeping, branched, isophyllous. Stems white villous, rooting at nodes. Petiole 5–10 mm; leaf blade ovate, 2–3 × 1.5–2 cm, both surfaces white hirsute, abaxially glaucous, adaxially green and sometimes purplish dotted, secondary veins 4 or 5 on each side of midvein, base broadly cuneate to rounded, margin sparsely crenulate, apex acuminate. Inflorescences terminal, abbreviated to headlike spikes, ca. 1 cm, densely covered with large-celled white trichomes; bracts leaflike, 1–2 cm;

bracteoles linear, ca. 5 mm. Calyx 5–7 mm, 5-lobed almost to base; lobes linear-lanceolate, densely white hirsute. Corolla purplish blue to violet, 1.5–1.8 cm, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow then gradually widened to ca. 1.2 cm at mouth; lobes oblong, ca. 3 × 3 mm, subequal, apex rounded. Stamens 4; shorter filament pair ca. 3 mm; longer filament pair ca. 7 mm, exserted; anther thecae ca. 1.8 × 1 mm, weakly exserted; pollen type 11. Ovary pilose at tip; style ca. 1.2 cm, pilose. Capsule narrowly obovoid, 6–8 mm, 4-seeded, apex pilose. Seeds ovate in outline, ca. 2 × 2 mm, pubescent. Fl. Aug–Dec.

- Valleys, moist places; 400–1800 m. Chongqing, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan.

11. *Strobilanthes tetrasperma* (Champion ex Benth) Druce, Rep. Bot. Soc. Exch. Club Brit. Isles 1916: 649. 1917.

四子马蓝 si zi ma lan

Ruellia tetrasperma Champion ex Benth, Hooker's J. Bot. Kew Gard. Misc. 5: 132. 1853; *Acanthopale radicans* (T. Anderson ex Benth) C. B. Clarke ex Benoist; *A. tetrasperma* (Champion ex Benth) Handel-Mazzetti; *Championella tetrasperma* (Champion ex Benth) Bremekamp; *Strobilanthes radicans* T. Anderson ex Benth.

Herbs 30–50 cm tall, isophyllous. Stems often procumbent and rooting at base, 4-angled, sulcate, retrorsely pubescent along sulci, glabrescent, basally slightly woody. Petiole 0.5–2.5 cm, sulcate, glabrous; leaf blade ovate, elliptic, or oblong, 1.5–11 × 1–4.5 cm, glabrous, adaxially darker and densely covered with cystoliths, secondary veins ca. 5 on each side of midvein, base attenuate or decurrent onto petiole, margin serrate to dentate, apex acuminate to acute. Inflorescences terminal or (sometimes) axillary, short often headlike spikes, few flowered, often reduced to a single flower pair; bracts leaflike, obovate to spatulate, 1–1.5 × 0.4–0.5 cm, sparsely pilose, pinnately veined; bracteoles linear, 5–6 × ca. 1 mm, abaxially glabrous or sparsely pilose and densely covered with cystoliths. Calyx 5-lobed almost to base; lobes linear, 5–7 × ca. 1 mm, accrescent to ca. 8 mm in fruit, glabrous except for large-celled trichomes on margin, densely covered with cystoliths. Corolla purple to purplish blue, funnel-shaped, 1.5–2 cm, straight, outside pubescent, inside villous; tube basally cylindrical and ca. 2 mm wide for ca. 5 mm then gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 4 × 5 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 5 mm, sparsely pubescent; anther thecae oblong, ca. 2 mm; pollen type 10. Ovary ovoid, ca. 3 mm, hispid at tip, with 4 ovules per locule; style ca. 1.5 cm, hirsute; stigma 2-lobed, lobes unequal. Capsule oblong, 7–10 mm, apically pubescent, 4-seeded. Seeds ovate in outline, ca. 2 × 2 mm, pubescent. Fl. Jul–Dec.

- Forests, shaded grasslands, rocks by streams, roadsides; 100–1000 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan [Vietnam].

12. *Strobilanthes japonica* (Thunberg) Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 124. 1866.

日本马蓝 ri ben ma lan

Ruellia japonica Thunberg in Murray, Syst. Veg., ed. 14,

576. 1784; *Acanthopale japonica* (Thunberg) C. B. Clarke ex S. Moore; *Championella japonica* (Thunberg) Bremekamp; *Strobilanthes bonatiana* H. Léveillé.

Herbs 20–50 cm tall, isophyllous. Stems slender, herbaceous, much branched; branchlets purplish red, 4-angled then terete, glabrous. Petiole 2–5 cm, white pubescent; leaf blade narrowly elliptic to lanceolate, 2–5 × 0.5–1.8 cm, both surfaces glabrous and densely covered with prominent linear cystoliths, secondary veins 3–5 on each side of midvein, base cuneate to broadly cuneate, margin crenulate, apex long acuminate. Inflorescences terminal, spikes, 1–3(–5) cm, sometimes reduced to a single flower pair; bracts imbricate, oblanceolate to oblong-lanceolate, 7–10 × 2–3 mm, as long as corolla tube, glabrous except for pubescence at base, apically densely covered with cystoliths, margin entire, apex obtuse; bracteoles linear, ca. 5 mm. Calyx equally 5-lobed almost to base; lobes linear, 6–7 mm, margin ciliate, apex rounded. Corolla purplish white or white, funnel-shaped, ca. 1.5 cm, straight, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical for 5–6 mm; lobes oblong-elliptic, 5–6 mm, equal. Stamens 4, included; shorter filament pair ca. 8 mm; longer filament pair ca. 1.2 cm; anther thecae oblong, ca. 1.5 mm; pollen type 10. Ovary glabrous; style filiform, ca. 1.2 cm, pilose; stigma 2-cleft. Capsule oblong, ca. 7 mm, presumably glabrous, 4-seeded. Seeds ovate in outline, ca. 3 mm, densely appressed pubescent. Fl. Aug–Sep, fr. Oct–Nov. $2n = 30$.

Often near temples and religious sites; 500–1100 m. Chongqing, Guizhou, Hubei, Hunan, Sichuan [Japan].

Strobilanthes japonica differs from *S. tetrasperma* in its lanceolate leaves and glabrous ovary. We have seen two collections intermediate between these two species (*Yu Xunlin 91690* from Hunan and *Exped. To Flora of Yunnan, Guizhou and Guangxi 50124* from Guizhou).

“*Dyschoriste grandiflora* H. S. Lo” (C. C. Hu, FRPS 70: 79. 2002) belongs here but is a nomen nudum and was therefore not validly published (*Vienna Code*, Art. 32.1(d)).

13. *Strobilanthes wangiana* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 473. 2010.

启无马蓝 qi wu ma lan

Herbs to 1 m tall, perennial, isophyllous. Stems sulcate, obscurely bifariously pubescent, glabrescent; nodes pustulose, sparsely pubescent. Petiole 4–5(–20) mm, almost glabrous; leaf blade elliptic to ovate-elliptic, 2.5–6 × 1.1–2.8 cm, both surfaces glabrous except for large-celled trichomes adaxially along midvein, cystoliths prominent, secondary veins 5–7 on each side of midvein, base cuneate and attenuate onto petiole, margin crenate, apex obtuse. Inflorescences terminal, subcapitate spikes, 2–4 cm, few flowered; bracts leaflike; basal bracts elliptic, 2–4 × 1–1.4 cm, apically diminishing in size, margin serrate; apical bracts oblong, 1.4–2 × 0.4–0.6 cm, abaxially sparsely pubescent, adaxially glabrous, margin ciliate and entire except for a few teeth near apex; bracteoles linear-lanceolate, 9–11 × ca. 1 mm, abaxially silky pubescent, adaxially glabrous, margin ciliate. Flowers imbricate on rachis, sessile. Calyx 1–1.3 cm, 5-lobed to ca. 3 mm above base; lobes linear-oblanceolate, 10–14 × 0.6–1 mm, outside silky pubescent, inside silky pubescent from middle apically and glabrescent toward base, margin ciliate. Corolla purplish, 3.5–4 cm,

ventricose and bent to ca. 90° at mouth, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then gradually widened to ca. 1 cm at mouth; lobes ovate, 4–5 × 4–5 mm, apex obtuse. Stamens 4, included; filaments pubescent, shorter pair 1–2 mm, longer pair 3–4 mm; anther thecae oblong, ca. 1.5 mm. Ovary ca. 2 mm, glabrous except for a few trichomes at tip. Capsule oblong, ca. 10 × 3 mm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, compressed, pubescent; areola small. Fl. Aug–Sep, fr. Nov.

• Forests; 1200–2300 m. Yunnan.

14. *Strobilanthes oligantha* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 124. 1866.

少花马蓝 shao hua ma lan

Acanthopale oligantha (Miquel) C. B. Clarke ex S. Moore; *Championella oligantha* (Miquel) Bremekamp.

Herbs 40–50 cm tall, isophyllous. Stems 4-angled, sulcate, sparsely and retrorsely white hairy. Petiole 3.5–4 cm, thinly pilose; leaf blade broadly ovate to elliptic, 4–7(–10) × 2–4 cm, both surfaces with prominent white cystoliths, abaxially thinly pilose on veins, adaxially glabrous to thinly pubescent, secondary veins 4–6 on each side of midvein, base broadly cuneate, margin remotely serrate, apex acuminate. Inflorescences short spikes, elongating to ca. 4 cm in fruit, sometimes reduced to a single flower pair; bracts leaflike; outer bracts ca. 1.5 cm; inner bracts smaller, densely covered with white large-celled trichomes; bracteoles linear-spatulate, ca. 1 cm, densely covered with white large-celled trichomes. Flowers imbricate on rachis. Calyx ca. 8 mm, subequally 5-lobed almost to base; lobes linear, subequaling bracteoles, inside apically with trichomes. Corolla bluish purple, 3–3.5 cm, usually bent, outside sparsely pubescent on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for ca. 1.5 cm then gradually widened to ca. 1.3 cm at mouth, expanded part campanulate and ca. 2.5 cm; lobes ca. 5 mm, subequal. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 5 mm, pilose; anther thecae oblong, ca. 2 × 1 mm; pollen type 10. Ovary pubescent at tip; style ca. 3.2 cm, pilose. Capsule narrowly obovoid, ca. 1 cm, pubescent at tip, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, pubescent. Fl. Jul–Sep, fr. Oct–Nov. $2n = 60$.

Forests, shaded moist grasslands; 100–800 m. Anhui, Fujian, Jiangxi, Zhejiang [Japan, Korea].

15. *Strobilanthes austrosinensis* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 470. 2010.

华南马蓝 hua nan ma lan

Herbs to 50 cm, perennial, drying a distinct dark green color, isophyllous. Stems basally procumbent and rooting at nodes but eventually ascending, sulcate, bifariously pubescent especially apically, with reflexed whitish large-celled trichomes. Petiole 0–2 cm, bifariously hirsute with reflexed whitish large-celled trichomes; leaf blade elliptic to suborbicular, 2–8 × 1–4.5 cm, abaxially pilose along veins, adaxially pilose and hirsute especially toward base and densely covered

with white cystoliths, secondary veins 3–5 on each side of midvein, base attenuate, margin serrate but becoming subentire toward base, apex acute to obtuse. Inflorescences terminal, headlike spikes, 1–2 cm, often elongating at maturity, leafy, few flowered; rachis densely whitish pilose; bracts shortly petiolate, leaflike, broadly obovate-spatulate, 1.5–1.8 × 0.5–0.8 cm, abaxially densely covered with whitish multicellular trichomes toward base, adaxially subglabrous, margin basally entire and apically 1–3-dentate, apex rounded to obtuse; bracteoles spatulate, 8–11 × 1–2.5 mm, abaxially toward base densely covered with whitish multicellular large-celled trichomes, adaxially whitish pilose. Calyx 1–1.2 cm, 5-lobed almost to base; lobes oblong-lanceolate, outside pilose, inside subglabrous, midvein prominent, margin ciliate with thick white apically spreading cilia, apex obtuse. Corolla bluish purple, funnel-shaped, 2.2–2.8 cm, ventricose, straight to slightly curved, outside pilose when young but glabrescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for 1.2–1.5 cm then gradually widened to ca. 1.5 cm at mouth; lobes ovate-elliptic, ca. 5 mm. Stamens 4, included; filaments hirsute, shorter pair ca. 6 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 1.2 × 0.4 mm; pollen type 10. Ovary ovoid, ca. 2 mm, glabrous except for comose tip; style ca. 1.5 cm, hirsute; stigma unequally 2-cleft. Capsule oblong, 9–10 × ca. 3 mm, glabrous except for pilose tip and along suture, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, densely pilose; areola small, glabrous. Fl. Jul–Sep, fr. Oct–Nov.

• Thickets, forest margins; 100–1500 m. Guangdong, Guangxi, Hunan, Jiangxi.

16. *Strobilanthes sarcorrhiza* (C. Ling) C. Z. Zheng ex Y. F. Deng & N. H. Xia, *Novon* 17: 154. 2007.

菜头肾 *cai tou shen*

Championella sarcorrhiza C. Ling, *Acta Phytotax. Sin.* 13(3): 93. 1975.

Herbs 20–40 cm tall, unbranched, isophyllous. Rhizomes swollen, fleshy. Stems 4-angled, sulcate, densely pubescent. Petiole 0–3 mm; leaf blade oblong-lanceolate, 4–18 × 1.5–3 cm, abaxially pubescent along veins, adaxially glabrous and densely covered with acerose cystoliths, secondary veins 5–9 on each side of midvein, base narrowly cuneate, margin dentate to undulate, apex acuminate. Inflorescences terminal, subcapitate spikes, 2–4(–5) cm, 4–10-flowered; rachis pubescent; bracts leaflike, obovate-elliptic, 1–2 × 0.3–1 cm, glabrous; bracteoles linear-lanceolate, ca. 8 mm, glabrous except for large-celled trichomes on margin, abaxially densely covered with white clavate cystoliths. Calyx ca. 1 cm, 5-lobed almost to base; lobes linear, unequal, glabrous except for large-celled trichomes on margin, outside densely covered with white clavate cystoliths. Corolla purple, funnel-shaped, 3.5–4.5 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 7 mm then gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 4 × 3 mm, subequal, apex emarginate. Stamens 4, included; filaments pilose, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 1.5 mm; pollen type 3. Ovary glabrous; style filiform, ca. 3.2 cm, pubescent. Capsule glabrous, 4-

seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, densely pubescent. Fl. Aug–Sep, fr. Nov.

• Forests in valleys; 200–600 m. Zhejiang.

This species is used medicinally.

17. *Strobilanthes procumbens* Y. F. Deng & J. R. I. Wood, *J. Trop. Subtrop. Bot.* 18: 476. 2010.

金佛山马蓝 *jin fo shan ma lan*

Herbs to 70 cm tall, perennial, isophyllous. Stems at first procumbent and rooting at nodes then erect, sulcate, densely pubescent with multicellular trichomes. Petiole 3–11 mm, sulcate, densely pubescent with multicellular trichomes; leaf blade ovate to rhomboidal, 0.8–3 × 0.3–2 cm, both surfaces pubescent with multicellular trichomes, adaxially with numerous cystoliths, secondary veins 3–5 on each side of midvein, abaxially elevated, and adaxially impressed, base cuneate and slightly decurrent onto petiole, margin crenate, apex acute. Inflorescences terminal, subcapitate spikes, ca. 1 cm; bracts leaflike, oblanceolate, 4–12 × 2–4 mm, apically diminishing in size, abaxially pubescent, adaxially pubescent with white to slightly yellowish multicellular trichomes, margin entire or with 1 or 2 teeth and silky ciliate, apex obtuse; bracteoles linear-spatulate, ca. 5 × 1 mm, indumentum as for bracts. Calyx subequally 5-lobed to base, white pilose; lobes linear, apex obtuse. Corolla white, funnel-shaped, 2.8–3.3 cm, straight to slightly curved, outside pubescent especially on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 1 mm wide for ca. 6 mm then gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 2 × 2 mm. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 4 mm, pubescent; anther thecae oblong, ca. 1.3 mm; pollen type ?4. Ovary glabrous except for comose tip; style ca. 1 cm, glabrous. Capsule oblong, ca. 0.8 cm, glabrous except for comose tip, 4-seeded. Seeds elliptic in outline, ca. 1 × 1 mm, pubescent; areola small. Fl. Aug–Sep, fr. Nov.

• Streamsides; 800–1000 m. Chongqing (Nanchuan).

18. *Strobilanthes lihengiae* Y. F. Deng & J. R. I. Wood, *Bot. J. Linn. Soc.* 150: 379. 2006.

李恒马蓝 *li heng ma lan*

Herbs to 40 cm tall, perennial, isophyllous. Stems rounded to slightly sulcate, apparently ascending, bifariously pubescent to subglabrous. Petiole 0.2–4 cm, pilose with large white multicellular trichomes; leaf blade ovate to ovate-elliptic, 1.5–11 × 0.5–6 cm, both surfaces pilose with large-celled trichomes especially on veins but adaxially sparser, secondary veins 4 on each side of midvein, base cuneate, margin dentate to crenate, apex shortly acuminate. Inflorescences terminal on main stem and on small axillary branchlets, headlike spikes, very compact; bracts obovate, 8–11 × 6–9 mm, shortly and densely greenish tomentose and also pilose with long large-celled white gland-tipped and non-glandular trichomes, margin entire, apex rounded; bracteoles oblong-oblanceolate, ca. 6 × 1.5–2 mm, margin long ciliate. Calyx subequally 5-lobed to ca. 1 mm from base; lobes green-tipped, lanceolate-oblong, 8–9 × ca. 1.3 cm, exceeding bracteoles, margin long ciliate, apex obtuse. Corolla

with a whitish tube base and blue apical part of tube and lobes, 3.2–4 cm, ventricose, sparsely pilose on lobes; tube basally cylindrical and ca. 1 mm wide for 8–10 mm then bent and expanded gradually to ca. 1.5 cm wide at mouth; lobes ovate, ca. 5 × 5 mm, apex acute. Stamens 4, included; filaments coarsely pilose, shorter pair ca. 3 mm, longer pair ca. 5 mm; anther thecae narrowly oblong, ca. 3 × 0.5 mm; pollen type 3. Ovary villous; style 2.5–3 cm, basally sparsely pilose. Capsule cylindrical, ca. 12 × 3 mm, comose, 4-seeded. Seeds ovate-elliptic in outline, ca. 2.5 × 2 mm, pilose. Fl. Nov–Dec.

• Disturbed evergreen broad-leaved forests; ca. 2000 m. Yunnan (Tengchong).

19. *Strobilanthes esquirolii* H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 12: 18. 1913.

白头马蓝 bai tou ma lan

Pyrrothrix heterochroa (Handel-Mazzetti) C. Y. Wu & C. C. Hu; *Strobilanthes heterochroa* Handel-Mazzetti; *S. leucocephala* Craib; *Tetragoga angustiphylla* Q. H. Chen; *T. esquirolii* (H. Léveillé) E. Hossain.

Subshrubs 0.5–2 m tall, much branched, anisophyllous. Stems 4-angled, basally glabrescent, apically rust-colored retrorsely setose. Petiole 1–3 cm, hispid-pilose; leaf blade ovate-elliptic to oblong-elliptic, 4–17 × 2–8 cm, smaller of pair ca. 3/4 size of larger one, roughly hirsute, abaxially paler, adaxially with prominent cystoliths, secondary veins 7–10 on each side of midvein, abaxially prominent, and adaxially impressed, base cuneate and attenuate, margin serrulate and ciliate, apex acute to caudate. Inflorescences terminal, heads, often yellowish, 2–3 × ca. 2 cm, 8–10-flowered; rachis densely white sericeous with gland-tipped trichomes; bracts oblong-lanceolate, 1–3 × 0.5–0.7 cm, outer ones longer with caudate tips giving inflorescences an eared appearance, inner ones smaller, indumentum variable, white sericeous, with gland-tipped or non-glandular trichomes, and apically often becoming brownish; bracteoles oblanceolate, 7–9 × ca. 2 mm, abaxially basally white sericeous, trichomes apically often slightly rust-colored. Flowers imbricate on rachis. Calyx 7–10 mm, 5-lobed almost to base; lobes linear-oblancoate, densely white sericeous toward base but slightly rust-colored toward apex, apex acute. Corolla violet, 3–3.5 cm, curved, ventricose, outside densely white pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 4 mm wide for ca. 6 mm then gradually widened to ca. 1 cm at mouth; lobes ovate, ca. 4 × 5 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 4 mm, glabrous; longer filament pair ca. 7 mm, white pilose; anther thecae oblong, ca. 3 × 1 mm; pollen type 3. Ovary densely white pilose; style ca. 2.8 cm, white pilose. Capsule oblong, 7–10 mm, apically white pilose, 4-seeded. Seeds ovate in outline, ca. 3.5 × 2 mm, densely pubescent; areola small. Fl. Sep–Dec.

Mountain slopes; 200–800 m. Guizhou, Yunnan [Laos, Thailand, Vietnam].

20. *Strobilanthes hossei* C. B. Clarke, *Bot. Jahrb. Syst.* 41: 67. 1907.

红毛马蓝 hong mao ma lan

Championella fulvihilspida (D. Fang & H. S. Lo) C. C. Hu & C. Y. Wu; *Pyrrothrix hossei* (C. B. Clarke) C. Y. Wu & C. C. Hu; *P. rufohirta* (C. B. Clarke ex W. W. Smith) C. Y. Wu & C. C. Hu; *Strobilanthes fulvihilspida* D. Fang & H. S. Lo; *S. rufohirta* C. B. Clarke ex W. W. Smith.

Herbs or subshrubs 20–30(–100) cm tall, much branched, anisophyllous. Stems slender, erect, 4-angled, basally glabrescent, apically reddish brown setose. Petiole 1.5–2.5 cm, densely reddish setose; leaf blade ovate to ovate-lanceolate, 8–9 × 3.5–4 cm, both surfaces reddish brown setose on veins, abaxially whitish, adaxially dark green, cystoliths absent or obscure, secondary veins ca. 5 on each side of midvein, base broadly cuneate to subrounded, margin crenate, apex acuminate. Inflorescences axillary, spikes, 2–4 cm; rachis densely reddish setose; bracts spatulate, 1.3–1.6 × ca. 0.3 cm, persistent, basal claw pale reddish setose, expanded apex green and leaflike; bracteoles linear-spatulate, 0.8–1.2 cm, reddish setose. Calyx ca. 1.3 cm, 5-lobed almost to base; lobes linear-spatulate, reddish setose. Corolla pale blue, 4–5 cm, straight, outside puberulent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then gradually widened to ca. 1.2 cm at mouth; lobes orbicular, 6–7 mm in diam. Stamens 4, included; filaments white villous, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2 × 1 mm; pollen type 3. Capsule light brown, fusiform, ca. 1 cm, gland-tipped pubescent, 4-seeded, apex apiculate. Seeds brown, ovate in outline, ca. 2 × 2 mm, compressed, pubescent, apex shortly apiculate; areola absent. Fl. Aug–Dec, fr. Nov–Feb.

Thickets, mountain slopes; 1000–1800 m. Guangxi, Yunnan [Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

21. *Strobilanthes torrentium* Benoist, *Bull. Mus. Natl. Hist. Nat.* 28: 188. 1922.

急流马蓝 ji liu ma lan

Subshrubs to 1 m tall, isophyllous or slightly anisophyllous. Stems dark green, erect, 4-angled, sulcate, bifuriously pubescent. Petiole 0.5–3 cm, pubescent and slightly hispid; leaf blade ovate to elliptic, 3–13 × 1.5–5.5 cm, abaxially densely yellow pilose along veins, adaxially sparsely pubescent, hispid, and with numerous cystoliths, secondary veins 5–7 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin serrate, apex acuminate and slightly falcate. Inflorescences axillary or terminal, headlike spikes, 1.5–3 cm, very compact, densely covered with long silky rufous trichomes; bracts imbricate, somewhat variable in size and shape; outer bracts leaflike, obovate to subrhombic, 1.5–1.7 × 0.5–0.7 cm, distinctly angled, densely villous, apex acute; inner bracts obovate, ca. 10 × 5 mm, angled, villous, apex subacute; bracteoles oblanceolate, ca. 7 mm, margin ciliate, apex obtuse. Calyx 1–1.1 cm, villous, 5-lobed to ca. 3 cm from base; lobes linear-oblong 7–8 × ca. 1 mm, with 2 slightly shorter than others, margin ciliate, apex obtuse. Corolla with a white tube and blue to mauve lobes, 3–4.5 cm, curved, outside sparsely pubescent on tube and on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for 8–10 mm then gradually widened to 1–1.2 cm at mouth; lobes ovate, ca. 3 × 5 mm, apex obtuse. Stamens 4, included; filaments pilose,

shorter pair ca. 2 mm, longer pair ca. 5 mm; anther thecae oblong, ca. 2.5 mm; pollen type 3. Ovary villous; style ca. 3.3 cm, basally glabrous, apically pubescent. Capsule oblong, ca. 9 mm, pilose at tip, 4-seeded. Seeds unknown. Fl. Aug–Nov.

Forests by streams; 1900–2300 m. Yunnan [India, Myanmar].

22. *Strobilanthes anamitica* Kuntze, Revis. Gen. Pl. 2: 498. 1891.

海南马蓝 hai nan ma lan

Championella maclurei (Merrill) C. Y. Wu & H. S. Lo; *Strobilanthes maclurei* Merrill.

Herbs 50–100 cm tall, isophyllous. Stems reddish, stout, erect or procumbent and rooting at nodes, hirsute when young, glabrescent. Petiole 1–2 cm; leaf blade oblong-ovate, 3–13 × 1.5–5.5 cm, both surfaces golden to brown hirsute, adaxially densely covered with cystoliths, secondary veins ca. 5 on each side of midvein, base cuneate to subrounded, margin crenulate, apex acuminate to shortly acuminate. Inflorescences axillary or terminal, headlike spikes, 1–3 cm, very compact, elongated after flowering; bracts obovate, ca. 1 cm, brown hirsute, pinnately veined, apex reflexed; bracteoles spatulate-linear, ca. 10 × 1 mm, abaxially hirsute on apical half, adaxially subglabrous, margin ciliate. Calyx 6–8 mm, hirsute, 5-lobed almost to base; lobes linear, ca. 1 mm wide, outside hirsute on apical half, margin ciliate. Corolla light blue or white, ca. 3 cm, outside pubescent on tube, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 0.2 mm wide for ca. 1.2 cm then gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 6 mm. Stamens 4, included; filaments pilose, shorter pair ca. 3 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2 × 1 mm; pollen type 2. Ovary pubescent at tip; style ca. 2.5 cm, hirsute. Capsule light brown, ca. 7 mm, pubescent at tip, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, pubescent. Fl. Sep–Jan, fr. Dec–Mar.

Forests, on rocks by streams; 400–1800 m. Guangxi, Hainan, Yunnan [Vietnam].

23. *Strobilanthes yunnanensis* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 164. 1912.

云南马蓝 yun nan ma lan

Pteracanthus hygrophiloides (C. B. Clarke ex W. W. Smith) H. W. Li; *P. hygrophiloides* var. *brachytrichus* (Handel-Mazzetti) C. Y. Wu; *P. mekongensis* (W. W. Smith) C. Y. Wu & C. C. Hu; *P. yunnanensis* (Diels) C. Y. Wu & C. C. Hu; *Strobilanthes hygrophiloides* C. B. Clarke ex W. W. Smith; *S. hygrophiloides* var. *brachytricha* Handel-Mazzetti; *S. hygrophiloides* var. *subnuda* Benoist; *S. limprichtii* Diels; *S. mekongensis* W. W. Smith.

Subshrubs 0.5–2.5 m tall, much branched, isophyllous. Stems 4-angled, bifariously whitish pubescent, sometimes glabrescent. Petiole 2–4 cm, whitish pubescent; leaf blade ovate, elliptic, or elliptic-ovate, 3–11 × 2–5 cm, abaxially pale green and sparsely pubescent, adaxially dark green and pubescent, cystoliths abundant on both surfaces, secondary veins 4–7 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin crenate-serrate, apex acuminate and sometimes falcate. Inflorescences axillary or terminal, subcapitate spikes,

rarely reduced to a single flower; peduncle 0–4 mm, densely white pubescent; bracts persistent, hirsute; outermost sterile bracts leaflike, petiolate, lanceolate to ovate-lanceolate, 1.5–2.5 × 0.3–0.4 cm; inner floral bracts linear-oblong, 1.2–1.6 cm, with 1 reddish brown vein; bracteoles linear to oblanceolate, ca. 10 × 2 mm, pilose, apex obtuse. Flowers usually only one sterile per node. Calyx 1.2–1.6 cm, 5-lobed almost to base; lobes linear-lanceolate, 11–15 × 1–1.5 mm, subhyaline, pilose especially on midvein, margin ciliate, apex finely acuminate. Corolla pale blue to pinkish, 3.5–4.5 cm, straight, outside densely white pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and 8–9 mm wide for 1–1.5 cm then gradually widened to ca. 2 cm at mouth; lobes orbicular, 6–8 mm in diam. Stamens 4, included; filaments pilose, shorter pair ca. 2 mm, longer pair 4–7 mm; anther thecae oblong, ca. 4 × 1 mm; pollen type 3. Ovary whitish comose; style 2.8–3.4 cm, sparsely pilose. Capsule oblong, 11–13 × ca. 2.5 mm, apically sparsely gland-tipped pubescent, 4-seeded. Seeds ovate in outline, 2.5–3.5 × 2–2.5 mm, densely appressed pilose. Fl. Jul–Sep, fr. Oct–Nov.

• Moist open shady places in thickets; 800–2800 m. Gansu (Wenxian), Sichuan, Xizang (Médog, Zayü), Yunnan.

24. *Strobilanthes fengiana* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 481. 2010.

冯氏马蓝 feng shi ma lan

Subshrubs to 50 cm tall, perennial, weakly anisophyllous. Stems 4-angled, sulcate, glabrescent. Petiole 1–2 cm, sulcate, bifariously pubescent; leaf blade ovate, smaller of pair 6–8 × 3–4 cm and larger one 10–14 × 4–6 cm, abaxially glabrous except pilose along midvein, adaxially glabrous and with prominent cystoliths, secondary veins 4–7 on each side of midvein, base rounded to broadly cuneate, margin undulate and ciliate, apex acuminate. Inflorescences terminal, subcapitate spikes, 1.5–3 cm; rachis pubescent; bracts lanceolate, 10–15 × ca. 2 mm, abaxially glabrescent, adaxially sparsely pubescent; bracteoles lanceolate, 8–10 × ca. 2 mm, abaxially glabrous, adaxially densely covered with multicellular large-celled trichomes. Calyx ca. 1.2 cm, 5-lobed almost to base; lobes linear-spatulate, outside apically covered with multicellular large-celled trichomes, margin ciliate with multicellular large-celled trichomes, apex acute. Corolla purple, 3–3.5 cm, outside pilose with large-celled trichomes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.5 cm then bent to ca. 90° above middle and gradually widened to ca. 1.3 cm at mouth; lobes rounded. Stamens 4, included; filaments pilose, shorter pair ca. 6 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 2 mm. Capsule oblong, 12–14 × 3–4 mm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, pubescent; areola small. Fl. Sep–Dec, fr. Nov–Feb.

• Forests; 1200–1800 m. Yunnan (Xichou).

25. *Strobilanthes lamium* C. B. Clarke ex W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 195. 1918.

野芝麻马蓝 ye zhi ma ma lan

Pteracanthus lamium (C. B. Clarke ex W. W. Smith) C. Y. Wu & C. C. Hu.

Herbs 30–80 cm tall, unbranched, anisophyllous. Stems 4-angled, sulcate, basally glabrescent, apically whitish gland-tipped pubescent. Leaves apically denser; petiole 3–10 mm, hirsute; leaf blade ovate to ovate-lanceolate, 4–5 × 2.5–3 cm, both surfaces with very small conspicuous cystoliths, abaxially paler, sparsely pilose, and setose along veins, adaxially dark green, sparsely hirsute, and yellowish brown setose along midvein, secondary veins 7 or 8 on each side of midvein, base broadly cuneate and decurrent onto petiole, margin coarsely serrate, apex acute. Inflorescences terminal, subcapitate spikes, 3–5 cm, 4–8-flowered; bracts oblong to lanceolate, resembling reduced leaves, 1.4–1.6 × 0.6–0.7 cm, persistent, abaxially hirsute especially on veins; bracteoles narrowly oblong-elliptic, ca. 1.2 cm, abaxially gland-tipped pilose. Flowers imbricate on rachis. Calyx ca. 1.1 cm, gland-tipped pilose, 5-lobed almost to base; lobes linear-lanceolate, subequal, pilose, apex acute. Corolla purple, ca. 3.5 cm, bent at mouth, outside sparsely pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 6 mm then gradually widened to ca. 1 cm at mouth; lobes orbicular, ca. 6 mm in diam. Stamens 4, included; filaments densely pilose, shorter pair ca. 5 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 2.3 × 1.3 mm, erect. Ovary pilose at tip; style pilose. Capsule not seen. Fl. Jul–Aug.

- Forests, slopes; 800–1500 m. Chongqing, Hubei, Hunan.

26. *Strobilanthes cyphantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 162. 1912.

弯花马蓝 wan hua ma lan

Pteracanthus cyphanthus (Diels) C. Y. Wu & C. C. Hu.

Subshrubs 45–60 cm tall. Stems 4-angled. Petiole 2–5 cm; leaf blade ovate, 3–7 × 1.5–4.5 cm, both surfaces pilose, adaxially with numerous obscure cystoliths, secondary veins 6–8 on each side of midvein, base decurrent onto petiole, margin serrate, apex acute. Inflorescences terminal or in apical leaf axils, subcapitate, dense, sessile or with peduncle to 5 mm, white pilose; outer sterile bracts leaflike; inner floral bracts elliptic, ca. 12 × 5 mm, white pilose, margin dentate and ciliate; bracteoles linear, ca. 16 × 1 mm, thinly pilose. Calyx 1–1.3 cm, 5-lobed almost to base; lobes linear, ca. 11 × 1 mm, subequal, thinly pilose. Corolla blue, 3–4 cm, strongly bent and ventricose, outside thinly pilose, inside pubescent on lobes and glabrous in tube except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1 cm then bent to ca. 90° at middle and widened to ca. 1.2 cm at mouth; lobes oblong, ca. 5 × 4 mm. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 3 mm, glabrous except for a few trichomes basally; anther thecae oblong, ca. 2 × 1–1.5 mm; pollen type 3. Ovary comose; style 2.7–3.2 cm, pubescent. Capsule ca. 1.4 cm, pilose at tip, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, densely covered with appressed trichomes. Fl. Jul–Oct, fr. Nov–Dec.

- Mixed forests; 1200–3200 m. Gansu (Wenxian), Sichuan, SE Xizang, Yunnan.

“*Strobilanthes curviflorus* [sic!] C. B. Clarke” (C. Y. Wu, Index Fl. Yunnan. 2: 1685. 1984) belongs here but was not validly published because it was merely cited as a synonym (*Vienna Code*, Art. 34.1(c)).

27. *Strobilanthes strigosa* D. Fang & H. S. Lo, Guihaia 17: 36. 1997.

糙毛马蓝 cao mao ma lan

Subshrubs 30–60 cm tall, isophyllous. Stems black when dry, 4-angled, sulcate, bifariously pubescent and hirsute. Petiole 5–12 mm, pubescent and hirsute; leaf blade elliptic to broadly ovate, 3.5–8 × 2–5 cm, both surfaces sparsely hispid pilose and with conspicuous cystoliths, secondary veins ca. 7 on each side of midvein and prominent, base cuneate to attenuate, margin serrate, apex acute. Inflorescences terminal or in apical leaf axils, spikes, 2–3 cm; bracts elliptic, 9–10 × 5–6 mm, persistent, pinnately veined, margin gland-tipped ciliate, apex acute; bracteoles oblanceolate, ca. 9 mm, densely covered with linear cystoliths, margin gland-tipped ciliate. Flowers imbricate on rachis. Calyx ca. 1.2 cm, 5-lobed to base; lobes falcately spatulate, ca. 2 mm wide, unequal, margin gland-tipped ciliate. Corolla purplish, ca. 4.5 cm, slightly bent, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical for ca. 1.5 cm then gradually widened to ca. 1 cm at mouth; lobes ovate, ca. 7 mm, apex rounded. Stamens 4, included; shorter filament pair ca. 2.5 mm, glabrous; longer filament pair ca. 5 mm, pilose; anther thecae oblong, ca. 2 × 1.3 mm; pollen type 4. Ovary comose; style ca. 2.8 cm, sparsely pilose. Capsule not seen. Fl. Dec.

- Limestone slopes; 400–600 m. Guangxi (Jingxi).

Strobilanthes strigosa is a poorly understood species whose placement is uncertain.

28. *Strobilanthes longiflora* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 94. 1922.

长花马蓝 chang hua ma lan

Championella longiflora (Benoist) C. Y. Wu & C. C. Hu.

Herbs to 50 cm tall, isophyllous. Stems sulcate, glabrous. Petiole 2–4 mm, pubescent; leaf blade broadly lanceolate to ovate, to ca. 10 × 5 cm, glabrous, cystoliths very prominent on both surfaces, secondary veins 3–5 on each side of midvein, base cuneate, margin minutely crenulate, apex acuminate. Inflorescences terminal or from apical axils, spikes, 0–4 cm, 8–12-flowered but sometimes reduced to a single flower in leaf axils; bracts oblanceolate-spatulate, 10–13 × 1.5–3 mm, sparsely pilose, apex entire to weakly 3-lobed; bracteoles oblong, ca. 6 × 1 mm, pilose with a comose apex, apex obtuse. Calyx ca. 1 cm, 5-lobed almost to base; lobes linear, ca. 9 × 1.5 mm, comose. Corolla blue, funnel-shaped, ca. 5 cm, strongly bent, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then gradually widened to ca. 9 mm at mouth; lobes ovate, ca. 4 × 3 mm, apex obtuse. Stamens 4, included; filaments pilose, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2.5 × 1.2 mm; pollen type 15. Ovary glabrous but pubescent at tip; style sparsely white pilose; stigma linear. Capsule oblong-fusiform, ca. 8 × 2 mm, glabrous apart from a few apical trichomes, 4-seeded. Fl. Aug–Oct, fr. Nov–Dec.

- Thickets; 700–1500 m. Yunnan.

29. *Strobilanthes henryi* Hemsley, J. Linn. Soc., Bot. 26: 240. 1890.

南一笼鸡 nan yi long ji

Gutzlaffia anisandra (Benoist) Handel-Mazzetti; *G. anisandra* var. *drosothyrsa* Handel-Mazzetti; *G. forrestii* S. Moore; *G. henryi* (Hemsley) C. B. Clarke ex S. Moore; *G. lyi* (H. Léveillé) E. Hossain; *G. multiramosa* Handel-Mazzetti; *Paragutzlaffia henryi* (Hemsley) H. P. Tsui; *P. lyi* (H. Léveillé) H. P. Tsui; *Ruellia lyi* H. Léveillé; *Strobilanthes anisandra* Benoist.

Subshrubs to 70 cm tall, variable from hirsute to subglabrous, weakly anisophyllous. Stems slender, erect or ascending, 4-angled, much branched, villous to subglabrous. Petiole 0.5–3 cm; leaf blade ovate, ovate-elliptic, or subrhomboidal, 2–9 × 1.5–4.5 cm, both surfaces thinly to densely pilose, abaxially paler, adaxially with linear cystoliths, secondary veins 5 or 6 on each side of midvein, base broadly cuneate, slightly oblique, and usually decurrent onto petiole, margin crenulate, apex acute. Inflorescences terminal, spikes, usually 3–8 cm; bracts at base of spike resembling sessile reduced leaves; floral bracts oblong to spatulate, 6–7 × 1–2 mm, persistent, abaxially gland-tipped pubescent to subglabrous; bracteoles linear, ca. 7 × 0.8 mm, abaxially gland-tipped pubescent to subglabrous. Flowers paired, varying considerably in density, basally distant on rachis but apically becoming imbricate. Calyx 8–11 mm, subequally 5-lobed almost to base; lobes linear, 6–7 mm, outside gland-tipped pubescent to subglabrous. Corolla light purple, blue, or white, funnel-shaped, 1.7–2.3 cm, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for 3.5–6 mm then bent and gradually widened to ca. 1 cm at mouth; lobes orbicular, ca. 2 mm in diam., spreading. Fertile stamens 2, staminodes 2; filaments ca. 3.5 mm, pubescent; anther thecae ovoid-oblong, exerted; pollen type 15. Ovary oblong, glabrous but with a few apical glands; style ca. 2 cm, glabrous. Capsule oblong, 7–10 mm, glabrous apart from a few apical glands, 4-seeded. Seeds suborbicular in outline, ca. 2 × 2 mm, densely villous; areola small. Fl. Jan, Apr, Jul–Oct.

• Mountain slopes; 1000–2800 m. Guizhou, Hubei, Hunan, Sichuan, SE Xizang, Yunnan.

30. *Strobilanthes cyclus* C. B. Clarke ex W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 192. 1918.

环毛马蓝 huan mao ma lan

Subshrubs 40–60 cm tall, isophyllous, whole plant with hispid trichomes. Stems erect or suberect, with whitish multicellular trichomes. Petiole 2–5 mm, densely pilose; leaf blade broadly ovate to suborbicular, 2.5–5.5 × 2–4.5 cm, abaxially pale green and hirsute along veins, adaxially dark green, densely hirsute, and with prominent linear cystoliths, secondary veins 4 or 5 on each side of midvein, base broadly cuneate to subrounded, margin crenate to sometimes subentire, apex rounded to acute. Inflorescences axillary or terminal, capitate spikes, 1–3 cm, shortly pedunculate; bracts narrowly oblong-elliptic, 10–12 × 5–6 mm, densely pilose; bracteoles oblong, ca. 7 × 2 mm, densely pilose on apical half, apex obtuse. Calyx ca. 7 mm, outside pilose, weakly 2-lipped; lobes linear-oblong;

lower 2 lobes distinct to base; upper 3 lobes fused in their basal half, with central lobe slightly longer. Corolla blue, 2–2.5 cm, substraight, outside glabrous except for pubescence on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.2 cm then gradually widened to ca. 1 cm at mouth; lobes suborbicular, ca. 5 mm in diam. Stamens 4; filaments glabrous, shorter pair ca. 3 mm and included, longer pair ca. 5 mm and exerted; anther thecae oblong, ca. 2.2 × 1.3 mm; pollen type 17. Ovary comose; style ca. 2 cm. Capsule ellipsoid, ca. 7 × 3.5 mm, pilose at tip, 2-seeded with basal retinacula sterile. Seeds ovate to suborbicular in outline, ca. 1 mm, flattened, pubescent; areola small but prominent. Fl. Aug.

• Forests; 1800–2300 m. Yunnan.

31. *Strobilanthes serrata* J. B. Inlay, Bull. Misc. Inform. Kew 1939: 117. 1939.

齿叶马蓝 chi ye ma lan

Gutzlaffia glandulosa Lace.

Subshrubs 50–100 m tall, perennial, erect, slightly anisophyllous. Stems sulcate, glabrous or with a few crisped trichomes. Petiole 0.5–7 cm, diminishing in length apically on stems, glabrous or sparsely pubescent; leaf blade ovate to oblong-ovate, 5–12 × 4–6 cm, abaxially uniformly violet to light green and glabrous except for pubescence along veins, adaxially green variegated with white patches and glabrous, secondary veins 7–9 on each side of midvein, base gradually narrowed and then ± decurrent to 2 cm onto petiole, margin coarsely serrate, apex acuminate. Inflorescences from apical leaf axils, simple or branched pedunculate spikes, commonly forming a terminal panicle of spikes; spikes 2–7 cm, densely gland-tipped pilose; peduncle of panicles 2–10 cm, subglabrous to thinly pubescent; rachis and branches densely gland-tipped pilose; bracts oblong-ovate to oblong-obovate, 3–4 × 1.5–2.5 mm, persistent, densely gland-tipped pilose, apex obtuse; bracteoles oblong to obovate, 3–4 × 1–1.5 mm, abaxially densely gland-tipped pilose, adaxially glabrous but densely covered with white cystoliths, apex obtuse. Flowers in opposite pairs, basally 1–2 cm apart on rachis, clearly separate all along spike except at very apex. Calyx 5–6 mm, subequally 5-lobed to base; lobes oblong, outside densely gland-tipped villous, inside glabrous and densely covered with white cystoliths. Corolla pale blue with a white tube, 2–2.6 cm, straight or slightly bent, outside sparsely to densely pilose with large-celled trichomes; tube basally cylindrical and narrow for 6–8 mm then widened to ca. 1 cm at mouth; lobes ovate, ca. 3 × 3 mm, apex obtuse. Fertile stamens 2; filaments ca. 4 mm, glabrous; anther thecae ca. 1.5 mm, included; pollen type 18. Ovary villous; style ca. 2 cm, glabrous. Capsule oblong, 5–7 × ca. 2 mm, silky pubescent, 4-seeded. Seeds ca. 2 × 2 mm, pubescent. Fl. Sep–Jan.

Partly shaded moist places in evergreen broad-leaved forests; 700–1600 m. Yunnan [Myanmar, Thailand].

32. *Strobilanthes tubiflos* (C. B. Clarke) J. R. I. Wood, Edinburgh J. Bot. 51: 264. 1994.

管花马蓝 guan hua ma lan

Strobilanthes petiolaris Nees var. *tubiflos* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 458. 1884.

Subshrubs of unknown habit. Stems 4-angled to subterete, sulcate, glabrous except for a few trichomes in grooves. Petiole 5–10 mm; leaf blade ovate-elliptic, 6.5–16 × 3.5–8 cm, abaxially paler, sometimes purplish, and glabrous except for appressed trichomes on midvein, adaxially glabrous and with prominent cystoliths, secondary veins 4–7 on each side of midvein, base cuneate and decurrent as a wing onto petiole, margin dentate, apex acuminate. Inflorescences terminal, branched spikes, 2–4 cm; rachis gland-tipped pilose; sterile bracts leaf-like, ovate, 9–10 × ca. 6 mm, with prominent cystoliths; floral bracts obovate, 5–6 × 2.5–3.5 mm, persistent, densely yellowish gland-tipped pubescent, cystoliths abaxially prominent, apex usually emarginate; bracteoles oblanceolate, ca. 5 × 1 mm, abaxially gland-tipped pubescent especially apically, apex obtuse. Calyx 7–8 mm, subequally 5-lobed almost to base; lobes oblong, ca. 1 mm wide, outside ciliate and apically gland-tipped pilose, inside glabrous. Corolla blue, 2–3 cm, curved, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 1 mm wide for ca. 3 mm then gradually widened to ca. 1 cm at mouth; lobes broadly ovate, ca. 2 × 3 mm, apex rounded. Fertile stamens 2, included; filaments glabrous, ca. 4 mm; anther thecae oblong, erect, ca. 2 × 0.8 mm; pollen type 3. Ovary oblong-ovate, ca. 1 mm, apically pilose; style ca. 2 cm, glabrous. Capsule oblong, ca. 6 × 2 mm, pubescent, 4-seeded. Seeds suborbicular in outline, ca. 1 × 1 mm, pubescent; areole prominent. Fl. Aug.

- Valleys, streamsides; 200–300 m. Xizang (Médog).

33. *Strobilanthes affinis* (Griffith) Terao ex J. R. I. Wood & J. R. Bennett, Kew Bull. 58: 134. 2003.

肖笼鸡 xiao long ji

Adenosma affinis Griffith, Not. Pl. Asiat. 4: 133. 1854; *Strobilanthes acrocephala* T. Anderson; *S. darrisii* H. Léveillé; *S. thirionnii* H. Léveillé; *Tarphochlamys affinis* (Griffith) Bremekamp; *T. darrisii* (H. Léveillé) E. Hossain.

Herbs to 60 cm tall, isophyllous. Stems 4-angled, sulcate, white pubescent with large-celled trichomes. Petiole 0.5–1.5 cm, pubescent; leaf blade ovate to ovate-elliptic, 3–8 × 2–4.5 cm, both surfaces sparsely strigose, abaxially yellowish green, adaxially dark green and densely covered with subulate cystoliths, secondary veins 5–7 on each side of midvein, base subrounded to cuneate and decurrent onto petiole, margin crenulate, apex acute. Inflorescences axillary or terminal, dense spikes, 2–6 cm; peduncle 0.5–2 cm, densely gland-tipped pubescent; sterile bracts sometimes present, sessile, suborbicular to ovate, 5–10 × 5–10 mm, strigose; floral bracts imbricate, broadly obovate, rhomboidal, or elliptic, 6–7 × 3–4 mm, gland-tipped pilose with large-celled trichomes, 5-veined, margin ciliate, apex sometimes reflexed; bracteoles oblong-linear, ca. 5 × 1.2 mm, slightly shorter than calyx, gland-tipped pubescent, margin ciliate. Calyx 5–7 mm, 5-lobed almost to base; lobes linear, one slightly longer than others, gland-tipped pubescent, 1-veined, margin ciliate, apex obtuse. Corolla purplish blue to violet, ca. 1.5 cm, curved, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 1

mm wide for ca. 7 mm then gradually widened to ca. 7 mm at mouth; limb somewhat 2-lipped, lower lip 3-lobed, upper lip 2-lobed; lobes orbicular, ca. 3 × 3 mm, unequal. Stamens 4; shorter filament pair ca. 4 mm, glabrous; longer filament pair ca. 6 cm, hirsute; anther thecae oblong, ca. 2 × 1.2 mm, strongly exerted; pollen type 14. Ovary pilose; style pilose, ca. 1.2 cm. Capsule oblong, 7–9 mm, pubescent, 4-seeded. Seeds brown, ovate to suborbicular in outline, ca. 1.5 × 1.5 mm, pubescent, glabrescent; areola small, glabrous. Fl. Sep–Nov.

Mountain slopes, thickets; 600–1300 m. Guangxi, Guizhou, Hunan, Yunnan [India, Myanmar, Vietnam].

Strobilanthes affinis is a very distinct species. Not only is the pollen unique but also the species is distinctive for having 4 exerted stamens and trichomes caducous on the seeds.

34. *Strobilanthes pinnatifida* C. Z. Zheng, J. Hangzhou Univ., Nat. Sci. Ed. 8: 431. 1981.

羽裂马蓝 yu lie ma lan

Pteracanthus pinnatifidus (C. Z. Zheng) C. Y. Wu & C. C. Hu.

Herbs to 40 cm tall, unbranched, isophyllous. Stems erect, brown hirsute. Petiole 1.5–2 cm, hirsute; leaf blade elliptic to ovate-elliptic, 3–13 × 1–5 cm, whitish appressed hirsute, secondary veins 6 or 7 on each side of midvein, base cuneate to attenuate and often decurrent onto petiole, margin coarsely dentate to deeply pinnatifid or lobed, apex acuminate to caudate. Inflorescences terminal, spikes, 5–9 cm; bracts spatulate-obovate, to 1.2 cm, pubescent; bracteoles linear, 1–1.5 cm, pubescent. Flowers distant on rachis. Calyx 1–1.5 cm, pubescent with gland-tipped trichomes, 5-lobed almost to base; lobes linear, equal. Corolla purplish blue, ca. 3.5 cm, ventricose, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1.2 mm then gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 4 × 3.5 mm, apex emarginate to obtuse. Stamens 4, included; filaments pilose, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2 mm. Ovary oblong, glabrous; style ca. 3 mm, sparsely hirsute. Capsule oblong, sparsely pubescent, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, pubescent; areola small. Fl. Aug–Sep, fr. Nov.

- Forests in moist areas; 600–700 m. Zhejiang (Jingning, Qingyuan).

Strobilanthes pinnatifida is unique because of its pinnatifid or lobed leaves.

35. *Strobilanthes auriculata* Nees in Wallich, Pl. Asiat. Rar. 3: 86. 1832.

耳叶马蓝 er ye ma lan

Perilepta auriculata (Nees) Bremekamp; *P. edgeworthiana* (Nees) Bremekamp; *P. siamensis* (C. B. Clarke) Bremekamp; *Strobilanthes auriculata* var. *edgeworthiana* (Nees) C. B. Clarke; *S. auriculata* var. *siamensis* C. B. Clarke; *S. edgeworthiana* Nees; *S. siamensis* C. B. Clarke.

Subshrubs 0.5–2 m tall, much branched, weakly to strongly anisophyllous. Stems 4-angled, sometimes zigzag, gla-

brous or sparsely hirsute. Leaves sessile; leaf blade narrowly to broadly oblong-elliptic or oblong-oblongeolate, rarely ovate for small leaves, 2–20 × 1.5–6 cm, both surfaces sparsely pilose, abaxially pale green or reddish when young, adaxially green, secondary veins 12–15 on each side of midvein, base attenuate, cuneate, rounded, or auriculate, margin serrate to undulate, apex acuminate. Inflorescences axillary or terminal, spikes, 3–10 cm, sometimes branched; peduncle 2–4 cm, 4-angled, sulcate, bracteate; sterile bracts ovate, 0.8–2 × ca. 1.5 cm; floral bracts imbricate, broadly ovate to obovate-spatulate, 4–9 mm, often becoming recurved, persistent, densely villous and ciliate, apex usually apiculate but sometimes rounded or emarginate; bracteoles absent. Calyx 6–12 mm, gland-tipped pilose, 5-lobed almost to base; lobes linear, unequal with 2 slightly shorter than others, margin usually ciliate, apex subacute. Corolla pale purple to violet, funnel-shaped, 2.5–3 cm, curved, outside gland-tipped pilose on lobes, inside glabrous; tube basally cylindrical and narrow for ca. 4 mm then weakly to strongly bent, abruptly inflated, and widened to ca. 2.5 cm at mouth; limb weakly 2-lipped, lower lip 3-lobed, upper lip 2-lobed; lobes ca. 3 mm. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 4 mm; anther thecae oblong, ca. 1.5 × 1 mm; pollen type 3. Ovary glabrous; style ca. 3.2 cm. Capsule narrowly oblong-obovoid, 8–10 × ca. 2 mm, glabrous, 4-seeded, apex apiculate. Seeds ovate-suborbicular in outline, ca. 2 × 1.8 mm, pubescent; areola very small. Fl. Sep–Jan, fr. Jan–Feb.

Valleys; 300–1500 m. Guangxi, Yunnan [Bangladesh, India, Malaysia (Langkawi Island), Myanmar, Nepal, Pakistan, Thailand].

Strobilanthes auriculata var. *dyeriana* (Masters) J. R. I. Wood with leaf blade abaxially reddish rather than green is from Myanmar and Vietnam and is grown as a cultivated plant in Guangdong and Yunnan.

Strobilanthes auriculata is one of the few species of *Strobilanthes* that can be recognized in a sterile state with confidence on account of its sessile, sometimes auriculate, oblong to oblongeolate leaves. It is known to be pleistacial in part of its range.

36. *Strobilanthes mogokensis* Lace, Bull. Misc. Inform. Kew 1915: 406. 1915.

卵叶马蓝 luan ye ma lan

Subshrubs to 60 cm tall. Stems 4-angled, sulcate, white gland-tipped pubescent, glabrescent. Petiole 0.6–1.5 cm, sulcate, pubescent; leaf blade variable in size and shape, basal ones broadly ovate and 4–9 × 2–5 cm, apicalmost ones cordate and 3–6 × 2–4.5 cm, both surfaces pubescent, secondary veins 4–6 on each side of midvein, base truncate to narrowly cuneate and slightly decurrent onto petiole, margin crenulate-serrate, apex acuminate to obtuse. Inflorescences terminal, spikes, 3–5 cm; rachis gland-tipped pubescent; bracts lanceolate-oblong, 11–12 × ca. 4 mm, abaxially yellowish gland-tipped pubescent, adaxially gland-tipped pubescent; bracteoles narrowly oblong-elliptic, 7–8 × ca. 1 mm, abaxially glabrous, adaxially gland-tipped pubescent. Calyx ca. 1 cm, outside pubescent, inside gland-tipped pubescent, 2-lipped, lower lip 2-lobed almost to base, upper lip 3-lobed to middle; lobes linear, ca. 1 mm wide. Corolla color not recorded, 2.5–3 cm, ventricose, curved, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then

gradually widened to ca. 1 cm at mouth; lobes ovate, ca. 4 × 4 mm. Stamens 4, included; filaments glabrous, shorter pair ca. 3 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 2 × 1.2 mm, erect; pollen type 9. Ovary white pilose at tip; style ca. 2.5 cm, apically hirsute. Capsule ca. 1 cm, pilose at tip, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, compressed, densely pilose. Fl. Oct–Dec, fr. Jan–Feb.

Streamsides; 600–800 m. Yunnan (Ruili) [Myanmar].

37. *Strobilanthes argentea* J. B. Imlay, Bull. Misc. Inform. Kew 1939: 121. 1939.

银毛马蓝 yin mao ma lan

Subshrubs to 50 cm tall, anisophyllous. Stems somewhat sulcate, bifariously pilose with large-celled trichomes, eventually glabrescent, basally woody. Petiole 0.2–4.3 cm, pilose; leaf blade ovate, 4–12 × 2–6 cm, smaller of pair ca. 1/2 size of larger one, both surfaces thinly or rather densely pilose with large white trichomes especially along veins, abaxially paler and with prominent cystoliths, base attenuate and ± decurrent onto petiole, margin crenulate to dentate, apex acute to shortly acuminate and commonly falcate. Inflorescences terminal, spikes, simple or branched, 1–4 cm, 2–10-flowered; peduncle 1–2.5 cm, pilose; rachis pilose; bracts oblong-lanceolate but basal ones spatulate, 7–10 × 1.5–3.5 mm, densely pilose with gland-tipped and non-glandular trichomes, apex acute; bracteoles oblong-lanceolate, 6–7 × 1.5–2 mm, densely pilose with gland-tipped trichomes, apex acute. Flowers paired, basally distant on rachis but apically becoming confluent. Calyx subequally 5-lobed almost to base; lobes lanceolate, abaxially pilose with gland-tipped and non-glandular trichomes, apex acute; central upper lobe longer than laterals. Corolla blue, 2.3–3.5 cm, ventricose and strongly bent, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then gradually widened to 7–8 mm at mouth; lobes broadly ovate, ca. 4 × 4 mm, apex rounded. Stamens 4, included; filaments glabrous, shorter pair 2–3 mm, longer pair 5–7 mm; anther thecae oblong, ca. 2 × 1 mm. Ovary pilose at tip; style ca. 2.5 cm, pilose. Capsule not seen. Fl. Oct–Nov.

Partly shaded and moist places along streams; 1100–1700 m. Yunnan [Thailand].

38. *Strobilanthes aprica* (Hance) T. Anderson in Bentham, Fl. Hongk. 262. 1861.

山一笼鸡 shan yi long ji

Gutzlaffia aprica Hance, Hooker's J. Bot. Kew Gard. Misc. 1: 143. 1849; *G. aprica* var. *glabra* (J. B. Imlay) H. S. Lo; *G. dielsiana* (W. W. Smith) S. Moore; *Phlebophyllum apricum* (Hance) Bentham; *Strobilanthes aprica* var. *glabra* J. B. Imlay; *S. cavaleriei* H. Léveillé var. *angustifolia* H. Léveillé; *S. dielsiana* W. W. Smith; *S. mairei* H. Léveillé.

Shrubs or perennial herbs, to 70 cm tall, isophyllous. Stems 4-angled, sulcate, retrorsely white hirsute. Petiole 5–10 mm, shortly white pubescent; leaf blade elliptic to oblong-elliptic, 2–7 × 1–3 cm, leathery, indumentum very variable, both surfaces usually scabrous-hispid but abaxially sometimes whitish

silky tomentose and occasionally glabrous except for pubescent midvein, secondary veins 5–7 on each side of midvein, base broadly cuneate, margin entire and scabrid to thinly ciliate, apex acute. Inflorescences axillary or terminal, short dense subcapitate spikes, becoming clustered in apicalmost leaf axils; spikes usually sessile but occasionally basal ones with a 0.5–3(–7) cm peduncle; bracts ovate-lanceolate, 13–15 × 3–5 mm, subleathery, abaxially and on margin with white multicellular trichomes, adaxially glabrous, apex long acuminate; bracteoles linear, 10–11 × ca. 1 mm, both surfaces covered with white cystoliths, abaxially and on margin sparsely pilose with multicellular trichomes, adaxially glabrous. Calyx 1–1.3 cm, 5-lobed for ca. 1/2 its length; lobes linear, lower 2 becoming distinct, upper 3 remaining connate, outside pubescent to subglabrous, inside glabrous, margin pilose. Corolla lilac with a white tube, funnel-shaped, 2.5–3.5 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 1 mm wide for 1.3–1.5 cm then abruptly inflated to ca. 1 cm in diam.; lobes suborbicular, ca. 5 × 5 mm, subequal, apex obtuse. Stamens 2, exerted; filaments ca. 1 cm, glabrous; anther thecae ellipsoid, ca. 2.5 mm; pollen type 11. Ovary white, narrowly oblong, pilose at tip; style ca. 3.5 cm, curved, pilose. Capsule oblong, 1–1.3 cm, glabrous except for a few trichomes at tip, 4-seeded. Seeds ovate in outline, ca. 2 mm, convex on both surfaces, pubescent; areola large, glabrous. Fl. Aug–Jan, fr. Sep–Feb.

Dry forests, montane thickets; below 2200 m. Guangdong, Guangxi, Guizhou, Jiangxi, Sichuan, Yunnan [Cambodia, Laos, Myanmar, Thailand, Vietnam].

39. *Strobilanthes dalzielii* (W. W. Smith) Benoist in Lecomte, Fl. Indo-Chine 4: 679. 1935.

曲枝马蓝 qu zhi ma lan

Acanthopale dalzielii W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 193. 1919; *Championella dalzielii* (W. W. Smith) Bremekamp; *C. dalzielii* var. *glabra* Benoist; *Pteroptychia dalzielii* (W. W. Smith) H. S. Lo; *Strobilanthes dalzielii* var. *inaequalis* Benoist.

Subshrubs or perennial herbs, 40–100 cm tall, branched, strongly anisophyllous. Stems slender, erect, zigzag, slightly pubescent to subglabrous. Petiole 0–3 mm; leaf blade ovate to ovate-lanceolate, smaller of pair 2–5 × 1–2 cm and larger one 9–14 × 3–5 cm, abaxially glaucous and glabrous or sparsely pubescent along veins, adaxially green, glabrous, and with prominent cystoliths, secondary veins 3–5 on each side of midvein, base rounded but cordate for apical leaves, margin serrate, apex acuminate to acute and sometimes falcate. Inflorescences axillary or terminal, spikes, 2–5 cm, 2–5-flowered; rachis usually zigzag, sparsely white puberulent; bracts linear-lanceolate, ca. 3 × 1 mm, glabrous, 1-veined; bracteoles linear, ca. 5 × 1 mm, glabrous or puberulent with gland-tipped trichomes. Flowers distant on rachis, solitary, not paired. Calyx ca. 1 cm, densely white pilose at base and along midvein, 5-lobed almost to base; lobes linear, apex finely acuminate. Corolla purplish blue or white, 3.5–4.5 cm, curved, outside densely white pilose in bud, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then ventricose

and gradually widened to 1–1.5 cm at mouth; lobes suborbicular, ca. 8 mm in diam. Stamens 4, slightly exerted; filaments hirsute, shorter pair ca. 5 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 2 mm; pollen type 13. Ovary glabrous; style ca. 3.2 cm, pilose. Capsule linear-oblong, 1.8–2.2 cm, compressed, glabrous, 4-seeded, apex apiculate. Seeds ovate in outline, ca. 2 × 2 mm, densely appressed tomentose; areola very small. Fl. Oct–Jan.

By streams; 400–1200 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Taiwan, Yunnan [Laos, Thailand, Vietnam].

The strongly anisophyllous sessile leaves combined with the densely pubescent buds make *Strobilanthes dalzielii* very distinct.

Specimens misidentified as *Difflugossa divaricata* (Nees) Bremekamp (H. P. Tsui & C. C. Hu, FRPS 70: 172. 2002; C. C. Hu & X. P. Fu, Higher Pl. China 10: 377. 2004) belong here.

40. *Strobilanthes bantonensis* Lindau, Bull. Herb. Boissier 5: 650. 1897.

桂越马蓝 gui yue ma lan

Shrubs of unknown size, strongly anisophyllous. Stems zigzag, glabrous. Petiole 2–5 mm; leaf blade ovate-elliptic, smaller of each pair deciduous, larger one 7–15 × 4–7 cm, glabrous, secondary veins 4 or 5 on each side of midvein, base cuneate, margin sinuate-dentate, apex acute. Inflorescences axillary or terminal, spikes 3–13 cm, fertile apically only; bracts oblanceolate to obovate, ca. 2 × 1 mm, sparsely gland-tipped pilose, ± persistent, apex obtuse to rounded; bracteoles linear-ob lanceolate, ca. 5 mm, sparsely gland-tipped pilose. Flowers 2 or 3 per spike, 1–1.4 cm apart, one fertile at each node alternately. Calyx 7–10 mm; lobes linear, 7–9 × ca. 1 mm, subequal, glabrous or becoming sparsely gland-tipped pilose, apex obtuse. Corolla purplish blue or white, ca. 3.2 cm, outside densely pubescent in bud, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then ventricose and gradually widened to ca. 1.3 cm at mouth; lobes oblong, ca. 4 × 6 mm. Stamens 4, included; filaments of shorter stamen pair ca. 2 mm and glabrous, longer pair ca. 5 mm and sparsely hirsute; anther thecae oblong ca. 2 mm; pollen type 1. Ovary glabrous; style ca. 3 cm, sparsely hirsute. Capsule fusiform, 1.2–1.3 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 mm, appressed pubescent. Fr. Dec.

Forests in limestone hills; 600–1500 m. Guangxi [Vietnam].

Strobilanthes bantonensis is a little-known species with very distinct pollen.

41. *Strobilanthes pateriformis* Lindau, Bull. Herb. Boissier 5: 653. 1897.

翅枝马蓝 chi zhi ma lan

Pteracanthus alatiramosus (H. S. Lo & D. Fang) C. Y. Wu & C. C. Hu; *Pteroptychia pateriformis* (Lindau) Bremekamp; *Strobilanthes alatiramosa* H. S. Lo & D. Fang.

Herbs to 50 cm tall, anisophyllous, drying blackish green. Stems somewhat zigzag, internodes winged, wing 1.5–4 mm wide. Petiole 1–3 cm, glabrous; leaf blade oblong-ovate to lanceolate, smaller of pair 2–8 × 1–3 cm and larger one 6–13(–17)

× 2.5–5.5 cm, glabrous, secondary veins 4–6 on each side of midvein, base cuneate and decurrent onto petiole, margin dentate to crenate, apex acute. Inflorescences axillary or terminal, spikes, 3–10 cm; bracts ovate to lanceolate, 2.5–5 mm, caducous, glabrous, apex acute to obtuse; bracteoles spatulate-linear to linear, 4–7 mm, caducous, glabrous. Flowers 5–10 mm apart on rachis, often one sterile per node. Calyx 6–12 mm, glabrous, subequally 5-lobed or with 2 lobes slightly longer; lobes lanceolate, ca. 10 × 1 mm but accrescent in fruit, apex acute. Corolla pale purple, 3–4 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 5 mm then gradually widened to ca. 1 cm at mouth; lobes ovate, 3–4 mm, subequal, apex emarginate. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 5 mm, hirsute; anther thecae oblong, ca. 2.5 × 1 mm; pollen type 12. Ovary apex minutely pubescent; style ca. 2.5 cm. Capsule fusiform, ca. 1.4 cm, glabrous except apically, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, densely appressed pubescent. Fl. Sep–Nov, fr. Dec–Feb.

Dense forests; 400–1700 m. Guangxi, Guizhou, Hainan, Sichuan, Yunnan [Indonesia, Laos, Thailand, Vietnam].

42. *Strobilanthes truncata* D. Fang & H. S. Lo, *Guihaia* 17: 31. 1997.

截头马蓝 jie tou ma lan

Herbs to 3 m tall, perennial, anisophyllous. Stems 4-angled, somewhat zigzag, sulcate, glabrous. Petiole 0.6–7 cm; leaf blade broadly ovate, ovate, ovate-elliptic, or rarely elliptic, smaller of pair 3.5–7 × 2–4 cm and larger one 10–19 × 4.5–11.5 cm, glabrous, densely covered with linear cystoliths especially along abaxial veins, secondary veins 4–7 on each side of midvein, reticulate veins conspicuous, base broadly cuneate and oblique, margin remotely dentate to rarely serrate, apex acute. Inflorescences axillary or terminal, spikes, 7–15(–26) cm, sometimes branched; peduncle 0.5–5.5 cm, glabrous; rachis 4-angled, strongly zigzag, sulcate, bifariously pubescent; bracts elliptic, 5–7 × ca. 4 mm, caducous, glabrous, margin ciliate, apex truncate to retuse; bracteoles yellowish but apically black, linear-lanceolate, ca. 8 × 1.5 mm, persistent, abaxially sparsely puberulent, margin ciliate, apex truncate to rounded. Flowers distant on rachis. Calyx yellowish with a black apex, 8–10 mm, sparsely pubescent, usually sparsely covered with cystoliths, 2-lipped, lower lip 2-lobed almost to base, upper lip 3-lobed; lobes lanceolate, 5–6 mm, margin apically ciliate. Corolla white, 3.5–4 cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 4 mm wide for 1–1.5 cm then ± ventricose and gradually widened to ca. 2 cm at mouth; lobes ovate, ca. 7 × 5 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 7 mm, sparsely hirsute; anther thecae oblong, 3–4 × ca. 1.5 mm; pollen type 12. Ovary comose; style ca. 2.7 cm, sparsely hirsute. Capsule fusiform, ca. 1.7 cm, glabrous except at apex, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, densely appressed pubescent. Fl. Oct–Dec, Apr.

Forests on limestone hills; 900–1300 m. Guangxi (Napo) [Vietnam].

Strobilanthes truncata is doubtfully distinct from *S. pateriformis*, differing only in its truncate bracts and unwinged stem.

43. *Strobilanthes rankanensis* Hayata, *Icon. Pl. Formosan.* 9: 84. 1920.

兰嵌马蓝 lan qian ma lan

Parachampionella rankanensis (Hayata) Bremekamp.

Herbs 15–30 cm tall, rarely branched, isophyllous. Stems slender, 4-angled, procumbent, usually rooting at basal nodes, sulcate, bifariously pubescent. Petiole 0.5–1.5 cm, sulcate, bifariously pubescent or subglabrous; leaf blade ovate to elliptic, (0.5–)1–3.5 × 0.5–1.8 cm, glabrous or sparsely hirsute along veins, secondary veins 3 or 4 on each side of midvein, base cuneate to subrounded, margin serrate, apex acute. Flowers solitary in leaf axils. Bracts absent; bracteoles linear-spatulate, 6–9 × 0.7–0.9 mm, sparsely hirsute, apex obtuse. Calyx 6–9 mm, slightly hirsute, 2-lipped, lower lip 2-lobed almost to base, upper lip unequally 3-lobed; lobes linear, margin ciliate. Corolla purple with white stripes, funnel-shaped, ca. 2 cm, outside glabrous, inside glabrous except for a few trichomes at base of filaments and adaxially in throat; tube basally cylindrical and ca. 1.5 mm wide for ca. 2.5 mm then gradually widened to ca. 2 cm at mouth; lobes oblong, ca. 3 × 4 mm, subequal, apex emarginate. Stamens 4, longer pair slightly exerted; filaments glabrous, shorter pair ca. 3 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2 mm, basally divergent; pollen type 11. Ovary ellipsoid, glabrous; style ca. 2 cm, basally sparsely gland-tipped pilose. Capsule fusiform, 1–1.2 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 2.5 × 1.5 mm, lenticular, densely covered with long appressed trichomes. Fl. May–Sep.

• Moist places in ravines; 600–1700 m. Taiwan.

Strobilanthes rankanensis is a distinctive, superficially isolated species because of the unique combination of trailing habit, 2-lipped calyx, and globose echinulate pollen.

44. *Strobilanthes longispica* (H. P. Tsui) J. R. I. Wood & Y. F. Deng, *Bot. J. Linn. Soc.* 150: 383. 2006.

长穗腺背蓝 chang sui xian bei lan

Adenacanthus longispicus H. P. Tsui, *Fl. Reipubl. Popularis Sin.* 70: 348. 2002; *Strobilanthes tripartita* J. R. I. Wood.

Herbs to 1.2 m tall, isophyllous, drying blackish green. Stems 4-angled, sulcate, bifariously pubescent. Petiole (0.2–)1–2.8 cm, hirsute; leaf blade elliptic to long ovate, 4.5–13 × 1.4–5 cm, both surfaces slightly strigose, adaxially densely covered with linear cystoliths, secondary veins 7 or 8 on each side of midvein, base attenuate, margin serrate, apex acuminate. Inflorescences axillary or terminal, spikes, 3–20 cm, with 2–7 flower pairs; peduncle ca. 1 cm, pubescent; rachis pubescent with gland-tipped trichomes; bracts linear-lanceolate, 6–8 × 1–2 mm, persistent, abaxially pubescent with gland-tipped trichomes, 1-veined, apex acute; bracteoles linear, 4–6 × ca. 1 mm, pubescent with gland-tipped trichomes, apex acute. Flowers 1.5–3.5 cm apart on rachis, usually only one sterile per node. Calyx 1.2–1.8 cm, outside pilose with gland-tipped trichomes, 2-lipped; lower lip 2-lobed almost to base, lobes lanceolate and 10–16 × 1.2–1.5 mm; upper lip 3-lobed, lobes triangular and 4–

6 × 1.2–1.5 mm. Corolla violet blue, ca. 3.5 cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindric and narrow for ca. 7 mm then gradually widened to ca. 1 cm at mouth; lobes oblong-ovate, ca. 7 × 6 mm, apex emarginate. Stamens 4, included; filaments hirsute, shorter pair ca. 2.2 mm, longer pair ca. 5 mm; anther thecae oblong, ca. 2 mm; pollen type 3. Ovary ellipsoid, ca. 3 mm, glabrous; style ca. 1.8 cm, sparsely gland-tipped pubescent. Capsule oblong, 1.5–1.8 cm, gland-tipped pubescent at tip, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, convex, densely pilose; areola small, glabrous. Fl. Oct–Jan.

Thickets on mountain slopes; 1300–1600 m. Yunnan (Gongshan) [Myanmar].

Strobilanthes longispica is very close to *S. dryadum*, differing only in its lanceolate rather than ovate-oblong bracts, unwinged inflorescence rachis, and less dense inflorescence indumentum.

45. *Strobilanthes dryadum* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 94. 1922.

林马蓝 lin ma lan

Pteracanthus dryadum (Benoist) C. Y. Wu & C. C. Hu.

Herbs to 1 m tall, much branched, nearly isophyllous. Stems 4-angled, sulcate, bifariously pubescent. Petiole 1–3 cm, sulcate, bifariously pubescent; leaf blade ovate to lanceolate, to 25 × 8 cm, glabrous, abaxially pale, secondary veins 6 or 7 on each side of midvein, base attenuate and decurrent onto petiole forming wings, margin crenate-dentate, apex acuminate. Inflorescences terminal, spikes, 3–6 cm, with 2–6 flower pairs; rachis pubescent with gland-tipped trichomes, winged, wing ca. 1 mm; bracts ovate-oblong, 4–7 × 1–2 mm, persistent, gland-tipped pubescent, apex obtuse; bracteoles oblong, ca. 4 × 0.5 mm, gland-tipped pubescent. Flowers distant on rachis, usually one sterile per node. Calyx 1–1.5 cm, accrescent in fruit, outside gland-tipped pubescent, 2-lipped; lower lip 2-lobed almost to base; upper lip 3-lobed to below middle, lobes linear-oblong and 11–15 × 1–2 mm. Corolla blue, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindric and ca. 2 mm wide for ca. 8 mm then gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 8 × 8 mm. Stamens 4, included; filaments hirsute, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2 mm; pollen type 4. Ovary puberulent at tip; style ca. 2.2 cm, sparsely pilose; stigma linear, compressed. Capsule narrowly oblong-obovoid, 1–1.2 cm, apically gland-tipped pubescent, 4-seeded. Seeds pilose; areola small. Fl. May, Sep–Nov, fr. Jan–Mar.

• Moist places in forests; 1300–2500 m. Guangxi, Yunnan.

46. *Strobilanthes adpressa* J. R. I. Wood, Kew Bull. 58: 110. 2003.

紧贴马蓝 jin tie ma lan

Subshrubs to 2 m tall, anisophyllous. Stems somewhat sulcate, bifariously pilose with large-celled trichomes, eventually glabrescent, basally woody; nodes pustulose, pubescent. Leaves basally petiolate, apically sessile; petiole (0–)1–2.5 cm, sulcate, sparsely pilose; leaf blade ovate-elliptic, (4–)6–16 × (1–)3.5–8.5 cm, smaller of pair ca. 2/3 size of larger one, thinly

leathery, both surfaces villous with large-celled trichomes especially on veins, secondary veins 9–13 on each side of midvein, curved, and netted near margin, base decurrent onto petiole or those apically on stem amplexicaul, margin shallowly serrate, apex acuminate. Inflorescences terminal, spikes, 5–7 cm; rachis 4-angled, gland-tipped pilose; bracts somewhat imbricate, oblong, 1.1–1.7 × 0.5–0.7 cm, gland-tipped pilose, tardily deciduous as flowers open; bracteoles linear-oblong, 9–15 × 1.2–2 mm, persistent, abaxially gland-tipped pilose, apex acute. Flowers arranged in pairs, erect, ± appressed to rachis. Calyx 1.2–1.6 cm, 2-lipped; lower lip 2-lobed almost to base; upper lip 3-lobed, lobes 12–14 × ca. 1.5 mm. Corolla yellow or blue, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindric, ca. 2.5 mm wide for ca. 1.5 cm then gradually ventricose and widened to ca. 1.5 cm at mouth, strongly bent ca. 2.5 cm above base; lobes ovate, ca. 6 × 5 mm, apex obtuse. Stamens 4, included; filaments sparsely pilose, shorter pair ca. 4 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 4 × 1.5 mm. Ovary comose with shortly stipitate glands; style ca. 2.5 cm, pilose. Capsule not seen. Fl. Oct–Dec.

Stream-sides in forests; 1500–1800 m. Yunnan (Maguan) [Vietnam].

47. *Strobilanthes atroviridis* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 480. 2010.

景东马蓝 jing dong ma lan

Subshrubs to 3 m tall, isophyllous or slightly anisophyllous, blackish green when dry. Stems branched, 4-angled, sulcate, glabrous, densely covered with white prominent cystoliths; nodes pustulose, pubescent. Petiole 2–5 cm, bifariously pubescent; leaf blade ovate-elliptic, 9–22 × 5.5–14 cm, abaxially paler green and glabrous, adaxially green, subglabrous with sparse large-celled trichomes, and sparsely covered with prominent cystoliths especially along veins, secondary veins 6–10 on each side of midvein, prominent on both surfaces, curved, and netted near margin, tertiary veins conspicuous, base decurrent onto petiole, margin crenulate, apex acute to long acuminate. Inflorescences axillary, shortly pedunculate spikes, 1–3(–6) cm, 2(–8)-flowered but commonly reduced to a subcapitate flower pair; rachis gland-tipped pubescent; bracts linear-lanceolate, 9–14 × 2–3 mm, abaxially gland-tipped pubescent, adaxially glabrous; bracteoles linear-lanceolate, 9–13 × ca. 2.5 mm, abaxially gland-tipped pubescent, adaxially glabrous. Flowers paired. Calyx 1–1.5 cm, outside gland-tipped pubescent, inside glabrous, 2-lipped; lower lip 2-lobed almost to base, lobes linear-lanceolate, 9–14 × 2–3 mm, and apex acute; upper lip with 3 lanceolate 5–7 mm teeth connate for 4–7 mm. Corolla purplish blue, 3–4 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube ca. 2 mm wide at base then gradually widened to ca. 2 cm at mouth; lobes ovate, ca. 1 × 1 cm, apex emarginate. Stamens 4, included; filaments basally pubescent, shorter pair ca. 6 mm, longer pair ca. 8 mm; anther thecae oblong; pollen type 3. Ovary not examined; style ca. 2 cm, glabrous. Capsule not seen. Fl. Apr, Jun, Nov.

• Moist places in forests; 2100–2400 m. Yunnan (Jingdong).

48. *Strobilanthes pteroclada* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 187. 1922.

延苞马蓝 yan bao ma lan

Hymenochlaena pteroclada (Benoist) C. Y. Wu & C. C. Hu.

Subshrubs or perennial herbs, to 1 m tall, slightly anisophyllous, becoming black when dry. Stems 4-angled, sulcate, glabrous or subglabrous. Petiole (0–)0.5–1.5(–4) cm; leaf blade lanceolate, 7–20 × 3–8 cm, glabrous, abaxially densely covered with white cystoliths along veins, adaxially cystoliths prominent, secondary veins 5–9 on each side of midvein, base cuneate and decurrent onto petiole, margin serrulate to crenate, apex acuminate. Inflorescences axillary or terminal, spikes, 5–12 cm; peduncle 2–4.5 cm, apically widened to ca. 1.6 cm to form base of bract; bracts lanceolate to narrowly ovate, 1.5–2 × 0.8–1.6 cm, glabrous or gland-tipped pubescent, pinnately veined, base gradually narrowed and decurrent onto peduncle, margin entire or slightly dentate, apex acute to acuminate; bracteoles narrowly lanceolate, 5–7 × ca. 0.8 mm, glabrous, apex acuminate. Flowers ca. 3 cm apart on rachis. Calyx 7–9 mm, glabrous, weakly 2-lipped; lower lip 2-lobed, lobes 6–8 mm; upper lip 3-lobed, lobes lanceolate, ca. 6 mm, and apex acuminate. Corolla purplish blue, 3–4 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2.5 mm wide for ca. 1.4 cm and then gradually widened to ca. 1.8 cm at mouth; lobes ovate, ca. 6 × 5 mm, subequal, apex obtuse. Stamens 4, included; filaments pilose at base, shorter pair ca. 4 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 2.5 × 1.5 mm; pollen type 3. Ovary glabrous; style ca. 2.4 cm, sparsely pubescent. Capsule fusiform, ca. 1.3 cm, glabrous, 4-seeded. Seeds white, ovate in outline, ca. 2 × 2 mm, densely appressed tomentose. Fl. Apr–May, fr. Jun–Jul.

Thickets or forests by streams; 300–900 m. Guangxi, Guizhou [Vietnam].

49. *Strobilanthes ovata* Y. F. Deng & J. R. I. Wood, Novon 20: 143. 2010.

滇西马蓝 dian xi ma lan

Herbs 30–40 cm tall, perennial. Stems with a narrow wing to 0.8 mm wide on each side, densely covered with cystoliths, glabrous. Leaves basally petiolate and apically becoming sessile; petiole of basal leaves 3–5 mm, glabrous; leaf blade ovate-elliptic, 2–5 × 1–2.3 cm, both surfaces glabrous and with prominent cystoliths, abaxially paler and with prominent veins covered by cystoliths, secondary veins 2–4 on each side of midvein, base decurrent onto petiole, margin crenate to crenate-serrate, apex acuminate. Inflorescences terminal on main stem or on branches arising from apicalmost leaf axils, spikes, 1–7 cm; rachis narrowly winged, pilose with multicellular trichomes and some gland-tipped trichomes; bracts ovate, oblong-ovate, or rounded, 3–7 × 1–5 mm, pubescent; bracteoles oblanceolate, ca. 5 × 1 mm, subglabrous to pilose with multicellular trichomes and some gland-tipped trichomes, apex rounded. Calyx subglabrous or gland-tipped pilose on margin, slightly 2-lipped; upper lip 8–10 mm, 3-lobed to 3 mm from base, lobes triangular and 5–7 mm; lower lip 2-lobed almost to base, lobes linear-oblan-

ceolate to subspatulate, 9–10 mm, and apex obtuse. Corolla light blue, 3–3.5 cm, gently curved, subventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm and then gradually widened to ca. 1.3 cm at mouth; lobes ovate, ca. 4 × 4 mm, subequal. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 5 mm, basally pilose; anther thecae oblong, ca. 2 × 1 mm; pollen type 3. Ovary oblong, ca. 2 mm, comose at tip; style ca. 2.2 cm, sparsely pilose. Capsule narrowly oblong-ellipsoid, ca. 12 × 2 mm, glabrous except for gland-tipped pubescent tip, 4-seeded. Seeds ovate to suborbicular in outline, ca. 3 × 2 mm, pilose. Fl. Oct–Feb, fr. Dec–Mar.

• Moist forests; 1600–2200 m. Yunnan.

50. *Strobilanthes tamburensis* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 454. 1884.

毛冠马蓝 mao guan ma lan

Herbs to 50 cm tall, perennial, slightly anisophyllous. Stems decumbent and basally rooting then ascending, 4-angled, sulcate, bifariously pilose. Leaves usually sessile or with a petiole to 3 mm; leaf blade ovate to suborbicular, 8–45 × 8–45 cm, both surfaces glabrous or pilose, abaxially whitish, adaxially green, secondary veins 5–7 on each side of midvein, base rounded to subcordate, margin entire or obscurely crenulate-serrate, apex acute to obtuse. Inflorescences terminal, spikes, 3–6 cm; bracts orbicular to obovate, 5–8 × 5–8 mm, persistent until flowers fall, pilose; bracteoles obovate, ca. 3 × 3 mm, pilose. Flowers ca. 2.5 cm apart basally on rachis but imbricate apically. Calyx 6–10 mm, 5-lobed almost to base; lobes linear-spatulate, margin ciliate. Corolla blue, 2.5–3 cm, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1 cm then bent to ca. 90° and abruptly widened to 8–10 mm at mouth; lobes broadly ovate, ca. 5 × 6–7 mm. Stamens 4, included; filaments subglabrous, shorter pair ca. 4 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 2 × 1 mm; pollen type 16. Ovary gland-tipped; style ca. 2.5 cm, sparsely pilose, apically glabrous. Capsule ca. 1.2 cm, gland-tipped pilose, 4-seeded. Seeds orbicular in outline, ca. 3 × 3 mm, densely pilose; areola absent. Fl. Aug–Nov.

Wet places in forests; 1200–2100 m. Xizang (Cona) [Bhutan, India, Nepal].

51. *Strobilanthes taoana* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 479. 2010.

陶氏马蓝 tao shi ma lan

Subshrubs, weakly anisophyllous, becoming black when dry. Stems somewhat sulcate, pilose with large-celled trichomes, eventually glabrescent, basally woody. Petiole 0–2 mm, pilose; leaf blade ovate, 4–10 × 2–5 cm, smaller of pair ca. 2/3 size of larger one, abaxially paler, glabrous except for a few trichomes on veins, and densely covered with prominent cystoliths, adaxially green with inconspicuous cystoliths and subglabrous except for a few scattered hispid trichomes and a strigose or scurfy midvein, base slightly asymmetric, rounded to subcordate, and briefly decurrent onto petiole, margin serrate, apex

acute to shortly acuminate and commonly falcate. Inflorescences axillary or terminal, spikes, 2–5 cm; rachis straight, pilose; sterile bracts leaflike, apically diminishing in size, subsessile, ovate, 1–4 × 0.7–2.2 cm, apex acuminate; floral bracts oblong-elliptic, 3–6 × 2–4 mm, glabrous, apex acuminate; bracteoles obovate to oblong-lanceolate, 3–5 × 1–2 mm, glabrous. Flowers in opposite pairs but often solitary. Calyx 9–16 × 1–2 mm, subequally 5-lobed to ca. 1 mm from base; lobes almost colorless, linear, glabrous, covered with cystoliths, apex obtuse. Corolla white, 2–2.5 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally ca. 2 mm wide then gradually widened to ca. 1.2 cm at mouth; lobes ovate, 4–6 mm, apex rounded. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 6 mm; anther thecae spherical, ca. 1 mm in diam., glabrous. Ovary glabrous; style ca. 2 cm, glabrous. Capsule not seen. Fl. Jan.

- Limestone hills; ca. 2200 m. Yunnan (Jinghong).

52. *Strobilanthes rubescens* T. Anderson, J. Linn. Soc., Bot. 9: 479. 1867.

红色马蓝 hong se ma lan

Pteracanthus rubescens (T. Anderson) Bremekamp.

Subshrubs 0.5–2 m tall, isophyllous. Stems somewhat sulcate, pilose with large-celled trichomes, eventually glabrescent, basally woody. Petiole to 2 mm but apically leaves becoming sessile, pilose; leaf blade ovate to suborbicular, 4–10 × 2–5 cm, smaller of pair ca. 2/3 size of larger one, abaxially paler and glabrous except for a few trichomes on veins and densely covered with prominent cystoliths, adaxially green with inconspicuous cystoliths and subglabrous except for a few scattered hispid trichomes and a strigose or scurfy midvein, base rounded, cordate, or cuneate and decurrent onto petiole, margin crenulate-dentate, apex acute to shortly acuminate and commonly falcate. Inflorescences axillary, spikes, 2–5 cm, secund, sometimes reduced to solitary flowers in leaf axils; rachis straight or obscurely zigzag, pilose; sterile bracts leaflike, sessile, ovate, 1–4 × 0.7–2.2 cm, variable in development, glabrous, densely covered with cystoliths, apex acuminate; floral bracts ovate, 2–3 × 1–1.5 mm, persistent, glabrous, apex acuminate; bracteoles oblong-lanceolate, 1.5–3 × 0.5–1 mm, caducous, glabrous. Flowers to 2 cm apart basally on rachis but internodes shorter apically. Calyx 0.9–1.6 cm, subequally 5-lobed to ca. 1 mm from base; lobes almost colorless, linear, 1–2 mm wide, glabrous, covered with cystoliths, apex acute. Corolla white, 2–2.5 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for ca. 5 mm then gradually widened to ca. 1.2 cm at mouth; lobes ovate, 4–6 mm, apex rounded. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 6 mm; anther thecae spherical, ca. 1 mm in diam., glabrous; pollen type 3, requires confirmation. Ovary glabrous; style ca. 2 cm, glabrous. Capsule 1–1.2 cm, glabrous except hairy at tip, 4-seeded. Fl. Oct–May.

- Limestone hills; ca. 1900 m. Yunnan [Bhutan, India].

53. *Strobilanthes pinetorum* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 197. 1918.

松林马蓝 song lin ma lan

Difflugossa pinetorum (W. W. Smith) C. Y. Wu & C. C. Hu.

Subshrubs to 1 m tall, much branched, anisophyllous. Stems erect, glabrous or subglabrous. Petiole (0–)1–2 cm, subglabrous, winged; leaf blade broadly ovate to suborbicular, smaller of pair 2–3 × 1–1.5 cm and larger one 6–10 × 3.5–5 cm, both surfaces with prominent cystoliths, abaxially olive-green and glabrous, adaxially dark green and sparsely pilose but soon glabrescent, secondary veins 5 or 6 on each side of midvein, base subrounded to broadly cuneate and abruptly decurrent onto petiole or cordate for apical leaves, margin serrate, apex long acuminate. Inflorescences axillary or terminal, simple or branched spikes, to 10 cm; sterile bracts leaflike, sessile, ovate, 1–5 × 0.7–3.5 cm, base cordate, apex shortly acuminate; floral bracts ovate-oblong, 7–11 × 2–3 mm; bracteoles linear-lanceolate, ca. 6 × 1 mm, glabrous, apex obtuse. Calyx ca. 7 mm, glabrous, 5-lobed almost to base; lobes linear-oblong, ca. 6 × 1 mm, apex obtuse. Corolla whitish purple, ca. 4 cm, curved, ventricose, outside glabrous; tube basally cylindrical and ca. 2 mm wide for ca. 1.3 cm then curved and gradually widened to ca. 1.2 cm at mouth; lobes orbicular, ca. 4 × 4 mm. Stamens 4, included; filaments subglabrous, shorter pair ca. 4 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 2 × 1.5 mm; pollen type 5. Ovary pilose at tip; style ca. 3.2 cm, apically sparsely hirsute. Capsule not seen. Fl. Jun.

- Forests; ca. 2000 m. Yunnan (Tengchong).

Strobilanthes pinetorum is only known from the type, which is distinctive but very immature.

54. *Strobilanthes helicta* T. Anderson, J. Linn. Soc., Bot. 9: 479. 1867.

曲序马蓝 qu xu ma lan

Asystasia calycina Nees (1832), not *Strobilanthes calycina* Nees (1836); *Echinacanthus calycinus* (Nees) Nees; *Pteracanthus calycinus* (Nees) Bremekamp.

Subshrubs 50–100 cm tall, pliestesial, nearly isophyllous. Stems 4-angled, erect, sulcate, usually glabrous but sometimes apically brown pubescent. Petiole 0.2–5 cm, bifariously pubescent; leaf blade ovate-lanceolate to elliptic, 5–12 × 1–6 cm, both surfaces glabrous except for pubescence on margin near base, abaxially paler, adaxially dark green, secondary veins 6 or 7 on each side of midvein and abaxially prominent, base attenuate and decurrent onto petiole, margin serrate to rarely subentire, apex acuminate. Inflorescences axillary, spikes, 2–12 cm, secund, sometimes few flowered and frequently with bract pairs fertile only apically; rachis usually strongly zigzag; bracts linear, 5–13 mm, persistent, one of pair per node shorter than other, glabrous or gland-tipped pilose; bracteoles linear, 2–3 mm, glabrous or gland-tipped pilose. Flowers 6–10 mm apart on rachis, only one sterile per node. Calyx 1.3–2.5 cm, glabrous or gland-tipped pubescent, 5-lobed almost to base; lobes linear with one shorter than others, often keeled, outside with white cystoliths, apex acuminate. Corolla white or flushed pale purple, 3.5–4 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally narrow and cylindrical for ca. 5 mm then

abruptly widened to ca. 1.8 cm and finally narrowed slightly and bent to ca. 90° near mouth; lobes oblong, ca. 5 × 4 mm, unequal, apex emarginate. Stamens 4, included; filaments glabrous, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 3 × 1 mm; pollen type 4. Ovary glabrous; style 2.8–3.2 cm, apically hirsute. Capsule oblong, 1.8–2 cm, glabrous, 4-seeded, apex apiculate. Seeds ovate in outline, ca. 4 × 2.5 mm, appressed pubescent. Fl. Sep–Nov, fr. Nov–Jan.

Evergreen broad-leaved forests; 1700–2200 m. SE Xizang, Yunnan [Bhutan, India, Myanmar, Nepal].

55. *Strobilanthes rostrata* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 476. 2010.

西畴马蓝 xi chou ma lan

Herbs to 1 m tall, perennial, slightly anisophyllous. Stems 4-angled, sulcate, glabrous. Petiole (1.5–)4–8 cm, glabrous; leaf blade elliptic, (4.5–)11–17 × (2.5–)7–10 cm, both surfaces glabrous, abaxially paler, adaxially green and with numerous cystoliths, secondary veins (6–)9–12 on each side of midvein, base subrounded and decurrent onto petiole, margin dentate, apex acute. Inflorescences axillary, branched spikes, bearing a pair of reduced leaves at branching point and forming a lax terminal panicle of spikes, ultimate branches slightly zigzag; bracts spatulate-linear, 2–3 mm, persistent, glabrous, both surfaces with abundant white cystoliths; bracteoles linear, ca. 3 mm. Flowers only one fertile per pair. Calyx ca. 1 cm, glabrous, outside densely covered with white cystoliths, inside with cystoliths in 2 lines along lobe margin, 5-lobed to ca. 2 mm from base; lobes linear, equal. Corolla blue, ca. 3.8 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.2 cm, bent to ca. 45° at middle, and gradually widened to ca. 1 cm at mouth. Stamens 4; filaments included, shorter pair ca. 6 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 2 mm. Ovary glabrous; style ca. 2.7 cm, pilose. Capsule ca. 1.6 cm, glabrous, 4-seeded, apex with a ca. 4 mm beak. Seeds ovate in outline, ca. 2 × 2 mm, appressed pilose; areola small. Fl. Aug–Sep, fr. Nov.

• Forests by streams in limestone areas; 1400–1600 m. Yunnan (Xichou).

56. *Strobilanthes chrysodelta* J. R. I. Wood, Kew Bull. 64: 41. 2009.

金三角马蓝 jin san jiao ma lan

Herbs 30–60 cm tall, perennial, anisophyllous. Stems slightly 4-angled, sulcate, glabrous. Petiole 0.5–2.5 cm, glabrous; leaf blade elliptic, 3–9 × 1.7–4 cm, smaller of pair ca. 2/3 size of larger one but similar in shape, both surfaces glabrous, abaxially with prominent cystoliths, adaxially much paler, secondary veins 4 on each side of midvein, base attenuate and slightly decurrent onto petiole, margin slightly serrate, apex acute. Inflorescences terminal, spikes, 2–10 cm, 2–10-flowered; rachis gland-tipped pilose; basal sterile bracts leaflike but sessile or almost so, ovate, base rounded; apical floral bracts ovate-elliptic, 5–6.5 × ca. 2 mm, persistent, gland-tipped pilose, apex obtuse; bracteoles oblong-oblongeolate, ca. 8 × 1 mm, persistent until after anthesis, gland-tipped pilose, apex obtuse. Flowers

opposite pairs, 1–2 cm apart on rachis. Calyx 1–1.1 cm, accrescent to ca. 1.5 cm in fruits; lobes linear, gland-tipped pilose, apex obtuse; lower 2 lobes distinct to base; upper 3 lobes connate for ca. 3 mm from base but becoming distinct in fruit, central lobe slightly longer than others and becoming subspatulate. Corolla pale violet with a white tube, 3.7–4 cm, straight, outside glabrous; tube basally cylindrical and ca. 2.5 mm wide for ca. 1.1 cm then gradually widened to ca. 1.2 cm at mouth; lobes ovate, 9–10 × ca. 7 mm, apex rounded. Stamens 4, all fertile, included; filaments erect, very sparsely pilose, shorter pair ca. 2 mm, longer pair ca. 4 mm; anther thecae oblong, ca. 2 × 0.5 mm, erect, muticous. Ovary comose; style pilose. Capsule ca. 1.5 cm, glabrous except for a few gland-tipped trichomes at apex, 4-seeded. Seeds ca. 3 × 2.5 mm, lenticular, pilose; areola almost lacking. Fl. and fr. Apr.

Moist places; 2100–2400 m. Yunnan [Myanmar].

57. *Strobilanthes tonkinensis* Lindau, Bull. Herb. Boissier 5: 651. 1897.

糯米香 nuo mi xiang

Herbs 50–100 cm tall, weakly anisophyllous. Stems 4-angled, pubescent, glabrescent, fragrant when dry. Petiole to 2 cm, pubescent; leaf blade broadly oblong-elliptic, to 18.5 × 6 cm, both surfaces sparsely pubescent especially on veins, adaxially with prominent cystoliths, secondary veins 4–7 on each side of midvein, base cuneate and decurrent onto petiole, margin crenate, apex acute. Inflorescences terminal, simple spikes, 3–11 cm, sometimes with branches arising in apical leaf axils; rachis pubescent with gland-tipped trichomes; bracts linear-spatulate, 10–12 × 2–2.5 mm, sparsely pubescent and gland-tipped pubescent, densely covered with white cystoliths, 1-veined; bracteoles linear, ca. 5 × 1 mm, pubescent, abaxially densely covered with cystoliths. Calyx 5-lobed to base; lobes linear, 8–9 × ca. 1 mm, subequal, pubescent, outside covered with prominent cystoliths. Corolla pink to pure white, ca. 3.2 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then gradually widened to ca. 1 cm at mouth; lobes orbicular, ca. 5 mm in diam. Stamens 4, included; shorter filament pair ca. 4 mm, glabrous; longer filament pair ca. 7 mm, puberulent; anther thecae oblong, ca. 3 mm; pollen type 4. Ovary obovoid, ca. 3 mm, gland-tipped pilose at tip; style ca. 1.5 cm, glabrous. Capsule narrowly oblong-obovoid, 8–10 × ca. 2.5 mm, gland-tipped pilose, 4-seeded, apex apiculate. Seeds ovate in outline, ca. 2 × 2 mm, pubescent; areola small, glabrous. Fl. Apr–Jun, Dec, fr. Jun–Jul.

Moist forests; 200–1500 m. Guangxi, Yunnan [Thailand, Vietnam].

Strobilanthes tonkinensis is a medicinal and aromatic plant.

The name "*Semnostachya menglaensis*" (H. P. Tsui, FRPS 70: 349. 2002) belongs here but was not validly published because the herbarium where the type specimen is conserved was not specified (*Vienna Code*, Art. 37.7).

58. *Strobilanthes stolonifera* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 98. 1922.

匍枝马蓝 pu zhi ma lan

Subshrubs to 20 cm tall, isophyllous. Stems ascending, usually rooting at nodes, glabrous but with cystoliths. Petiole 3–15(–20) mm, glabrous; leaf blade elliptic, (3–)5–10 × (1–)2–2.5 cm, both surfaces with prominent cystoliths, abaxially pale green to whitish and sparsely pubescent, adaxially pubescent but soon glabrescent, secondary veins 5–7 on each side of midvein, base decurrent onto petiole, margin crenate to crenate-serrate, apex acuminate. Inflorescences terminal, spikes, 1–2 cm; rachis pilose; sterile bracts at base of inflorescence leaflike; floral bracts oblong to elliptic, 9–13 × 2–3 mm, pubescent; bracteoles oblong, ca. 8 × 1.5 mm, pilose with large-celled trichomes. Calyx lobes linear, 11–14 × ca. 1 mm, pubescent with some trichomes gland-tipped. Corolla violet, 3–3.5 cm, subventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then slightly curved and gradually widened to ca. 1 cm at mouth; lobes ovate, ca. 4 × 4 mm. Stamens 4, included; filaments pilose, shorter pair ca. 3 mm, longer pair ca. 6 mm; anther thecae oblong, 2.5–3 × ca. 0.8 mm; pollen type 4, requires confirmation. Ovary oblong, 3–4 mm, puberulent at tip with some gland-tipped trichomes; style ca. 3 cm, villous. Capsule narrowly oblong, ca. 13 × 3 mm, pilose, 4-seeded. Seeds orbicular in outline, ca. 3 × 3 mm, villous. Fl. Jun.

- Dry places; 1800–2400 m. Yunnan.

59. *Strobilanthes vallicola* Y. F. Deng & J. R. I. Wood, Bot. J. Linn. Soc. 150: 380. 2006.

河口马蓝 he kou ma lan

Herbs 0.8–1.5 m tall, perennial, isophyllous. Stems black, 4-angled, apically sulcate, glabrous. Petiole 1.3–2.5 cm, glabrous; leaf blade oblong-elliptic, 15–25 × 6.5–11 cm, both surfaces glabrous and with prominent cystoliths, abaxially paler and with prominent veins covered with cystoliths, secondary veins 6–9 on each side of midvein, base cuneate, margin serrate, apex acuminate. Inflorescences terminal, spikes, 15–25 cm, branched or rarely unbranched; rachis densely pilose with large-celled trichomes; bracts ovate-oblong, 8–12 × ca. 4 mm, persistent, pilose with large-celled trichomes and some gland-tipped trichomes; bracteoles lanceolate, 9–13 × 1.1–1.3 mm, persistent, pilose with large-celled trichomes and some gland-tipped trichomes. Flowers opposite pairs, sessile, 0.8–2 cm apart on rachis. Calyx 14–18 × 1–1.5 mm, persistent, pilose with large-celled trichomes, some trichomes gland-tipped. Corolla white, 3–3.5 cm, outside glabrous except for lobe margin, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for 1–1.5 cm then gradually ventricose and strongly bent 1.5–2.5 cm from base; lobes ovate, ca. 4 × 5 mm, apex obtuse. Stamens 4, included; filaments glabrous, shorter pairs 2–3 mm, longer pairs 3–5 mm; anther thecae oblong, 3–4 × ca. 1 mm, glabrous; pollen type 9. Ovary ca. 3 × 1 mm, glabrous; style ca. 2.5 cm. Capsule oblong, 1.5–2 × 0.2–0.3 cm, narrowed at both ends, comose, 4-seeded. Seeds ovate to suborbicular in outline, ca. 3 × 3 mm, pilose. Fl. Apr–Jun.

- Moist places, stream and riversides in moist forests; below 200 m. Yunnan (Hekou).

60. *Strobilanthes cognata* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 189. 1922.

奇瓣马蓝 qi ban ma lan

Pteracanthus cognatus (Benoist) C. Y. Wu & C. C. Hu.

Herbs to 50 cm tall, isophyllous, drying blackish. Stems stout, 4-angled, lenticellate, glabrous. Petiole ca. 1 cm, glabrous; leaf blade oblong to lanceolate, 6–12 × 3–4.5 cm, both surfaces densely covered with small cystoliths, very sparsely pilose with scattered large-celled trichomes, secondary veins 8–10 on each side of midvein, base cuneate, margin crenate, apex acuminate. Inflorescences terminal, spikes, 3–5 cm; bracts lanceolate, 7–20 × ca. 6 mm, sparsely pilose with large-celled white trichomes, margin ciliate, apex acuminate; bracteoles oblong, ca. 11 × 2 mm, gland-tipped pilose, apex acute. Flowers imbricate on rachis. Calyx 1–1.2 cm, outside gland-tipped pilose, 5-lobed almost to base; lobes linear, ca. 1 mm wide, apex acute. Corolla violet, 4–5 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 2.5 cm then gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 6 × 5 mm, apex obtuse. Stamens 4, included; filaments erect, shorter pair ca. 6 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 3 × 1 mm; pollen type 4. Ovary glabrous except pilose at tip; style 3.5–4.2 cm. Capsule ca. 1.8 cm, pilose at tip, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, densely appressed pubescent. Fl. Aug–Oct, fr. Nov–Dec.

- Moist places by streams; 1200–1400 m. Guizhou, Hubei, Hunan.

61. *Strobilanthes cusia* (Nees) Kuntze, Revis. Gen. Pl. 2: 499. 1891.

板蓝 ban lan

Goldfussia cusia Nees in Wallich, Pl. Asiat. Rar. 3: 88. 1832; *Baphicacanthus cusia* (Nees) Bremekamp; *Dipteracanthus calycinus* Champion; *Ruellia indigofera* Griffith; *R. indigotica* Fortune; *Strobilanthes balansae* Lindau; *S. championii* T. Anderson; *S. flaccidifolia* Nees.

Herbs 0.5–1.5 m tall, erect, branched, drying blackish, isophyllous to weakly anisophyllous. Stems glabrous or minutely brown puberulent. Petiole 0.5–7 cm; leaf blade elliptic to ovate, 4–20 × 2–9 cm, both surfaces glabrous or abaxially minutely puberulent along veins, abaxially paler green, adaxially dark green, secondary veins 7–9 on each side of midvein, base attenuate, margin serrate, apex acute. Inflorescences terminal or axillary, bracteate spikes, 1–6 cm, often aggregated to form a leafy branched panicle; peduncle 1–12 cm; bracts leaflike, petiolate, oblanceolate, obovate, or spatulate, 1.2–2.5 cm, basally usually sterile; bracteoles linear-oblanceolate, 2–3 mm, deciduous before bracts. Calyx 0.8–1.5 mm in flower, accrescent to ca. 2.5 cm in fruit, minutely puberulent, 5-lobed almost to base; 4 lobes linear-lanceolate, apex acute to obtuse; 1 lobe oblanceolate and much longer. Corolla blue, 3.5–5 cm, straight to slightly bent, outside glabrous; tube basally cylindrical and ca. 3 mm wide for 1–1.5 cm then slightly curved and gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 9 × 9 mm, subequal. Stamens 4, included; filaments glabrous, shorter pair ca. 3 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 3 mm; pollen type 4. Ovary oblong, apex puberulent with few gland-tipped

trichomes; style ca. 3.2 cm, glabrous. Capsule 1.5–2.2 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3.5 mm, covered with appressed trichomes; areola small. Fl. Jul–Feb, fr. Dec–Feb. $2n = 16, 32$.

Usually in moist wooded places, sometimes cultivated; 100–2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Laos, Myanmar, Thailand, Vietnam].

Strobilanthes cusia is reported to flower irregularly. The species is perhaps pliestesial.

In at least part of its stated range *Strobilanthes cusia* may be cultivated rather than native.

This is a medicinal and dye plant and is the source of “Assam indigo.”

62. *Strobilanthes flexicaulis* Hayata, Icon. Pl. Formosan. 5: 135. 1915.

曲茎兰嵌马蓝 qu jing lan qian ma lan

Parachampionella flexicaulis (Hayata) C. F. Hsieh & T. C. Huang; *Strobilanthes fauriei* Benoist; *S. glandulifera* Hayata; *S. prionophylla* Hayata; *Triaenacanthus flexicaulis* (Hayata) C. F. Hsieh & T. C. Huang.

Subshrubs to 1 m tall, much branched, anisophyllous. Stems 4-angled, winged, glabrous. Petiole 0.2–2.5 cm, glabrous or sparsely pubescent; leaf blade ovate, ovate-lanceolate, or ovate-elliptic, 3.5–18 × 1.8–5 cm, abaxially glaucous, adaxially sparsely pilose to subglabrous, secondary veins 4–6 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin serrate to crenate, apex acuminate. Inflorescences axillary or terminal, spikes, ca. 3 cm, few flowered; rachis often zigzag, glabrous to gland-tipped pilose; bracts persistent, basally merging into leaves, ovate to suborbicular, and shortly petiolate, apically becoming ovate to oblanceolate and sessile, 4–15 × 2–10 mm, apically diminishing in size, glabrous, apex obtuse; bracteoles linear, ca. 4 × 0.5 mm at anthesis but accrescent to ca. 14 × 1 mm, glabrous or sparsely gland-tipped pilose. Pedicel to 1 mm or flowers sessile. Calyx 0.9–1.1 cm at anthesis, strongly accrescent to ca. 3.2 cm in fruit, 2-lipped; lower lip 2-lobed almost to base, lobes linear; upper lip 3-lobed to middle, lobes linear, ca. 6 × 1 mm at anthesis, margin ciliate with gland-tipped trichomes but soon glabrescent, and apex obtuse. Corolla blue to purple, campanulate, ca. 4 cm, outside glabrous or glabrescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 4 mm wide for ca. 1.5 cm then gradually widened to ca. 1.5 cm at mouth; limb slightly 2-lipped; lower lip ca. 1 cm, 3-lobed, center lobe orbicular, ca. 6 × 7 mm, base contracted, and apex emarginate, lateral lobes orbicular, somewhat oblique, and apex emarginate; upper lip 2-lobed, lobes semiorbicular and ca. 5 × 8 mm. Stamens 4; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 7 mm, hirsute; anther thecae oblong-linear, ca. 3.5 × 1 mm; pollen type 3. Ovary obovoid, glabrous; style filiform, ca. 3 cm, pubescent with gland-tipped trichomes; stigma subulate. Capsule linear-oblong, 1.6–2 cm, glabrous, 4-seeded. Seeds oblong-ovate in outline, ca. 3.5 × 2 mm, densely covered with appressed trichomes. Fl. Sep–Nov, fr. Feb. $2n = 30$.

Streamsides in forests; 200–2300 m. Taiwan [Japan (Ryukyu Islands)].

Strobilanthes tashiroi Hayata (*S. flexicaulis* var. *tashiroi* (Hayata) Yamazaki) is endemic to the Ryukyu Islands (K. Iwatsuki et al., eds., Fl. Japan 3a: 391. 1993).

63. *Strobilanthes lanyuensis* Seok, C. F. Hsieh & J. Murata, J. Jap. Bot. 79: 151. 2004.

兰屿马蓝 lan yu ma lan

Subshrubs to 1.5 m tall, anisophyllous. Stems 4-angled, retrorsely pubescent. Petiole 0.5–5 cm, appressed pubescent; leaf blade variable in shape and size, oblong-lanceolate, oblong-ovate, or ovate, 3–20 × 2–8 cm, abaxially glabrous or sometimes pubescent along veins, adaxially glabrous and with numerous cystoliths, secondary veins 3–5 on each side of midvein and abaxially prominent, base cuneate to narrowly cuneate and decurrent onto petiole, margin mucronate-serrate, apex acute to acuminate. Inflorescences terminal or from apical leaf axils, spikes, 5–10 cm; rachis 4-angled, glabrous or gland-tipped pubescent; bracts obovate, narrowly oblong, or linear-oblong, 1–2.5 × 0.3–2 cm, abaxially glabrous or sparsely pubescent and with numerous cystoliths, apex obtuse; bracteoles linear, 10–20 × 3–4 mm, abaxially glabrous or sparsely pubescent. Calyx 1.3–2.4 cm, accrescent to ca. 4 cm in fruit, 2-lipped, lower lip 2-lobed almost to base, upper lip 3-lobed to 2/3 of length; lobes linear, glabrous, pubescent, or rarely gland-tipped pilose on margin, cystoliths numerous, apex acute. Corolla white, funnel-shaped, ca. 4 cm, bent near mouth, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 8 mm then gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 5 × 4 mm. Stamens 4, included; filaments densely pilose, shorter pairs ca. 2 mm, longer pair ca. 2.5 mm; anther thecae oblong, ca. 2 mm; pollen type 3. Ovary glabrous; style ca. 2.5 cm; stigma very unequally 2-lobed. Capsule cylindrical-fusiform, ca. 1.7 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 × 3 mm, densely appressed pubescent. Fl. Sep–Nov, fr. Jan.

• Moist places in forests; 200–1000 m. Taiwan (Lan Yu).

Strobilanthes lanyuensis is close to *S. flexicaulis*, itself a variable species, differing only in the white, resupinate corolla and a few other minor characters. Further studies are needed to confirm its status.

64. *Strobilanthes atropurpurea* Nees in Wallich, Pl. Asiat. Rar. 3: 86. 1832.

翅柄马蓝 chi bing ma lan

Herbs 30–50(–100) cm tall, perennial, much branched, isophyllous or slightly anisophyllous. Stems slender, 4-angled, rooting at nodes, glabrous or pubescent. Leaves basally petiolate, apically sessile; petiole 0–2 cm, winged, glabrous or pubescent; leaf blade ovate, elliptic, or narrowly lanceolate, 1–6(–16) × 0.5–3.5(–6.5) cm, puberulent or glabrous, adaxially with linear cystoliths, secondary veins 5 or 6 on each side of midvein, base rounded to attenuate and shortly decurrent onto petiole, margin serrate to coarsely crenate, apex acute to acuminate. Inflorescences axillary, spikes, 2–7 cm, zigzag, secund, few flowered, often much reduced to flowers solitary or paired in leaf axil on main stem; bracts leaflike, ovate to subcordate, 8–

10 × ca. 3 mm, apically smaller, persistent, glabrous, 3-veined or pinnately veined; bracteoles linear-oblong, ca. 5 × 2 mm. Calyx 1–1.5 cm, accrescent to 2–2.5 cm in fruit, 5-lobed almost to base; lobes linear, 11–20 × 1–1.5 mm, unequal with one slightly larger than others, glabrous or pilose, rarely gland-tipped pubescent, abaxially with linear cystoliths. Corolla pale purple, bluish purple, or rarely white, 2.5–3.5 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then inflated, widened to 1.5–1.8 cm, and bent at mouth; lobes oblong, ca. 3 × 4 mm, apex obtuse. Stamens 4, included; filaments glabrous, shorter pair ca. 4 mm, longer pair ca. 7 mm; anther thecae oblong, ca. 2 mm; pollen type 3. Ovary glabrous; style ca. 2 cm, glabrous; stigma acute. Capsule fusiform, 1.2–1.8 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 × 3 mm, pubescent with appressed trichomes; areola 0.2–0.3 mm. Fl. Jun–Oct.

Moist places on mountain slopes, forests, by rivers; 700–2900 m. Chongqing, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Myanmar, Nepal, Pakistan, Vietnam].

There are no reports of *Strobilanthes atropurpurea* being pliestesial flowering from China or the E Himalaya, although this is a well-known phenomenon in this species in the W Himalaya.

- 1a. Leaf blade ovate to ovate-elliptic,
1.5–6(–16) × 1–3.5(–6.5) cm,
glabrous or pubescent 64a. var. *atropurpurea*
1b. Leaf blade lanceolate,
1–3 × 0.5–1.2 cm, glabrous 64b. var. *stenophylla*

64a. *Strobilanthes atropurpurea* var. *atropurpurea*

翅柄马蓝(原变种) chi bing ma lan (yuan bian zhong)

Hemigraphis cuneata S. Y. Hu; *Pteracanthus alatus* (Wallich ex Nees) Bremekamp; *Ruellia alata* Wallich ex Nees; *Strobilanthes densa* Benoist; *S. wallichii* Nees; *S. wallichii* var. *microphylla* Nees.

Leaf blade ovate to ovate-elliptic, 1.5–6(–16) × 1–3.5(–6.5) cm, glabrous or pubescent. Fl. Jun–Sep. 2n = 32, 40.

Moist places on mountain slopes, forests; 700–2900 m. Chongqing, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Xizang (Cona, Nyalam), Yunnan, Zhejiang [Bhutan, India, Myanmar, Nepal, Pakistan, Vietnam].

The name "*Strobilanthes triflora*" (Y. C. Tang, Iconogr. Cormophyt. Sin. 4: 163. 1975) belongs to this variety but was not validly published because no Latin description or diagnosis was provided (*Vienna Code*, Art. 36.1).

64b. *Strobilanthes atropurpurea* var. *stenophylla* (C. B. Clarke) Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 482. 2010.

镇宁马蓝 zhen ning ma lan

Strobilanthes stenophylla C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 472. 1884 [*"stenophyllus"*]; *S. martini* H. Léveillé.

Leaf blade lanceolate, 1–3 × 0.5–1.2 cm, glabrous. Fl. Oct.

By rivers. Guizhou (Zhenning) [India].

65. *Strobilanthes latisejala* Hemsley, J. Linn. Soc., Bot. 26: 241. 1890.

薄萼马蓝 bao e ma lan

Herbs to 50 cm tall, perennial, isophyllous. Stems 4-angled, sulcate, glabrous. Petiole 1–2.5 cm, glabrous; leaf blade lanceolate to ovate-lanceolate, 2–6 × 1–2.5 cm, abaxially glabrous and paler, adaxially with a few scattered trichomes and abundant cystoliths, secondary veins 4–6 on each side of midvein, base cuneate and decurrent onto petiole, margin crenulate, apex acuminate. Inflorescences axillary, subcapitate, 1–2 cm, 2–4-flowered; peduncle 0–2 cm; bracts leaflike, ovate, 6–9 × 3–5 mm, persistent, glabrous, margin subentire, apex acute; bracteoles linear, 5–6 × ca. 2 mm, glabrous. Calyx 8–10 mm, 5-lobed almost to base; lobes ovate-elliptic, 6–10 × 3–5 mm, unequal with one larger than others, outside sparsely pilose, apex obtuse. Corolla pale blue, ca. 3.2 cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then gradually widened to ca. 1 cm at mouth; lobes ovate, ca. 4 × 3 mm. Stamens 4; filaments glabrous, shorter pair ca. 4 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 2 × 1.2 mm, erect; pollen type 3. Ovary glabrous; style ca. 2.7 cm, glabrous. Capsule not seen.

- Forests. Hubei (Xingshan).

Strobilanthes latisejala is only known from the type and is possibly conspecific with the very variable *S. atropurpurea*, from which it can be distinguished by its distinctive broad sepals.

66. *Strobilanthes tibetica* J. R. I. Wood, Edinburgh J. Bot. 51: 262. 1994.

西藏马蓝 xi zang ma lan

Pteracanthus tibeticus (J. R. I. Wood) C. Y. Wu & C. C. Hu.

Subshrubs to 1.5 m tall, gregarious, probably pliestesial, nearly isophyllous. Stems slightly 4-angled, glabrous or obscurely bifariously pubescent. Petiole 1–3 cm, sparsely pilose; leaf blade ovate to elliptic, 7–14 × 3–9 cm, abaxially paler and subglabrous except for a few trichomes near base of midvein, adaxially green, subglabrous except for a few scattered short hispid trichomes, strigose or scurfy along midvein, and with conspicuous cystoliths, secondary veins 5 or 6 on each side of midvein, base narrowly cuneate and decurrent nearly to petiole base, margin strongly serrate, apex shortly acuminate and slightly falcate. Inflorescences axillary, spikes, 4–12 cm, second, sometimes reduced to single axillary flowers; rachis finely puberulent to gland-tipped pilose, straight or obscurely zigzag, winged, wings 0.2–1 mm wide; bracts glabrous; basal bracts leaflike, with a petiole to 4 mm, ovate, 1.5–2.5 cm, apex acuminate; apical bracts sessile, narrowly oblong-elliptic, 1–1.2 cm, apex acuminate; bracteoles oblong, 2.5–4 mm, apex obtuse. Flowers to 1.5 cm apart on rachis. Calyx 0.9–2 cm, apparently not accrescent, subequally 5-lobed to ca. 1 mm above base; lobes almost colorless, linear, glabrous or sparsely gland-tipped pilose, apex obtuse. Corolla violet, 3.2–4 cm, outside pubescent but silky gray in bud, inside glabrous; tube strongly inflated from near base then widened to ca. 1.5 cm at middle and finally bent to ca. 90° but not narrowed at mouth; lobes ovate, ca. 5 × 7 mm, apex rounded to slightly emarginate. Stamens 4, included; filaments ca. 2.5 mm, all equal in length, glabrous; anther

thecae oblong, ca. 1.5 mm. Ovary glabrous; style ca. 2 cm, glabrous or with a few trichomes. Capsule oblong, 1.1–1.2 cm, glabrous, 4-seeded, apex apiculate. Seeds oblong in outline, ca. 3 × 2 mm, covered with stiff white trichomes. Fl. Aug–Sep, fr. Oct–Nov.

Tsuga forests; 2300–2700 m. Xizang (Zayü) [India].

67. *Strobilanthes pterygorrhachis* C. B. Clarke, J. Linn. Soc., Bot. 25: 54. 1889.

翅轴马蓝 *chi zhou ma lan*

Subshrubs to 3.8 m tall, vigorous, subglabrous. Stems and branches weakly 4-angled. Petiole 2–9 cm, glabrous; leaf blade ovate, ca. 15 × 7.5 cm, glabrous, adaxially darker and with abundant cystoliths, base cuneate and shortly decurrent onto petiole, margin serrate, apex acute to shortly acuminate. Inflorescences terminal or axillary, spikes, secund; rachis 3–25 cm, slightly zigzag, strongly winged, glabrous; bracts at base of spike leaflike, petiolate, lanceolate, to 2 × 0.7 cm but diminishing in size apically to 6 × 3 mm; bracteoles linear-oblancoate, 5–10 mm. Flowers mostly paired, to 4 cm apart basally on rachis but somewhat confluent apically. Calyx 2.5–3.6 cm, subequally 5-lobed to near base; lobes narrowly lanceolate, 2.2–3.2 × ca. 0.3 cm, margin minutely ciliolate, apex narrowed into a finely acuminate or aristate point. Corolla yellow, ca. 3.5 cm, outside pubescent, inside glabrous except for trichomes retaining style; tube short, basally cylindric then abruptly widened and bent just below mouth. Filaments glabrous, shorter pair 3–4 mm, longer pair 5–6 mm; anther thecae oblong, 3–3.5 × ca. 1 mm. Ovary comose; style ca. 3 cm, glabrous. Capsule comose. Fl. Aug.

Moist places in forests; ca. 1800 m. Xizang (Médog) [India].

68. *Strobilanthes urophylla* Nees in A. Candolle, Prodr. 11: 192. 1847.

尾叶马蓝 *wei ye ma lan*

Pteracanthus urophyllus (Nees) Bremekamp; *Strobilanthes urophylla* var. *sikkimensis* C. B. Clarke.

Subshrubs, much branched, glabrous, anisophyllous. Stems 4-angled, glabrous. Petiole 0.8–1.6 cm; leaf blade narrowly ovate-elliptic, 5–14 × 1.5–5.5 cm, abaxially pale green, pubescent along veins, and with inconspicuous cystoliths, adaxially yellowish green, secondary veins 6–9 on each side of midvein, base cuneate to broadly cuneate and decurrent onto petiole, margin remotely serrate, apex shortly acuminate to caudate. Inflorescences axillary, short spikes; bracts leaflike, petiolate, ovate-elliptic, 0.8–4.5 cm, very persistent, abaxially with conspicuous cystoliths, pinnately veined, margin subentire, apex obtuse; bracteoles petiolate, obovate-spatulate, ca. 4 mm, persistent, subglabrous, 3-veined. Flowers in opposite pairs, 1–1.5 cm apart on rachis, in axils of leaflike bracts. Calyx 7–8 mm, pubescent, 5-lobed almost to base; lobes lanceolate with one longer than others, accrescent in fruit, apex acuminate. Corolla pale purple, 2–2.5 cm, ventricose, outside pubescent, inside subglabrous except for trichomes retaining style; tube basally cylindric and ca. 6 mm wide for ca. 5 mm then slightly bent and regularly widened to ca. 1.2 cm at mouth; lobes oblong, ca. 5 ×

4 mm, apex obtuse. Stamens 4, included; filaments hirsute, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2.5 × 1.2 mm; pollen type 3. Ovary comose; style ca. 1.7 cm, hirsute. Capsule ca. 1.4 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, pubescent; areola small. Fl. May–Jun, fr. Jul–Aug.

Evergreen broad-leaved forests; 1200–2000 m. Xizang (Médog) [India].

69. *Strobilanthes inflata* T. Anderson, J. Linn. Soc., Bot. 9: 476. 1867.

锡金马蓝 *xi jin ma lan*

Herbs 50–100 cm tall, branched, isophyllous. Stems straight or somewhat zigzag, glabrous, slightly 4-angled, sulcate, pubescent or with dense brown large-celled trichomes. Petiole 3–3.5(–7.5) cm, subglabrous, pubescent, or densely yellowish brown hirsute; leaf blade oblong-ovate, elliptic, or ovate, 5–20 × 1–10 cm, abaxially hirsute, pubescent, or subglabrous and with conspicuous cystoliths, adaxially pubescent or glabrous except brownish and whitish tomentose along veins, sparsely setose, densely yellowish brown hirsute on midvein, and with numerous cystoliths, secondary veins 6–8 on each side of midvein, base oblique and broadly rounded to cuneate and decurrent onto petiole, margin serrate to crenate, apex acuminate to caudate. Inflorescences spikes, 2.5–12(–21) cm, secund, sometimes reduced to 1 or 2 flower pairs; peduncle 1.5–3 cm; rachis usually geniculate at first node then straight or somewhat zigzag; bracts variable in size and shape with basalmost ones leaflike, with a 3–4 mm petiole, ovate to narrowly ovate, 2–3 × 0.8–1.3 cm, and margin serrate; apical bracts petiolate, obovate, elliptic, or ovate-spatulate, 0.6–3 × 0.3–1.2 cm, persistent, pubescent, margin usually with 1 or 2 teeth; bracteoles oblong to linear, 2–3.5 mm, apex rounded. Flowers 1–2 cm apart on rachis. Calyx 1.1–1.4 cm, white pilose with large-celled gland-tipped trichomes, 5-lobed to base; lobes linear, unequal, reflexed, glabrous in anthesis, sometimes gland-tipped pubescent in fruit, densely covered with white linear cystoliths, margin paler, apex acute. Corolla pinkish blue to blue, 3.5–4 cm, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindric and narrow for ca. 5 mm then abruptly widened to ca. 1.3 cm at mouth, just basal to mouth slightly narrowed and bent to ca. 90°; lobes oblong, ca. 5 × 6 mm. Stamens 4, included; filaments glabrous, shorter pair 3–4 mm and incurved, longer pair 5–6 mm; anther thecae oblong, ca. 2 × 1 mm; pollen type 3. Ovary comose; style ca. 1.8 cm, sparsely gland-tipped pubescent at base. Capsule brownish yellow, narrowly ellipsoid, 1.6–2 cm, glabrous, 4-seeded. Seeds orbicular in outline, ca. 3 mm in diam., villous; areola inconspicuous. Fl. Jun–Nov.

Evergreen broad-leaved forests, streamsides in shady places, forests, forest margins; 1700–3200 m. Xizang, Yunnan [Bhutan, India, Indonesia, Myanmar, Nepal].

1a. Stems, petioles, and inflorescences densely covered with long yellowish brown trichomes; leaf blade broadly ovate, 12–20 × 6–10 cm 69c. var. *aenobarba*

- 1b. Stems, petioles, and inflorescences subglabrous or white pubescent; leaf blade ovate-elliptic, less than 8×6 cm.
 2a. Leaf blade white pubescent 69a. var. *inflata*
 2b. Leaf blade subglabrous 69b. var. *gongshanensis*

69a. *Strobilanthes inflata* var. *inflata*

锡金马蓝(原变种) xi jin ma lan (yuan bian zhong)

Pteracanthus inflatus (T. Anderson) Bremekamp; *Strobilanthes wardii* W. W. Smith.

Stems, petioles, and inflorescences white pubescent. Leaf blade elliptic to ovate, ca. 5.5×3 cm. Fl. Jun–Nov.

Forests; ca. 1700 m. Xizang (Mêdog, Zayü), Yunnan [Bhutan, India, Myanmar, Nepal].

69b. *Strobilanthes inflata* var. *gongshanensis* (H. P. Tsui) J. R. I. Wood & Y. F. Deng, Bot. J. Linn. Soc. 150: 387. 2006.

贡山马蓝 gong shan ma lan

Pteracanthus gongshanensis H. P. Tsui, Acta Bot. Yunnan. 12: 277. 1990; *Strobilanthes unilateralis* J. R. I. Wood.

Stems, petioles, and inflorescences subglabrous. Leaf blade ovate-elliptic, $5-12 \times 1-4.5$ cm. Fl. Aug–Oct, fr. Dec.

Evergreen broad-leaved forests; 1900–2200 m. Yunnan (Gongshan) [Indonesia, Myanmar].

69c. *Strobilanthes inflata* var. *aenobarba* (W. W. Smith) J. R. I. Wood & Y. F. Deng, Bot. J. Linn. Soc. 150: 386. 2006.

铜毛马蓝 tong mao ma lan

Strobilanthes aenobarba W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 13: 185. 1921; *Pteracanthus aenobarbus* (W. W. Smith) C. Y. Wu & C. C. Hu.

Stems, petioles, and inflorescences densely covered with long yellowish brown trichomes. Leaf blade broadly ovate, $12-20 \times 6-10$ cm. Fl. Aug–Oct.

Streamsides in shady places, forest margins; 2300–3200 m. Xizang (Zayü), Yunnan [Indonesia, Myanmar].

70. *Strobilanthes congesta* Terao, Notes Roy. Bot. Gard. Edinburgh 40: 153. 1982.

密序马蓝 mi xu ma lan

Pteracanthus congestus (Terao) C. Y. Wu & C. C. Hu.

Subshrubs 0.6–1.8 m tall, anisophyllous. Stems subterete, whitish to brownish yellow pubescent with large-celled trichomes. Petiole 1–7 mm, densely hirsute; leaf blade ovate-lanceolate, $2-9 \times 0.8-3.5$ cm, smaller of pair ca. 2/3 size of larger one, both surfaces brownish to yellow hirsute, secondary veins 4–7 on each side of midvein and inconspicuous, base attenuate, oblique, and shortly decurrent onto petiole, margin crenate and ciliate, apex acuminate and often falcate. Inflorescences axillary or terminal, spicate with 1–4 small capitula borne singly along rachis; capitula 2–8-flowered, to 4 cm apart; rachis 3–7 cm, often basally with a pair of sterile leaflike bracts so leaves sometimes appearing verticillate, densely white or yellow pi-

lose; bracts linear-oblongate, $3-8 \times 0.8-1.5$ mm, persistent, pilose, apex obtuse; bracteoles ca. 6×1 mm, linear, white pilose. Calyx 5-lobed almost to base; lobes ovate to lanceolate, pilose on both surfaces except basally inside, abruptly narrowed at middle with an obtuse often apically recurved cauda $11-14 \times 1.5-5$ mm; one lobe ca. 2 mm longer than others. Corolla pale whitish purple, ca. 2.5 cm, curved, outside pubescent; tube basally narrow and cylindrical for ca. 6 mm then abruptly inflated and widened to ca. 1 cm at mouth; lobes oblong, ca. 4×3.5 mm. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair 5–6 mm, base pilose; anther thecae oblong, ca. 2×0.5 mm; pollen type 3. Ovary glabrous; style ca. 1.8 cm, pilose and gland-tipped pubescent. Capsule oblong, ca. 10×3 mm, glabrous, 4-seeded; seeds ovate in outline, ca. 3×2.5 mm, pubescent. Fl. Jul–Aug, fr. Dec.

Thickets, tropical forests; 1600–1800 m. Yunnan [Myanmar, ?Nepal].

Strobilanthes congesta is a very distinct species because of the form of its inflorescence and unique calyx.

71. *Strobilanthes larium* Handel-Mazzetti, Symb. Sin. 7: 893. 1936.

闭花马蓝 bi hua ma lan

Herbs to 1.5 m tall, isophyllous. Branches 4-angled, sulcate, silky gland-tipped pubescent. Petiole 2–5 cm, sulcate, subglabrous; leaf blade ovate-elliptic, $(5-7)-12 \times (2-3)-7$ cm, abaxially glabrous except pilose along midvein, glaucous, and with numerous cystoliths, adaxially green and subglabrous except for few large-celled multicellular trichomes along veins, secondary veins 6–8 on each side of midvein, base cuneate and decurrent onto petiole, margin dentate and ciliate, apex acuminate and falcate. Inflorescences axillary, spikes, (1–)3–10 cm; bracts oblong, $1.5-4 \times 0.2-0.5$ cm, variable in size and apically diminishing in size, abaxially densely covered with white large-celled multicellular trichomes especially toward base, margin subentire; bracteoles linear, ca. 4×1 mm, puberulent. Calyx 1–1.2 cm, 5-lobed almost to base; lobes unequal with one larger than others, outside puberulent, margin large-celled multicellular pubescent with gland-tipped trichomes. Corolla purplish, curved, 3.5–4 cm, outside densely whitish pubescent when young but glabrescent, inside densely pubescent when young but glabrescent except for trichomes below lobe bases; tube basally cylindrical and ca. 3 mm wide for ca. 5 mm then ventricose, bent to ca. 90° , and finally abruptly widened to ca. 1.3 cm at mouth; lobes oblong, ca. 5×4 mm, apex emarginate. Stamens 4, included; filaments glabrous, shorter pair 3–4 mm, longer pair 6–7 mm; anther thecae oblong, ca. 3×1 mm. Ovary glabrous; style 2.8–3 cm, apical part pilose. Capsule clavate, ca. 1.5 cm, glabrous except for pilose apex, 4-seeded. Seeds ca. 2×1.5 mm, lenticular, densely covered with scalelike trichomes; areola ca. 0.3 mm. Fl. May–Sep.

• By streams; 600–2700 m. Chongqing, Hubei, Hunan, Sichuan.

72. *Strobilanthes oresbia* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 196. 1918.

山马蓝 shan ma lan

Goldfussia grandissima H. P. Tsui; *Pteracanthus grandissimus* (H. P. Tsui) C. Y. Wu & C. C. Hu; *P. oresbius* (W. W. Smith) C. Y. Wu & C. C. Hu; *Strobilanthes grandissima* (H. P. Tsui) J. R. I. Wood.

Herbs to 2 m tall, erect, nearly isophyllous. Stems 4-angled, densely white pubescent with gland-tipped trichomes, glabrescent. Petiole 2–13 cm, gland-tipped pubescent, glabrescent, apically winged; leaf blade ovate to orbicular, 7–22 × 4–18 cm, pubescent especially along veins, cystoliths abundant on both surfaces, secondary veins 9–11 on each side of midvein, base cuneate, rounded, or sometimes subcordate and decurrent onto petiole, margin deeply dentate or serrate, apex acute to acuminate. Inflorescences axillary, spikes, to 15 cm, secund, sometimes reduced to single flowers; peduncle 0.5–7 cm, densely gland-tipped pubescent; rachis somewhat zigzag; bracts at base of spike leaflike, petiolate, ovate, to 4 × 2 cm, gland-tipped pubescent, base cuneate, margin serrate, apex obtuse; bracts toward spike apex lanceolate, diminishing apically to ca. 10 × 1 mm, margin entire, apex obtuse; bracteoles linear-oblong, ca. 7 × 1 mm, gland-tipped pubescent, apex obtuse. Flowers usually 1 per node, 0.8–2.5 cm apart on rachis. Calyx 1.2–2.1 cm, densely gland-tipped pubescent, 5-lobed almost to base; lobes linear-oblong, apex obtuse; one lobe to 2 mm longer than others. Corolla purplish blue, 4–5 cm, ventricose, outside sparsely white pubescent, inside pubescent; tube basally cylindrical and narrow for ca. 5 mm then bent to ca. 90°, strongly ventricose, and widened to ca. 1.5 cm at mouth; lobes oblong, ca. 6 × 5 mm, apex obtuse. Stamens 4; filaments glabrous, shorter pair ca. 2.5 mm, longer pair ca. 4 mm; anther thecae oblong, ca. 2.5 × 1 mm; pollen type 4. Ovary glabrous; style ca. 2.2 cm, shortly pilose. Capsule oblong, ca. 15 × 2–3 mm, glabrous except for very few stalked glands near apex, 4-seeded. Seeds blackish brown, elliptic in outline, 3–3.5 × ca. 2.5 mm, densely pilose; areola very small. Fl. Jul–Sep, fr. Oct–Dec.

Moist alpine meadows and forests; 1600–3300 m. Chongqing, Sichuan, Xizang (Zayü), Yunnan [India, Myanmar].

73. *Strobilanthes flexa* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 186. 1922.

城口马蓝 cheng kou ma lan

Pteracanthus flexus (Benoist) C. Y. Wu & C. C. Hu.

Herbs to 60 cm tall, isophyllous. Stems 4-angled, glabrescent. Petiole 1–5 cm, thinly pubescent; leaf blade ovate to elliptic, 3.5–15 × 3–7 cm, both surfaces glabrous except basally on abaxial midvein, cystoliths apparently absent, secondary veins 6–8 on each side of midvein, base cuneate and decurrent onto petiole, margin coarsely dentate or serrate, apex acute. Inflorescences axillary or terminal, spikes, 3–6 cm, lax, sometimes reduced to a single flower in axil of apical leaves; rachis gland-tipped pilose; bracts leaflike, oblong-oblong, 1.5–2 × 0.2–0.4 cm, apically diminishing in size, gland-tipped pubescent, apex acute to acuminate; bracteoles oblong, 7–8 × ca. 1 mm, gland-tipped pubescent, apex obtuse. Flowers basally to 1 cm apart on rachis but apically becoming congested. Calyx 0.8–1.2 cm, accrescent in fruit, gland-tipped pubescent, 5-lobed almost to base; lobes linear-oblong, 7–10 × ca. 1 mm, subequal, apex obtuse. Corolla purplish blue, 3.5–4 cm, outside pilose,

inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then abruptly inflated, bent to ca. 90° above middle, and finally widened to ca. 1.4 cm at mouth; lobes ovate, ca. 5 × 5 mm, apex rounded. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 4 mm; anther thecae oblong, ca. 2 × 1 mm, erect; pollen type 4. Ovary comose; style ca. 3.2 cm, sparsely pilose. Capsule oblong, 1.5–1.8 cm, apically gland-tipped pubescent, 4-seeded. Fl. Aug–Sep, fr. Oct–Dec.

• Forests; 1400–3600 m. Chongqing, Guizhou, Hubei, Sichuan, Yunnan.

Strobilanthes flexa appears to intergrade with *S. versicolor* and may just be a more robust form.

74. *Strobilanthes versicolor* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 163. 1912.

变色马蓝 bian se ma lan

Pteracanthus versicolor (Diels) H. W. Li.

Herbs to 50(–100) cm tall, with several annual stems arising from a perennial base, isophyllous. Stems sparsely to densely pubescent, glabrescent. Petiole (0–)1–3 cm, pubescent; leaf blade obovate to suborbicular, 2.5–6 × 1–3.5 cm, both surfaces thinly pilose especially on veins, densely covered with cystoliths, secondary veins 4–6 on each side of midvein, base broadly cuneate and decurrent onto petiole, margin coarsely serrate, apex acute. Inflorescences terminal or axillary, spikes, 4–15 cm, simple or sparingly branched; bracts leaflike, 1.2–3.5 × 0.3–1 cm, persistent, apically diminishing in size, thinly pilose; basal bracts petiolate, suborbicular to oblong-elliptic, margin dentate; apical bracts sessile, narrowly oblong-elliptic, margin entire; bracteoles linear-oblong, 4–8 × 1–2 mm, pilose. Flower pairs 1–1.5 cm apart on rachis even apically. Calyx ca. 1.5 cm, 5-lobed almost to base; lobes linear, 10–11 × ca. 1 mm, subequal, pilose with large-celled trichomes, apex obtuse. Corolla white or blue, 3.5–4 cm, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2.5 mm wide for 1–1.5 cm then abruptly bent to ca. 90° above middle and finally widened to ca. 1.5 cm at mouth; lobes ovate, ca. 6 × 5 mm, apex rounded. Stamens 4, included; filaments pilose, shorter pair ca. 5 mm, longer pair ca. 7 mm; anther thecae oblong, 2–2.5 × ca. 0.8 mm; pollen type 6. Ovary comose; style ca. 2.8 cm, pilose. Capsule ca. 1.4 cm, gland-tipped pubescent, 4-seeded. Seeds ovate in outline, ca. 3 × 3 mm, appressed pubescent. Fl. May–Aug.

• Grasslands at forest margins; 2800–3300 m. Sichuan, S Xizang, Yunnan.

75. *Strobilanthes forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 162. 1912.

腺毛马蓝 xian mao ma lan

Pteracanthus forrestii (Diels) H. P. Tsui; *P. rotundifolius* (Benoist) Bremekamp; *Strobilanthes panpienkaiensis* H. Léveillé; *S. rotundifolia* Benoist.

Herbs to 30–75 cm tall, isophyllous. Stems 4-angled, thinly pilose with gland-tipped trichomes, glabrescent, basally

woody. Leaves subsessile; leaf blade ovate to rarely ovate-oblong, 2–5 × 1.2–3 cm, both surfaces thinly pilose, adaxially with cystoliths, secondary veins ca. 4 on each side of midvein, base rounded, cordate, or rarely cuneate, margin crenate to subentire, apex acute to obtuse. Inflorescences terminal or very rarely also from apical leaf axils, spikes, 5–15 cm; rachis pilose with gland-tipped trichomes; bracts leaflike, pilose with gland-tipped trichomes; basal bracts ovate-elliptic, 1–3 × 1–2 cm, margin obscurely crenate; apical bracts lanceolate, 7–10 × ca. 3 mm, margin entire; bracteoles linear to narrowly oblong, 6–11 × ca. 1 mm, pilose with gland-tipped trichomes. Flowers 1–2.5 cm apart on rachis. Calyx 0.8–1.2 cm, 5-lobed almost to base; lobes linear with one ca. 2 mm longer than others, pilose with gland-tipped trichomes. Corolla blue to purple, 3.2–4 cm, curved, outside with a few trichomes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 5 mm then bent to ca. 90° and widened to ca. 1.5 cm at mouth; lobes ovate, ca. 6 × 7 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 2 mm; longer filament pair ca. 8 mm, shortly pubescent; anther thecae oblong, ca. 2 × 0.8 mm; pollen type 3. Ovary gland-tipped puberulent at tip; style ca. 2.8 cm. Capsule oblong, ca. 1.2 cm, apically gland-tipped pilose, 4-seeded. Seeds dark brown, ovate in outline, ca. 3 mm, pubescent; areola white, small. Fl. Jul–Aug.

- Forests, grass slopes; ca. 3000 m. Yunnan.

Strobilanthes forrestii was misidentified as *S. extensa* (*Pteracanthus extensus*) by Handel-Mazzetti (Symb. Sin. 7: 895. 1936), C. Y. Wu (Index Fl. Yunnan. 2: 1682. 1984), and H. P. Tsui and C. C. Hu (FRPS 70: 136. 2002; Fl. Yunnan. 16: 696. 2006).

76. *Strobilanthes lachenensis* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 465. 1884.

白毛马蓝 bai mao ma lan

Championella xanthantha (Diels) Bremekamp; *Pteracanthus lachenensis* (C. B. Clarke) Bremekamp; *P. leucotrichus* (Benoist) C. Y. Wu & C. C. Hu; *Strobilanthes leucotricha* Benoist; *S. xanthantha* Diels.

Herbs 30–100 cm tall, isophyllous. Stems erect, basally glabrescent, apically pubescent. Petiole 0.5–3.5 cm, thinly pubescent to glabrescent; leaf blade ovate, obovate, or broadly elliptic, 3–11 × 2–6.5 cm, both surfaces thinly white pubescent especially along veins, secondary veins 5–9 on each side of midvein, base cuneate and often decurrent onto petiole, margin serrate to crenate, apex acute to shortly acuminate. Inflorescences axillary or terminal, spikes, 3–10 cm, often forming a diffuse panicle of spikes; rachis gland-tipped pilose; bracts variable in size and shape; basal bracts leaflike, sessile, ovate, 2–5 × 0.5–2 cm, persistent, margin often toothed; apical bracts oblong to sometimes elliptic, 5–12 × 1–2 mm, persistent until flowers fall; bracteoles linear, 4–5 × ca. 1 mm, white gland-tipped pilose. Flowers basally to 2.5 cm apart on rachis but apically congested. Calyx 0.8–1.6 cm, accrescent in fruit, gland-tipped pilose, 5-lobed almost to base; lobes linear, 7–12 × ca. 1 mm, one longer and becoming spatulate. Corolla blue, 3–3.6 cm, curved, outside pubescent on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm, slightly bent at mouth, and gradually

widened to ca. 1.2 cm at mouth; lobes ovate, ca. 4 × 4 mm. Stamens 4, included; shorter filament pair 2–3 mm, glabrous; longer filament pair 7–8 mm, sparsely pilose; anther thecae oblong, ca. 2 × 1.3 mm, erect; pollen type 3. Ovary comose; style 2.7–3.2 cm, sparsely gland-tipped pilose. Capsule 1.1–1.4 cm, gland-tipped pilose at tip, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, densely appressed pubescent. Fl. Jun–Oct.

Forests; 1800–3400 m. Sichuan, Xizang (Dinggyê), Yunnan [Bhutan, India, Nepal].

Strobilanthes lachenensis was incorrectly reported as *Pteracanthus urticifolius* (Kuntze) Bremekamp by H. W. Li (Fl. Xizang. 4: 179. 1985).

77. *Strobilanthes nemorosa* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 97. 1922.

琴叶马蓝 qin ye ma lan

Difflugossa muliensis H. P. Tsui; *Pteracanthus nemorosus* (Benoist) C. Y. Wu & C. C. Hu; *P. panduratus* (Handel-Mazzetti) C. Y. Wu & C. C. Hu; *Strobilanthes pandurata* Handel-Mazzetti.

Herbs to 60 cm tall, much branched, isophyllous. Stems 4-angled, sulcate, pubescent, basally woody. Leaves sessile or with petiole to 1.5 cm; leaf blade lanceolate to oblong-elliptic, occasionally basally pandurate, 5–15(–20) × 1.5–6 cm, both surfaces sparsely pilose but glabrescent, adaxially dark green and densely covered with cystoliths, secondary veins 6–12 on each side of midvein, base rounded to attenuate, margin remotely serrate, apex acuminate. Inflorescences terminal or axillary, spikes, usually several spikes forming a panicle; rachis densely pilose, with gland-tipped trichomes; basal bracts leaflike, ovate-lanceolate, to 6 × 2 cm; apical bracts linear to narrowly oblong-elliptic, 7–12 × 1–3 mm, persistent, pilose with gland-tipped trichomes; bracteoles linear, ca. 5 × 1 mm, pilose with gland-tipped trichomes. Calyx 1–1.5 cm, pilose with gland-tipped trichomes, 5-lobed almost to base; lobes linear with one longer than others, apex obtuse. Corolla blue, 3–3.7 cm, ventricose, outside sparsely pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 5 mm then gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 5 × 4 mm, apex rounded. Stamens 4, included; shorter filament pair ca. 4 mm; longer filament pair ca. 6 mm, base pilose; anther thecae oblong, ca. 2.5 mm; pollen type 3. Ovary comose; style 2.8–3.2 cm, glabrous. Capsule clavate, ca. 1.6 cm, apically gland-tipped pilose, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2 mm, densely appressed pubescent. Fl. Aug.

- *Pinus-Quercus* forests, thickets; 1900–3400 m. Sichuan, Yunnan.

Strobilanthes nemorosa is similar to *S. lachenensis*, differing in little more than leaf shape. It may not be a distinct species.

78. *Strobilanthes extensa* (Nees) Nees in A. Candolle, Prodr. 11: 191. 1847.

棒果马蓝 bang guo ma lan

Goldfussia extensa Nees in Wallich, Pl. Asiat. Rar. 3: 88. 1832; *Pteracanthus claviculatus* (C. B. Clarke ex W. W. Smith) C. Y. Wu ex C. C. Hu; *P. duclouxii* (C. B. Clarke ex Benoist) C.

Y. Wu & C. C. Hu; *P. extensus* (Nees) Bremekamp; *Strobilanthes claviculata* C. B. Clarke ex W. W. Smith; *S. duclouxii* C. B. Clarke ex Benoist.

Subshrubs 0.5–2 m tall, much branched, anisophyllous. Stems erect, glabrous or pilose. Petiole (0–)5–10 mm, narrowly winged, sparsely pubescent; leaf blade ovate, lanceolate, or oblong-lanceolate, 4–15 × 1–5 cm, both surfaces with prominent cystoliths, abaxially subglabrous to pilose, adaxially glabrous or sparsely pilose, secondary veins ca. 5 on each side of midvein, base cuneate, margin remotely serrate, apex acuminate and falcate. Inflorescences axillary or terminal, spikes, to 5 cm, very lax, 2–6-flowered; peduncle and rachis densely hirsute; sterile bracts intergrading with leaves but sessile, ovate to lanceolate, to 6 × 2.5 cm, glabrous or pubescent, base cuneate to cordate; floral bracts ovate to linear, 3–6 × 1.5–4 mm, persistent, gland-tipped pilose; bracteoles oblong to elliptic, ca. 4 × 1–3 mm, gland-tipped pilose. Flowers usually paired, basally to 4 cm apart on rachis but apically closer. Calyx 1–2 cm, strongly accrescent in fruit, gland-tipped pilose, 5-lobed almost to base; lobes oblong-obovate, one lobe 2–3 mm longer than others, apex spatulate and darker green. Corolla pale whitish purple to violet, 3.2–4 cm, ventricose, outside pubescent only on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.2 mm then gradually widened to ca. 1.5 cm and bent at mouth; lobes orbicular, ca. 5 mm in diam. Stamens 4, included; filaments glabrous, shorter pair 3–4 mm, longer pair 7–8 mm; anther thecae oblong, ca. 2.5 × 1 mm, erect; pollen type 3. Ovary glabrous, apex with numerous sessile glands; style ca. 3.2 cm, sparsely pilose. Capsule clavate, 10–16 × ca. 2 mm, apically thinly gland-tipped pilose, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, pubescent; areola small. Fl. Aug–Oct, fr. Oct–Dec.

Mixed forests; 1900–2200 m. Sichuan, Yunnan [Bhutan, India, ?Nepal].

Strobilanthes extensa is very variable in leaf blade, bract, and bracteole shape and in the density of the indumentum.

79. *Strobilanthes spiciformis* Y. F. Deng & J. R. I. Wood, J. Trop. Subtrop. Bot. 18: 473. 2010.

黄连山马蓝 huang lian shan ma lan

Subshrubs to 50 cm tall, anisophyllous. Stems to 5 mm in diam., young part sulcate and angled, subglabrous apart from pubescent at nodes, basally woody. Leaves petiolate or apically subsessile; petiole (0.5–)1.3–2.3(–2.5) cm, glabrous; leaf blade ovate, smaller of pair 4–7 × 2–3.5 cm and larger one 9–15 × 3–6 cm, both surfaces glabrous, adaxially with prominent cystoliths, secondary veins 5 or 6 on each side of midvein, base cuneate and decurrent onto petiole, margin serrate, apex acuminate. Inflorescences terminal, spikes, 4–9 cm; rachis 4-angled, gland-tipped pilose; bracts ovate, ca. 8 × 5 mm, deciduous as flowers open, abaxially sparsely gland-tipped pilose, adaxially glabrous, apex rounded; bracteoles absent. Calyx 1–1.6 cm; lobes linear-oblong, 8–16 × 1–2 mm, unequal with one distinctly longer than others, gland-tipped pilose, margin entire and ciliate, apex acute. Corolla color not noted, probably bluish, ca. 2.5 cm, straight, outside pubescent in bud but soon glabrescent, inside glabrous; tube basally cylindrical and ca. 2 mm

wide for ca. 1 cm then gradually widened to ca. 8 mm at mouth; lobes orbicular, ca. 3 × 3 mm, apex obtuse. Stamens 4, included; filaments pilose, shorter pair ca. 5 mm, longer pair ca. 2 cm; anther thecae oblong, ca. 2 × 1 mm; pollen type 3. Ovary ca. 2.5 × 0.8 mm, glabrous except for a few gland-tipped pilose trichomes at tip; style ca. 2 cm, glabrous. Capsule oblong, 1.5–2 × 0.3–0.4 cm, glabrous except for a few gland-tipped pilose trichomes at tip and along ribs toward tip, 4-seeded. Seeds ovate to suborbicular in outline, ca. 3 × 3 mm, pilose. Fl. Aug–Oct.

• Moist places in forests; 1200–2400 m. Yunnan.

80. *Strobilanthes pseudocollina* K. J. He & D. H. Qin, Acta Phytotax. Sin. 45: 701. 2007.

阳朔马蓝 yang shuo ma lan

Herbs to 50 cm tall, ascending, weakly anisophyllous. Stems terete, lenticellate, glabrous. Petiole 0.5–2.5 cm, sulcate; leaf blade ovate to lanceolate-ovate, 2.5–13 × 1.5–6 cm, smaller of pair 1/2–2/3 size of larger one, glabrous, cystoliths prominent, secondary veins 4–8 on each side of midvein, base obtuse to cuneate, margin subentire to sparsely crenulate, apex acuminate. Inflorescences from terminal leaf axils, spikes, (1–)3–11 cm, 4–16-flowered; bracts subspatulate, 6–10 × 1.5–3 mm, leathery, glabrous, margin ciliate, apex acute; bracteoles lanceolate, ca. 4 × 0.6 mm, margin ciliate. Flower pairs 0.5–1.5 cm apart on rachis. Calyx 0.9–1.1 cm, 5-lobed almost to base; lobes linear, ca. 1 mm wide, unequal, margin ciliate. Corolla purple, ca. 4.5 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 1.5 mm wide for ca. 1 cm then gradually widened to ca. 1.5 cm at mouth; lobes suborbicular, 7–8 × 8–9 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 6 mm, sparsely hirsute; anther thecae oblong, ca. 2.5 × 1 mm, apiculate; connective shortly extended; pollen type 3. Ovary glabrous; style ca. 3 cm, glabrous. Capsule 1–1.5 cm, glabrous. Seeds ovate in outline, ca. 4 × 2 mm, densely pubescent. Fl. Sep–Oct, fr. Oct–Nov.

• Forests on limestone hills; 100–300 m. Guangxi (Yangshuo).

81. *Strobilanthes longzhouensis* H. S. Lo & D. Fang, Guihaia 17: 34. 1997.

龙州马蓝 long zhou ma lan

Perilepta longzhouensis (H. S. Lo & D. Fang) C. Y. Wu & C. C. Hu.

Shrubs to 2.5 m tall, slightly anisophyllous. Stems basally gray, apically purplish black, glabrous. Petiole 0.5–1.5 cm, glabrous; leaf blade lanceolate-ovate to oblong-elliptic, 3–15.5 × 2.5–6 cm, leathery, glabrous, cystoliths numerous, secondary veins 5–7(–9) on each side of midvein and prominent on both surfaces, base cuneate, margin serrulate to undulate, apex acuminate to acute. Inflorescences axillary, branched spikes, 1.5–5 cm, to 4 per leaf axil, sometimes becoming compound and paniculate; bracts ovate, 3–4 × ca. 2 mm, persistent, abaxially glabrous with numerous cystoliths, margin ciliate, apex acute; bracteoles ca. 6 × 1.2 mm. Flowers 1 sterile per node. Calyx 8–10 mm, with prominent cystoliths, 2-lipped; lower lip 2-lobed, upper lip 3-lobed; lobes lanceolate-triangular, ca. 6 mm, mar-

gins white ciliolate. Corolla pale purple, 3–3.5 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then gradually widened to ca. 1.5 cm at mouth; lobes broadly obovate, ca. 5 mm, apex emarginate. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 7 mm, villous; anther thecae oblong, ca. 2 mm; pollen type 3. Ovary glabrous; style ca. 2 cm, basally villous. Capsule oblong, 1.2–1.4 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 2.5 × 2.5 mm, densely covered with appressed trichomes. Fl. Sep–Dec, fr. Dec–Feb.

Hilly limestone areas; 200–500 m. Guangxi, Hainan [Vietnam].

82. *Strobilanthes cystolithigera* Lindau, Bull. Herb. Boissier 5: 651. 1897.

串花马蓝 chuan hua ma lan

Pteracanthus botryanthus (D. Fang & H. S. Lo) C. Y. Wu & C. C. Hu; *Strobilanthes botryantha* D. Fang & H. S. Lo; *S. myriostachya* D. Fang & H. S. Lo.

Subshrubs 1.5–3.5 m tall, isophyllous, drying green. Stems 4-angled, sulcate, glabrous. Petiole 0.5–2 cm, sulcate; leaf blade narrowly elliptic, narrowly ovate, or rarely ovate-elliptic, (2–)4–17 × 1.5–4.5 cm, glabrous, densely covered with linear cystoliths, secondary veins 4–6 on each side of midvein, base cuneate and decurrent onto petiole, margin subentire to irregularly crenate, apex acuminate. Inflorescences axillary, spikes, 2–6(–12) cm, sometimes branched, (2–)8–14-flowered; peduncle 0.5–1.5 cm; bracts elliptic, 4–6 × 3–4 mm, persistent, abaxially with prominent cystoliths and frequently a single black squamate gland, margin ciliolate, apex obtuse to acute; bracteoles ovate-lanceolate, ca. 5 × 1 mm, glabrous except for ciliolate margin, densely covered with cystoliths, apex acute. Flowers in opposite pairs, ca. 0.5 mm apart on rachis. Calyx 8–10 mm, subequally 5-lobed to base; lobes linear-lanceolate, 5–6 × ca. 1 mm, basally overlapping, glabrous, apex obtuse. Corolla purple, 3–4.5 cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for ca. 1 cm then gradually widened to ca. 1.8 cm at mouth; lobes broadly ovate, ca. 6 × 7 mm, apex rounded. Stamens 4, included; filaments pilose, shorter pair ca. 2 mm, longer pair ca. 5 mm; anther thecae oblong, ca. 2 × 1 mm; pollen type 3. Ovary glabrous; style ca. 2.8 cm, hirsute; stigma glabrous. Capsule oblong, ca. 1.7 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 1 cm, pilose; areola small, glabrous. Fl. Sep–Nov, fr. Dec.

Ravines or streambanks on limestone hills; 800–1200 m. Guangxi, Hainan, Yunnan [Vietnam].

83. *Strobilanthes abbreviata* Y. F. Deng & J. R. I. Wood, Bot. J. Linn. Soc. 150: 377. 2006.

短尖马蓝 duan jian ma lan

Shrubs to 3 m tall, isophyllous, drying green. Stems terete, ca. 9 mm in diam., sulcate, striate, glabrous; bark dull brown, smooth. Petiole 1–2.5 cm, glabrous; leaf blade oblong-elliptic, 6–25 × 2.5–9 cm, both surfaces glabrous and with numerous small cystoliths, abaxially olive-green, adaxially dark green,

base long attenuate and decurrent onto petiole, margin serrate, apex tapered, long acuminate, and sometimes falcate. Inflorescences axillary, spikes, 2–14 cm, basally rarely with a reduced second spike, usually some forming a 30–50 cm leafless panicle of spikes; peduncle 1–3 mm; rachis glabrous; bracts broadly oblong-obovate, 5–7 × 3–4 mm, concave, rigid, persistent into fruit, abaxially densely covered with cystoliths and dotted with small sessile brownish glands and often with larger sticky gland-tipped patches along midvein, apex abruptly truncate and with a short deciduous mucro; bracteoles lanceolate to oblong-lanceolate, 10–13 × 1–2 mm, slightly shorter than calyx, concave, rather rigid, glabrous or (rarely) scurfy along margin, abaxially densely covered with cystoliths and with scattered sessile glands sometimes becoming stipitate in fruit, apex obtuse. Flowers arranged in opposite pairs, both usually fertile, basally to 1 cm apart on rachis, apically confluent. Calyx 1.2–1.5 cm, slightly accrescent in fruit, subequally 5-lobed to just above base; lobes narrowly lanceolate, 10–14 × 1–2 mm, glabrous except for apical glands that sometimes become stipitate, outside non-glandular except for a few sessile glands near apex, densely covered with cystoliths, apex acute to acuminate. Corolla bluish purple, 4–4.5 cm, sometimes apically bent, outside glabrous; tube basally cylindrical and ca. 1.5 mm wide for 7–8 mm then ventricose and widened to ca. 1.5 cm at mouth; lobes ovate, ca. 5 × 5 mm. Stamens 4, included; filaments setose, shorter pair ca. 2 mm, longer pair ca. 4 mm; anther thecae narrowly oblong, ca. 3 × 0.5 mm; pollen type 3. Ovary comose; style ca. 2.5 cm, densely villous. Capsule oblong, 17–18 × ca. 3 mm, comose with a few trichomes, 4-seeded. Seeds ovate in outline, flattened, densely pilose; areola small, glabrous. Fl. Jun–Oct, fr. Dec–Mar.

Forests by streams; 200–1500 m. Yunnan [Cambodia, India, Myanmar, Thailand, Vietnam].

84. *Strobilanthes biocullata* Y. F. Deng & J. R. I. Wood, Novon 20: 406. 2010.

湖南马蓝 hu nan ma lan

Subshrubs 0.8–2 m tall, gregarious, anisophyllous. Stems subterete, bisulcate, glabrous. Petiole 1–5 cm, sulcate, glabrous; leaf blade oblong-elliptic to elliptic, smaller of pair 6–12 × 2–4 cm and larger ones 13–26 × 4–8 cm, both surfaces glabrous and densely covered with cystoliths, secondary veins 5–10 on each side of midvein and prominent on both surfaces, tertiary veins prominent, base narrowly cuneate, margin serrate, apex acuminate. Inflorescences axillary, simple spikes, (3–)7–10 cm, solitary, leafless; rachis glabrous; bracts ovate, 3.5–5 × 2.5–3 mm, glabrous, abaxially with 2 swollen bulges resembling eyes, apex long acuminate to mucronate; bracteoles ovate-oblong, ca. 4 × 2 mm, somewhat fragile and caducous, glabrous, apex acuminate to mucronate. Flowers in opposite pairs, 1–2 cm apart on rachis. Calyx 1–1.2 cm, sparsely pubescent when young, glabrescent, subequally 5-lobed almost to base; lobes yellowish brown, lanceolate, 1-veined, apex long acuminate. Corolla purplish blue, 3.5–4 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for 6–11 mm then bent to ca. 90° and gradually widened to ca. 2 cm at mouth; lobes ovate, ca. 4 × 7 mm, apex emarginate. Stamens 4, included; filaments pilose, shorter pair ca. 3 mm, longer pair ca. 1 cm; anther thecae oblong, ca. 3 × 1.2 mm;

pollen type 3. Ovary ca. 3 mm, glabrous; style ca. 2.8 cm. Capsule clavate, 1.5–2 cm, glabrous, 4-seeded. Seeds ca. 3 × 3 mm, lenticular, densely appressed pubescent; areola small. Fl. Jul–Oct, fr. Nov.

• On rocks by streams; 200–800 m. Guangdong, Guangxi, Hunan.

85. *Strobilanthes longespicata* Hayata, Icon. Pl. Formosan. 9: 83. 1920.

长穗马蓝 chang sui ma lan

Semnostachya longespicata (Hayata) C. F. Hsieh & T. C. Huang.

Shrubs 1.2–2 m tall, much branched, drying green. Branches ± 4-angled, sulcate, glabrous. Petiole 1–3 cm, sulcate, glabrous; leaf blade lanceolate to oblong-oblancheolate, 7–20 × 2–6 cm, glabrous, both surfaces with abundant cystoliths, secondary veins 6–10 on each side of midvein, base attenuate, margin remotely serrate, apex acute to shortly acuminate. Inflorescences axillary, spikes, (5–)10–15 cm, simple or less commonly branched; peduncle and rachis pubescent; bracts narrowly ovate to lanceolate, (5–)10–13 × (3–)6–7 mm, glabrous, cystoliths prominent, base truncate, apex acuminate; bracteoles linear-lanceolate, 9–11 × ca. 2 mm, scurfy-pubescent, apex acuminate. Flowers in opposite pairs, basally ca. 1 cm apart on rachis but apically imbricate. Calyx 5-lobed almost to base, accrescent in fruit; lobes linear-lanceolate, 9–15 × 2–3 mm, scurfy-pubescent, prominently 1-veined, margin ciliate, apex acuminate. Corolla pale purple, 4.5–5 cm, straight or slightly bent, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1 cm then gradually widened to 1.5–2 cm at mouth; lobes oblong, ca. 8 × 7 mm, subequal, apex emarginate. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 8 mm; anther thecae oblong, 2–2.5 × ca. 1 mm; pollen type 3. Ovary cylindrical-oblong, apically slightly hispid; style filiform, 3–3.2 mm, hispid. Capsule linear, ca. 1.7 cm, glabrous, 4-seeded. Seeds suborbicular in outline, ca. 3 mm in diam., flattened. Fl. Sep–Dec, fr. Feb–May.

• Forests; 200–1000 m. Taiwan.

86. *Strobilanthes myura* Benoist, Bull. Mus. Natl. Hist. Nat. 28: 95. 1922.

鼠尾马蓝 shu wei ma lan

Shrubs, drying green. Stems subterete, glabrous. Petiole 1–2.5 cm, glabrous; leaf blade ovate to elliptic, to 7–16 × 3–6 cm, glabrous, adaxially with cystoliths, secondary veins 8–11 on each side of midvein, base cuneate, margin crenate-dentate, apex acuminate. Inflorescences axillary, spikes, 5–8 cm; bracts ovate-triangular, 6–9 × ca. 2 mm, glabrous, midvein abaxially lined by cystoliths, margin sparsely ciliate, apex acuminate; bracteoles narrowly ovate, ca. 3.5 × 1 mm, margin sparsely ciliate, apex acuminate. Flowers basally ca. 1.5 cm apart on rachis but apically somewhat confluent. Calyx 5-lobed to base; lobes lanceolate, ca. 7 × 1 mm, equal, margin minutely ciliate, apex acuminate and shortly apiculate. Corolla purple, 2.5–3.4 cm, outside glabrous, inside glabrous except for trichomes retaining

style; tube basally cylindrical and narrow for ca. 5 mm then bent and abruptly widened to 1–1.2 cm at mouth; lobes oblong-ovate, ca. 5 × 4 mm. Stamens 4, included; filaments pilose, shorter pair ca. 4 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 2 × 1 mm; pollen type 3. Ovary sparsely pilose; style ca. 2.8 cm, sparsely pilose. Capsule unknown. Fl. Jul.

• Thickets; 600–800 m. Guizhou (Dushan).

87. *Strobilanthes guangxiensis* S. Z. Huang, Guihaia 6: 179. 1986.

广西马蓝 guang xi ma lan

Pteracanthus guangxiensis (S. Z. Huang) C. Y. Wu & C. C. Hu.

Herbs to 1 m tall, perennial, anisophyllous. Stems erect or ascending, densely pubescent, soon glabrescent. Petiole 0.3–3.5 cm, densely pubescent; leaf blade elliptic, smaller of pair 4–9 × 2.3–4.5 cm and larger one 9–14(–18) × 3.3–6(–8) cm, abaxially pale green and slightly pubescent, adaxially green, glabrous, and densely covered with prominent ca. 0.5 mm cystoliths, secondary veins 4–8 on each side of midvein, base cuneate, margin entire or slightly undulate, apex acuminate. Inflorescences axillary or terminal, spikes, 4–8 cm; peduncle ca. 4 cm, densely pubescent; rachis densely pubescent, usually with 2–6 nodes; bracts oblong to lanceolate, 10–13 × 2–3 mm, persistent, abaxially pubescent, adaxially glabrous, margin ciliate, apex acuminate to caudate; bracteoles oblong to lanceolate, 11–16 × 2–3 mm, abaxially pubescent, adaxially glabrous, margin ciliate, apex acuminate to caudate. Flowers 0.8–1.2 cm apart on rachis. Calyx ca. 1 cm, 5-lobed almost to base; lobes linear, ca. 9 × 1 mm, equal, outside pubescent, inside glabrous, margin ciliate from middle apically, apex acute. Corolla purple, 3.5–4 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1.2 cm then gradually widened to ca. 1.4 cm at mouth; lobes oblong, ca. 5 × 5 mm, unequal, apex emarginate. Stamens 4, included; filaments glabrous, shorter pair ca. 3 mm, longer pair ca. 6 mm; anther thecae oblong, 2.5–3.5 × ca. 2 mm. Ovary oblong, ca. 3 mm, pilose at tip; style 2.5–3 cm, villous; stigma linear, glabrous. Capsule not seen. Fl. Oct–Dec.

• Shaded valleys; 200–400 m. Guangxi (Liujiang).

This species is used medicinally.

88. *Strobilanthes compacta* D. Fang & H. S. Lo, Guihaia 17: 31. 1997.

密苞马蓝 mi bao ma lan

Subshrubs to 2 m tall, slightly anisophyllous. Stems 4-angled, glabrous. Petiole 1–3 cm, sulcate, glabrous; leaf blade elliptic to ovate-elliptic, 8.5–15 × 3.5–7 cm, both surfaces glabrous and densely covered with cystoliths, adaxially blackish when dry, secondary veins 8 or 9 on each side of midvein and prominent, base cuneate to attenuate, margin serrate, apex acuminate. Inflorescences axillary, simple spikes, 1.5–8(–10) × ca. 1.2 cm, very dense; basal sterile bracts ovate-oblong, 3–4 × ca. 1 cm, leathery, abruptly narrowed at middle with a long caudate apex; floral bracts ovate, 2–3 × 0.4–0.6 cm, leathery, persistent, abaxially glabrous, margin minutely ciliate or glabrous, apex

long acuminate; bracteoles ovate, ca. 1×0.5 cm, glabrous, densely covered with cystoliths, margin minutely ciliolate, apex acuminate. Flowers imbricate on rachis. Calyx 5-lobed almost to base; lobes broadly lanceolate, $12\text{--}15 \times 3\text{--}4$ mm, subequal, basally overlapping, margin minutely ciliolate but otherwise glabrous, apex acuminate. Corolla purple, $3.5\text{--}4.8$ cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then slightly ventricose and gradually widened to ca. 1.5 cm at mouth; lobes ovate, ca. 5 mm, apex rounded. Stamens 4, included; filaments pubescent, shorter pair ca. 2.5 mm, longer pair ca. 6 mm; anther thecae oblong, ca. 3×1 mm, glabrous. Ovary sparsely hirsute at tip; style ca. 2.5 cm, slightly hirsute at base and glabrous apically. Capsule fusiform, ca. 1.5 cm, somewhat hirsute on apical part, 4-seeded. Seeds ovate in outline, ca. 3×2 mm, densely appressed hairy. Fl. Aug–Sep.

- Forests on limestone hills; 200–300 m. Guangdong, Guangxi.

89. *Strobilanthes heteroclita* D. Fang & H. S. Lo, Guihaia 17: 32. 1997.

异序马蓝 yi xu ma lan

Herbs or subshrubs, to 1.5 m tall, gregarious, isophyllous. Stems \pm 4-angled, sulcate, glabrous. Petiole to 5 cm; leaf blade broadly ovate, elliptic, broadly elliptic, or suborbicular, $5.5\text{--}19 \times 2.5\text{--}10$ cm, glabrous, both surfaces densely covered with linear cystoliths, secondary veins 7–10 on each side of midvein and prominent, base rounded to broadly cuneate, margin serrate, apex shortly caudate. Inflorescences axillary from apical axils, spikes, 1.5–5 cm, compact, 1–3 per axil; peduncle 0–1.3 cm; bracts broadly lanceolate, $11\text{--}12 \times 3\text{--}4$ mm, leathery, persistent, rust-colored scurfy pubescent, abaxially with black sessile glands, glabrescent, apex acuminate; bracteoles lanceolate, 8–9 mm, leathery, rust-colored tomentose, apex acuminate. Calyx 1.2–1.4 cm, 5-lobed almost to base; lobes narrowly lanceolate, with 2 lobes slightly longer than others, apex acuminate. Corolla purple to light blue, $3.5\text{--}4$ cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1 cm then ventricose and gradually widened to ca. 1.2 cm at mouth; lobes ovate, $5\text{--}6 \times 5\text{--}6$ mm, apex obtuse. Stamens 4, included; filaments pilose, shorter pair ca. 2 mm, longer pair ca. 7 mm; anther thecae oblong, 2–2.5 mm. Ovary sparsely hirsute at tip; style ca. 1.7 cm; stigma hirsute. Capsule fusiform, 1.5–2 cm, pilose at tip, 4-seeded. Seeds ovate in outline, ca. 3×3 mm, appressed pubescent. Fl. Jul–Sep, fr. Nov.

- Forests on limestone hills; 100–500 m. Guangxi (Long'an).

90. *Strobilanthes mucronatopuncta* Lindau, Bull. Herb. Boissier 5: 650. 1897.

尾苞马蓝 wei bao ma lan

Shrubs to 1.5 m tall, weakly anisophyllous, drying blackish. Stems \pm 4-angled, glabrescent. Petiole 0.5–3 cm, scurfy pubescent; leaf blade ovate, elliptic, or oblong-elliptic, $8.5\text{--}15 \times 3.5\text{--}7$ cm, abaxially puberulent along veins, adaxially glabrous, both surfaces densely covered with cystoliths, secondary veins 8 or 9 on each side of midvein, base cuneate to attenuate, margin dentate, serrulate, or subentire, apex acuminate. In-

florescences terminal and from apical leaf axils, simple spikes, 4–9 cm, solitary; peduncle 0.3–1 cm, rust-colored pubescent; bracts lanceolate, ca. 2.4×0.6 cm, persistent, rust-colored pilose, apex acuminate; bracteoles lanceolate, ca. 5×4 mm, rust-colored pilose, apex long acuminate and aristate. Flowers imbricate on rachis. Calyx 1.7–1.8 cm, 5-lobed almost to base; lobes lanceolate, $16\text{--}17 \times$ ca. 2 mm, subequal, rust-colored pilose, apex acuminate. Corolla purple, $3.5\text{--}4$ cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1 mm then gradually widened to ca. 1.3 cm at mouth; lobes ovate, ca. 7×7 mm, apex obtuse. Stamens 4, included; filaments sparsely pubescent, shorter pair ca. 2 mm, longer pair ca. 4 mm; anther thecae oblong, ca. 2×1.3 mm; pollen type 3. Ovary pilose; style ca. 2.7 cm; stigma ca. 3 mm, pubescent. Capsule fusiform, 2–2.2 cm, pilose, 4-seeded. Seeds ovate in outline, ca. 4×3.5 mm, appressed pubescent. Fl. Sep–Oct, fr. Dec.

Forests on mountain slopes; 400–700 m. Guangxi, Yunnan [Vietnam].

91. *Strobilanthes fimbriata* Nees in Wallich, Pl. Asiat. Rar. 3: 85. 1832.

流苏马蓝 liu su ma lan

Endopogon macrostegius Nees; *Strobilanthes fimbriata* var. *majuscula* W. W. Smith; *S. macrostegia* (Nees) C. B. Clarke; *S. neesii* Kurz.

Shrubs 0.6–1.5 m tall, drying blackish green. Branches terete, apically thinly brown pubescent, glabrescent. Petiole 0.5–2.5 cm; leaf blade oblong-elliptic to elliptic, to 18×7 cm, both surfaces with cystoliths, abaxially glabrous except for brown scurfy pubescence along veins, adaxially glabrous, secondary veins 8–12 on each side of midvein, base cuneate, margin subentire, apex acuminate. Inflorescences axillary, spikes, 3–6 cm, with 6–8 flower pairs; peduncle 0–0.3 cm, glabrous; bracts obovate, ca. 13×5 mm, both surfaces densely covered with cystoliths, apical margin ciliate with rigid brown trichomes, apex abruptly narrowed to a mucro; bracteoles oblanceolate, ca. 1×3 mm, abaxially apically fulvous pubescent, margin with a distinct shoulder, apex cuspidate. Flowers imbricate on rachis. Calyx 1–1.3 cm at anthesis, accrescent to ca. 2 cm; lobes linear-lanceolate, to 18×1 mm, apex long acuminate. Corolla violet, ca. 4.5 cm, outside and inside glabrous except for trichomes retaining style; tube basally cylindrical for ca. 8 mm then abruptly widened to 1.5–1.8 cm at mouth; lobes broadly ovate, ca. 6×7 mm, apex rounded. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 7 mm, pilose; anther thecae oblong, ca. 3×1.5 mm, erect; pollen type 3. Ovary glabrous except for densely comose tip; style ca. 4 cm, pilose. Capsule oblong, 1–2 cm, comose, 4-seeded. Seeds ovate in outline, ca. 4×3 mm, densely appressed pilose. Fl. May.

Moist places in forests; ca. 1000 m. Xizang (Médog) [Bangladesh, India, Myanmar].

92. *Strobilanthes brunnescens* Benoist, Bull. Mus. Natl. Hist. Nat. 27: 544. 1921.

折苞马蓝 zhe bao ma lan

Perilepta refracta (D. Fang, Y. G. Wei & J. Murata) C. Y. Wu & C. C. Hu; *Strobilanthes refracta* D. Fang, Y. G. Wei & J. Murata.

Subshrubs 1–2 m tall, anisophyllous, drying blackish. Stems 4-angled, sulcate, brownish puberulent. Petiole 0.2–2.5 cm, brownish puberulent; leaf blade ovate to rarely obovate-elliptic, (2–)4.5–21 × (1–)2.5–9.5 cm, both surfaces densely covered with cystoliths, abaxially puberulent along veins, adaxially glabrous, secondary veins 4–12 on each side of midvein, base cuneate, margin subentire to crenulate, apex shortly acuminate. Inflorescences axillary, spikes, 1.5–3 cm; bracts oblong-obovate with a broad base, ca. 11 × 4–5 mm, concave, rigid, abaxially pubescent and with marginal cilia of rigid brown trichomes, apex acute and becoming reflexed; bracteoles linear, 10–12 × ca. 1 mm, apically brownish pubescent, apex often reflexed. Flowers imbricate on rachis. Calyx 1.2–1.5 cm, subequally 5-lobed; lobes lanceolate, ca. 10 × 1 mm, pubescent with rigid trichomes, apex acuminate. Corolla purple, ca. 4 cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for ca. 1 cm then gradually widened to ca. 2 cm at mouth; lobes ovate, ca. 5 mm, apex emarginate. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 7 mm, pilose; anther thecae oblong, 3–3.5 mm. Ovary hirsute at tip; style ca. 2.7 cm, pilose; stigma obconical. Capsule not seen. Fl. Dec.

Forests in valleys; 300–500 m. Guangxi, Yunnan [Vietnam].

93. *Strobilanthes nobilis* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 471. 1884.

沙坝马蓝 sha ba ma lan

Strobilanthes petelotii Benoist.

Herbs 50–100 cm tall, perennial, isophyllous, drying blackish. Stems ± 4-angled, sulcate, reddish brown pubescent, apically with distinctive scattered wartlike excrescences. Petiole 1–1.5 cm or leaves sessile; leaf blade ovate-lanceolate to oblong-elliptic, sometimes pandurate, 7–17(–25) × 3.5–8 cm, glabrous or thinly pilose especially on abaxial veins, margin, and adaxial surface, abaxially paler, adaxially with cystoliths, secondary veins 6 or 7 on each side of midvein and somewhat parallel, base cuneate to rounded and auriculate, margin crenate, apex shortly acuminate. Inflorescences axillary or terminal, simple or basally branched spikes, 5–20 cm, often forming a panicle when mature; rachis reddish brown puberulent, apically becoming very slender; bracts lanceolate, 1.5–2 × 0.2–0.4 cm, persistent, glabrous except for ciliolate margin, occasionally developing stipitate glands when mature, 1-veined, apex long acuminate; bracteoles similar to bracts but narrowly linear-lanceolate, ca. 18 × 1 mm. Flowers 1–1.5 cm apart on rachis and apically not very confluent. Calyx 1–2.2 cm, accrescent in fruit, 5-lobed almost to base; lobes linear, 14–20 × ca. 1 mm, equal, occasionally developing stipitate glands when mature, margin ciliolate, apex finely acuminate. Corolla blue, ca. 3 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2.5 mm wide for ca. 7 mm then strongly bent and abruptly widened to 1–1.4 cm at mouth; lobes ovate, ca. 4 × 4 mm, apex emarginate. Stamens 4, included; shorter filament pair 2–3 mm, glabrous; longer filament pair ca.

7 mm, basally pilose; anther thecae oblong, ca. 3 × 1.2 mm; pollen type 3. Ovary glabrous, with 2 ovules per locule; style ca. 2.5 cm, pilose. Capsule 1.2–2.2 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, densely appressed pubescent; areola small. Fl. Sep–Nov, fr. Mar.

Streamsides, forests; 1100–1800 m. Yunnan [India, Myanmar, Vietnam].

94. *Strobilanthes polyneuros* C. B. Clarke ex W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 198. 1918.

多脉马蓝 duo mai ma lan

Shrubs to 2 m tall, isophyllous. Stems 4-angled, sulcate, glabrous. Petiole 1–5 cm, sulcate, subglabrous; leaf blade elliptic to broadly lanceolate, 13–30 × 5–11 cm, glabrous, abaxially paler, adaxially with numerous cystoliths, secondary veins 12–20 on each side of midvein and parallel, base cuneate, margin serrate, apex acuminate. Inflorescences axillary, spikes, 2–8 cm, composed of 1–5 simple dense spikes arising at apex of peduncle forming a dense cluster of spikes; peduncle ca. 1 cm, puberulent and sometimes with warty excrescences; sterile bracts ovate at base of spike, ca. 1 × 0.5 cm; floral bracts lanceolate, 1.5–3 × 0.3–0.4 cm, abaxially minutely puberulent, apex finely acuminate and slightly incurved; bracteoles linear-lanceolate, ca. 2 cm, minutely puberulent, apex acuminate. Flowers imbricate on rachis. Calyx 1.7–2.3 cm, somewhat accrescent and sometimes becoming gland-tipped pilose at maturity, 5-lobed almost to base; lobes linear-lanceolate, thinly puberulent, apex finely acuminate. Corolla purple, 3.5–4 cm, straight, outside sparsely pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 1.4 cm then gradually widened to ca. 1.4 cm at mouth; lobes orbicular, ca. 6 mm in diam. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 5 mm; anther thecae oblong, ca. 3.5 × 1 mm; pollen type 3. Ovary sparsely gland-tipped pilose at tip; style ca. 3.5 cm, pilose. Capsule ca. 20 × 3 mm, glabrous or with a very few apical trichomes, 4-seeded. Seeds ovate in outline, 3–5 × 2–4 mm, densely appressed pubescent. Fl. Oct–Jan, fr. Mar.

Forests; 200–1600 m. Yunnan [Myanmar, Thailand, Vietnam].

95. *Strobilanthes bipartita* Terao ex J. R. I. Wood, Kew Bull. 58: 122. 2003.

双萼马蓝 shuang e ma lan

Subshrubs 50–100 cm tall, isophyllous. Stems terete, glabrous. Petiole 0.7–1.5 cm, sparsely brown pilose; leaf blade elliptic, 6–22 × 3.5–10 cm, hirsute especially along veins, abaxially cystoliths prominent, secondary veins 12–16 on each side of midvein, base cuneate, margin remotely serrate, apex acute. Inflorescences axillary or terminal, abbreviated to headlike spikes, ca. 2 cm; peduncle 2–4 mm, brown pubescent; bracts ovate, 3–3.5 × 1.2–1.7 cm, glabrous except for ciliate margin, margin entire or apically serrate, apex acute; bracteoles oblong-lanceolate, ca. 15 × 3 mm, glabrous. Calyx with appressed silky trichomes on both surfaces, 2-lipped; lower lip ca. 1.2 cm, 2-lobed, lobes triangular and ca. 1.5 × 1.5 mm; upper lip ca. 1.3 cm, 3-dentate to ca. 1 mm. Corolla purplish blue, ca. 4 cm, ventricose, outside glabrous, inside glabrous except for trichomes

retaining style; tube basally cylindric and ca. 2 mm wide for ca. 1.2 cm then gradually widened to ca. 1.4 cm at mouth; lobes ovate, ca. 5×7 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 2 mm, glabrous; longer filament pair ca. 4.5 mm, sparsely pilose; anther thecae oblong, ca. 3×1 mm. Ovary glabrous; style ca. 3.2 cm, pilose. Capsule not seen. Fl. Dec.

Thickets on limestone hills; 300–900 m. Yunnan (Jinghong) [Laos].

96. *Strobilanthes retusa* D. Fang, Acta Phytotax. Sin. 38: 187. 2000.

凹苞马蓝 ao bao ma lan

Perilepta retusa (D. Fang) C. Y. Wu & C. C. Hu.

Herbs to 80 cm tall, branched, anisophyllous. Stems black when dry, 4-angled, glabrous, winged between nodes, wing 0.5–2 mm wide. Leaves sessile; leaf blade elliptic, rhombic-elliptic, obovate, or ovate, $6.5\text{--}20.5 \times 4\text{--}8.5$ cm, abaxially glabrous except sparsely pilose along veins, adaxially pubescent and densely covered with cystoliths, secondary veins 5–9 on each side of midvein and prominent on both surfaces, basally attenuate to rarely broadly cuneate, base auriculate, amplexicaul, and decurrent onto petiole, margin crenate, apex acute to acuminate. Inflorescences axillary or terminal, subcapitate, $2.5\text{--}3.5 \times 2\text{--}2.5$ cm, elongating after flowering; peduncle 1–4 cm; bracts ovate, ca. 2.2×1.5 cm, abaxially puberulent, base cordate, margin deeply crenate, apex acute; bracteoles elliptic, $1.4\text{--}1.6 \times$ ca. 0.7 cm, margin undulate, apex obtuse to emarginate. Calyx ca. 1.2 cm, accrescent to ca. 1.8 cm in fruit, subequally 5-lobed; lobes oblanceolate, puberulent, lower 2 ca. 9.5 mm and connate at base, upper 3 ca. 1.2 cm and extremely shortly connate. Corolla white with purplish stripes on upper lobes, ca. 4 cm, slightly curved, outside glabrous; tube basally cylindric and narrow for ca. 1 cm then gradually widened to ca. 2 cm at mouth; lobes oblong, ca. 5×5 mm, apex subrounded. Stamens 4, included; filaments pilose, shorter pair ca. 2.5 mm and basally sparsely pilose, longer pair ca. 5 mm; anther thecae oblong, 3–4 mm. Ovary glabrous; style ca. 2.5 cm, pubescent; stigma unequally 2-lobed. Capsule ellipsoid, ca. 1.8 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 2.5×2.5 mm, densely appressed pilose. Fl. Jul.

• Moist places by streams; 500–600 m. Guangxi (Huanjiang).

97. *Strobilanthes cruciata* (Bremekamp) Terao, Acta Phytotax. Geobot. 31: 59. 1980.

四苞马蓝 si bao ma lan

Tetragoga cruciata Bremekamp, Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 41(1): 300. 1944; *T. nagensis* Bremekamp.

Subshrubs 1–2 m tall, anisophyllous. Stems 4-angled, sulcate, rust-colored hirsute or glabrous. Petiole 1–1.5 cm, pubescent; leaf blade ovate to ovate-lanceolate, $4\text{--}13 \times 1.5\text{--}5.5$ cm, smaller of pair ca. 1/3 size of larger one, abaxially pale white tomentose especially along midvein, adaxially sparsely tomentose and brownish green when dry, secondary veins 7–9 on each side of midvein, base cuneate, margin serrate and ciliate,

apex acuminate. Inflorescences axillary or terminal, subcapitate; peduncle 0–2.5 cm, gland-tipped pilose; outer bracts leaf-like, petiolar base forming a rigid involucre around capitulum, $1\text{--}2 \times 0.5\text{--}1$ cm, outside densely brownish gland-tipped pilose to subglabrous, inside glabrous, apical laminar portion ovate, $2\text{--}4 \times 2\text{--}3$ cm, and erect; inner bracts linear-pandurate, $12\text{--}16 \times 3\text{--}5$ mm, abaxially pilose and apically gland-tipped pubescent, adaxially glabrous, margin entire, apex acute; bracteoles narrowly linear, ca. 13×1 mm. Calyx ca. 1.1 cm, outside pilose except glabrous toward base, inside apically silky villous, margin apically ciliate. Corolla white, ca. 2.5 cm, curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindric and ca. 3 mm wide for ca. 1 mm then ventricose and gradually widened to ca. 1.2 cm at mouth; lobes ovate, ca. 4×4 mm, apex obtuse. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 6 mm, hirsute; anther thecae oblong, ca. 3×1 mm, erect, apiculate; connective shortly excurrent; pollen type 1. Ovary oblong, glabrous; style ca. 2.2 cm, gland-tipped pilose. Capsule fusiform, ca. 1.5 cm, glabrous, 4-seeded. Seeds brown, ovate in outline, ca. 4×3 mm, densely appressed pubescent; areola small. Fl. Dec–Jul.

Dense moist mixed forests; 800–1500 m. Hainan, Xizang (Médog), Yunnan [India, Indonesia, Myanmar, Thailand].

Strobilanthes cruciata is a very distinct species with unique inflorescence structure and unusual pollen combined with the calyx sericeous inside.

98. *Strobilanthes simonsii* T. Anderson, J. Linn. Soc., Bot. 9: 474. 1867.

西蒙马蓝 xi meng ma lan

Subshrubs to 1 m tall, anisophyllous. Stems and branches 4-angled, sulcate, tomentose. Petiole 2–10 mm, sulcate, tomentose; leaf blade ovate-elliptic, smaller one $1.2\text{--}4 \times 0.6\text{--}1.4$ cm and larger one $3.5\text{--}18 \times 1.6\text{--}6.5$ cm, both surfaces tomentose, secondary veins 5–7 on each side of midvein, base cuneate and oblique, margin crenulate-serrate, apex acuminate and falcate. Inflorescences axillary, capitate, few flowered; peduncle 0.2–1 cm, pubescent; bracts variable in size and shape; outermost bracts leaflike, pandurate with a constricted middle and broad petiolar base, $3\text{--}4 \times$ ca. 0.5 cm; inner bracts lanceolate, $13\text{--}20 \times$ ca. 3 mm, abaxially tomentose, apex acute; bracteoles linear, ca. 2×0.3 cm, abaxially apically pubescent. Calyx ca. 1.4 cm, subequally 5-lobed almost to base; lobes linear, outside apically pilose, apex acute. Corolla white, ca. 4 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindric and ca. 2.5 mm wide for ca. 8 mm then gradually widened to ca. 1.8 cm at mouth; lobes oblong, ca. 6×5 mm, apex rounded. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 1 cm, hirsute; anther thecae oblong, ca. 2×1 mm, base divaricate, apex apiculate; connective shortly excurrent. Ovary glabrous; style ca. 3.2 cm, hirsute. Capsule clavate, 1.8–2 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3×2 mm, densely pubescent. Fl. Mar–Aug.

Forests; 1300–1700 m. Xizang (Médog) [Bhutan, India].

99. *Strobilanthes echinata* Nees in Wallich, Pl. Asiat. Rar. 3: 85. 1832.

长苞马蓝 chang bao ma lan

Goldfussia echinata (Nees) N. P. Balakrishnan; *Strobilanthes jugorum* Benoist; *Tetraglochidium jugorum* (Benoist) Bremekamp.

Herbs to 2 m tall, anisophyllous. Stems subterete to 4-angled, sulcate, pubescent with brownish trichomes or glabrescent. Leaves petiolate but apicalmost ones sessile; petiole 0.5–4 cm, flat, slightly winged, pubescent or glabrous; leaf blade ovate, elliptic, or ovate-lanceolate, 4–20 × 1.5–7.5 cm, smaller of pair ca. 1/2 size of larger one, both surfaces pilose to subglabrous and with cystoliths, abaxially pale green, adaxially green, secondary veins 7–11 on each side of midvein, base cuneate and decurrent onto petiole, margin crenate-serrate, apex acuminate. Inflorescences capitate, 4–8-flowered, enveloped by bracts; peduncle short, usually simple; outer sterile bracts sessile, ovate, ovate-oblong, or oblong-ovate, 3–5 × 2–2.5 cm, equal or unequal, persistent, margin dentate, apex obtuse, rounded, or fimbriate; inner bracts fertile, obovate to spatulate, 2–3 × 0.7–0.8 cm, margin ciliate; bracteoles linear to oblanceolate, 13–23 × 1.5–3 mm, pubescent or glabrous, margin entire or sometimes dentate or fimbriate toward apex, apex acuminate. Calyx 1.5–2 cm, pubescent, 5-lobed almost to base; lobes linear, 12–19 × 1–2 mm, subequal, outside apically pubescent. Corolla violet, 4.5–5.5 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.5 mm then ventricose and widened to ca. 1.5 cm at mouth; lobes ovate, 8–9 × 8–10 mm, apex rounded. Fertile stamens 4, included; shorter filament pair 3–5 mm, glabrous; longer filament pair 5–7 mm, pilose; anther thecae oblong, 2–3 × ca. 2 mm, apex apiculate; connective excurrent; staminode occasionally present, small or inconspicuous; pollen type 3. Ovary glabrous; style ca. 2.5 cm, hirsute. Capsule fusiform, 1.2–1.8 cm, glabrous, 4-seeded. Seeds brown, ovate in outline, 3–5 × 2.5–4 mm, pilose; areola small. Fl. May–Sep.

Moist forests; 100–2200 m. Guangdong, Guangxi, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

Strobilanthes echinata has been misidentified in the recent literature as *Tetraglochidium gigantodes* (Lindau) C. Y. Wu & C. C. Hu (*Strobilanthes gigantodes* Lindau) by D. Fang et al. (Guihaia 17: 38. 1997), C. C. Hu (FRPS 70: 157. 2002), and C. C. Hu and X. P. Fu (Higher Pl. China 10: 373. 2004).

100. *Strobilanthes cuneata* (Shakya) J. R. I. Wood, Edinburgh J. Bot. 51: 218. 1994.

楔叶马蓝 xie ye ma lan

Dossifluga cuneata Shakya, J. Jap. Bot. 50: 99. 1975.

Herbs to 30 cm tall, isophyllous. Stems 4-angled, glabrous. Petiole ca. 5 mm; leaf blade obovate to broadly elliptic, 4.5–7 × 2–3.5 cm, abaxially sparsely pilose along veins, adaxially glabrous and densely covered with cystoliths, secondary veins 6 or 7 on each side of midvein, base narrowly cuneate, margin serrate and ciliate, apex acuminate. Inflorescences axillary, subsessile clusters; bracts leaflike, obovate, 6–12 × 6–8 mm, cystoliths

prominent, margin dentate; bracteoles linear-oblanceolate, 2–4 mm. Calyx 1.2–1.5 cm, 5-lobed almost to base; lobes linear-lanceolate, 1–1.5 mm wide, subequal, margin ciliate. Corolla blue, campanulate, 3–4 cm, outside glabrous except for cilia along veins, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.2 cm then gradually widened to ca. 1.4 cm at mouth; lobes orbicular, ca. 8 mm in diam. Stamens 4, included; filaments glabrous; shorter filament pair ca. 3 mm, equal, incurved; longer filament pair ca. 8 mm, unequal, incurved; anther thecae spherical, ca. 1.2 mm in diam., nodding; pollen type 3. Ovary glabrous; style 2.8–3.2 cm. Capsule obovoid, ca. 10 × 3 mm, glabrous, 4-seeded. Seeds suborbicular in outline, ca. 1.5 mm, long pilose; areole large. Fl. Aug.

Forests; ca. 2500 m. Xizang (Nyalam) [Nepal].

101. *Strobilanthes glomerata* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 475. 1867.

球序马蓝 qiu xu ma lan

Goldfussia glomerata Nees in Wallich, Pl. Asiat. Rar. 3: 88. 1832.

Subshrubs to 1 m tall, strongly anisophyllous. Stems and branches 4-angled to subterete, setose. Petiole 0.6–3 cm, densely pubescent; leaf blade elliptic, broadly elliptic, or narrowly ovate, 5.5–19 × 2.7–10 cm, smaller of pair ca. 1/5 size of larger one, both surfaces densely pubescent with purplish trichomes, secondary veins 5–7 on each side of midvein, base oblique, rounded, and decurrent onto petiole, margin serrate with shallow widely spaced teeth and ciliate with red multicellular trichomes, apex acuminate. Inflorescences capitate; bracts variable in size and shape; outer bracts sterile, lanceolate, ca. 3 × 0.6 cm, densely pubescent with purplish trichomes, margin serrate; inner bracts lanceolate, ca. 1.6 × 0.4 cm, margin entire and ciliate, apex acuminate; bracteoles lanceolate, 8–12 × ca. 2 mm, pubescent. Calyx ca. 1.5 cm, 5-lobed almost to base; lobes 10–13 × ca. 1.5 mm, slightly unequal, outside pubescent with purplish trichomes especially apically, inside glabrous. Corolla purple, 4–6 cm, subventricose, outside pubescent with gland-tipped trichomes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for 0.6–1.6 cm then bent to ca. 90° and gradually widened to ca. 1.7 cm at mouth; lobes ovate, ca. 4 × 7 mm, apex retuse. Stamens 4, included; filaments glabrous, shorter pair ca. 1.5 mm, longer pair 7–9 mm and unequal; anther thecae obliquely ellipsoid, ca. 1.5 mm; pollen type 3. Ovary glabrous; style ca. 3 cm, glabrous. Capsule fusiform, ca. 12 × 3 mm, glabrous, 4-seeded. Seeds ovate in outline, ca. 2 × 2 mm, densely pubescent; areola small. Fl. Aug–Oct.

Forests; 1000–1500 m. Xizang (Cona) [India].

Strobilanthes glomerata is introduced in Indonesia.

102. *Strobilanthes capitata* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 475. 1867.

头花马蓝 tou hua ma lan

Goldfussia capitata Nees in Wallich, Pl. Asiat. Rar. 3: 88. 1832.

Subshrubs or perennial herbs, to 1 m tall, much branched, anisophyllous. Stems decumbent to ascending, pilose, glabrescent. Petiole 1–3 cm; leaf blade lanceolate, elliptic-ovate, or elliptic, 4–14 × 1.5–9 cm, abaxially pubescent along veins but often glabrescent, adaxially sparsely pilose and with numerous cystoliths, secondary veins 6 or 7 on each side of midvein, base attenuate and oblique, margin serrate, apex acuminate. Inflorescences axillary, pedunculate heads, ovoid to ellipsoid, 1.5–2 × 1–3 cm, 1–3 per axil, sometimes forming a panicle of heads with reduced leaves; peduncle 1–6 cm, glabrous or pubescent, simple or branched, sometimes with a sterile bract at branching point; outer floral bracts sterile, ovate, 1.5–2.3 cm, not overtopping capitula, concave, deciduous as flowers open, pubescent or glabrous, margin crenate, apex obtuse, acute, or acuminate; inner bracts oblong-elliptic, 1.3–1.6 cm, margin entire or with 1 or 2 teeth; bracteoles oblong-elliptic, 7–11 mm, caducous, pilose. Calyx pale green, ca. 1.2 cm, accrescent to ca. 2 cm in fruit, 5-lobed almost to base; lobes linear-oblongate, equal, outside pubescent, margin ciliate. Corolla blue, 4.3–5.5 cm, straight, outside thinly pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for ca. 1.5 cm then gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 5 × 4 mm. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm and nodding, longer pair 7–8 mm and unequal; anther thecae spherical, ca. 1.2 mm in diam., incurved; pollen type 3. Ovary gland-tipped pilose; style ca. 3.5 cm, thinly pilose. Capsule oblong, 1.4–2 cm, apical half gland-tipped pilose, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, pubescent; areola small. Fl. Sep–Feb.

Forests; 900–1700 m. Xizang (Mainling, Nyalam) [Bhutan, India, Myanmar, Nepal].

103. *Strobilanthes speciosa* Blume, Bijdr. 799. 1826.

美丽马蓝 mei li ma lan

Baphicacanthus multibractealatus Hung T. Chang & H. Zhu; *Goldfussia speciosa* (Blume) Bremekamp.

Subshrubs or herbs, to 1.2 m tall, perennial, anisophyllous. Stems ascending, apically pubescent. Petiole 0.5–2 cm, hirsute; leaf blade of smaller pair ovate to suborbicular and ca. 3 × 1.6 cm and of larger pair ovate and 12.5–16.5 × 6–8 cm, both surfaces hirsute, adaxially with numerous prominent linear cystoliths, secondary veins 7–9 on each side of midvein, base oblique and decurrent onto petiole, margin irregularly crenate-dentate, apex acute to caudate. Inflorescences axillary, heads, narrowly ovoid, 1–2.5 × 1–1.5 cm, borne on simple or 3-furcate branches; peduncle 1–3 cm, simple or branched and sometimes with a sterile bract at branching point, hirsute; sterile bracts resembling small leaves; floral bracts lanceolate, 1.2–2.3 × 0.7–1 cm, overtopping capitula, abaxially brownish pubescent with gland-tipped trichomes, margin entire and ciliate, apex acuminate and falcate; bracteoles oblanceolate, 7–13 × ca. 2 mm, abaxially pilose, margin ciliate. Calyx outside hirsute, 5-lobed almost to base; lobes oblanceolate, 7–15 × ca. 0.2 mm, subequal, margin ciliate, apex acute. Corolla purplish blue, 3.5–5 cm, ventricose, outside gland-tipped pilose, inside glabrous; tube basally cylindrical and ca. 2.5 mm wide for ca. 1 cm then gradually widened to ca. 1.5 cm at mouth; lobes ca. 5 × 4 mm,

apex rounded. Stamens 4, included; filaments glabrous, shorter pair 1–2 mm and nodding, longer pair 4–6 mm; anther thecae spherical, ca. 1.2 mm in diam., incurved; pollen type 3. Ovary comose; style ca. 3.7 cm; stigma unequally 2-lobed. Capsule fusiform, 1.5–1.8 × ca. 0.4 cm, apically with a few gland-tipped trichomes, 4-seeded. Seeds brown, ovate in outline, ca. 3 × 2.5 mm, appressed pilose. Fl. Sep–Dec, fr. Jan.

Forests; 500–1800 m. Yunnan [Cambodia, Indonesia, Laos, Malaysia, Thailand, Vietnam].

This species intergrades with *Strobilanthes capitata*, from which it differs in little more than the narrower heads overtopped by the floral bracts and may not be distinct.

Strobilanthes speciosa has been misidentified as *Goldfussia glomerata* Nees by C. C. Hu (FRPS 70: 164. 2002).

104. *Strobilanthes kingdonii* J. R. I. Wood, Edinburgh J. Bot. 51: 244. 1994.

合页草 he ye cao

Subshrubs 0.5–3 m tall, branched, slightly anisophyllous. Stems 4-angled, bifariously pilose, apically glabrescent. Petiole 0.5–2 cm, pubescent; leaf blade ovate, 5–12 × 1.5–5 cm, both surfaces pubescent, abaxially slightly paler, secondary veins 5–8 on each side of midvein, base long attenuate, margin crenate to serrate, apex acute to acuminate and slightly falcate. Inflorescences axillary, dense headlike spikes, borne on a short usually simple or (2 or)3-furcate peduncle; peduncle 1–3 cm, pilose; rachis sparsely pilose; outer sterile bracts leaflike, lanceolate to narrowly oblong-elliptic, 1.3–2.7 × 0.3–0.8 cm, pubescent, margin dentate; floral bracts ovate, ovate-elliptic, or subrhomboidal, 7–10 × 2–4 mm, persistent, abaxially ciliate with long non-glandular white trichomes and scattered shorter white trichomes, apex obtuse; bracteoles linear-oblongate, 4–8 × 1.5–2 mm, persistent, margin ciliate with long white trichomes and sometimes stalked glands at apex, apex obtuse to acute. Calyx outside densely pilose with scattered long white trichomes mixed with numerous gland-tipped trichomes, inside glabrous, subequally 5-lobed to base, not accrescent; lobes narrowly oblong to lanceolate, 7–9 × ca. 1.5 mm, apex acute. Corolla purple, blue, or rose, 3.5–4.2 cm, straight, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and 1.5–2 mm wide for ca. 8 mm then ventricose and widened to ca. 1.2 cm at mouth; lobes broadly ovate, ca. 7 × 6 mm, apex rounded. Stamens 4, included; shorter filament pair 1.5–3.5 mm, glabrous; longer filament pair 6–8 mm, pilose; anther thecae shortly ellipsoid, ca. 1.2 mm, incurved; pollen type 3. Ovary apically gland-tipped pilose; style 1.7–1.9 mm, sparsely pilose. Capsule oblong, ca. 1 cm, gland-tipped pilose, 4-seeded. Seeds ca. 3 × 1.8 mm, pubescent. Fl. Mar, Jul, Nov.

● Evergreen broad-leaved forests by streams; 1500–2800 m. Xizang (Médog, Zayü), Yunnan (Fugong).

Strobilanthes kingdonii was mistakenly treated as *Sympagis monadelpha* (Nees) Bremekamp by C. C. Hu (FRPS 70: 176. 2002) and C. C. Hu and X. P. Fu (Higher Pl. China 10: 378. 2004) and also as *Sympagis petiolaris* (Nees) Bremekamp by C. C. Hu (FRPS 70: 178. 2002).

105. *Strobilanthes lamiifolia* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 476. 1867.

蒙自马蓝 meng zi ma lan

Goldfussia lamiifolia Nees in Wallich, Pl. Asiat. Rar. 3: 88. 1832; *G. austinii* (C. B. Clarke ex W. W. Smith) Bremekamp; *G. feddei* (H. Léveillé) E. Hossain; *G. hancockii* (C. B. Clarke ex W. W. Smith) Bremekamp; *G. mahongensis* (H. Léveillé) E. Hossain; *G. rotundifolia* (D. Don) Bremekamp; *Ruellia rotundifolia* D. Don; *Strobilanthes austinii* C. B. Clarke ex W. W. Smith; *S. feddei* H. Léveillé; *S. hancockii* C. B. Clarke ex W. W. Smith; *S. mahongensis* H. Léveillé.

Herbs 30–60 cm tall, erect, much branched, isophyllous. Stems slender, decumbent and often rooting at nodes, bifariously pilose or glabrescent. Petiole 0–3 cm but apically leaves sessile, densely yellowish brown pilose; leaf blade elliptic, ovate, obovate, or ovate-lanceolate, 1–7(–11) × 1–4(–6) cm, abaxially glabrous or pilose, adaxially dark green and glabrous or sparsely pilose, secondary veins 4–7 on each side of midvein, base cuneate and often decurrent onto petiole, margin serrulate to crenulate, apex acute. Inflorescences terminal or axillary from apical leaf axils, spikes, 2–5 cm; peduncle 0–6 cm, pubescent; sterile bracts resembling reduced leaves; floral bracts imbricate, oblong to ovate-elliptic, 1.1–2.5 cm, concave, caducous or somewhat persistent after flowering, dull green, abaxially pubescent and covered with cystoliths, margin usually crenulate; bracteoles narrowly oblong-elliptic, 6–7 × 1–2 mm, scarious and caducous, abaxially puberulent. Calyx 0.8–1.4 cm, outside gland-tipped ciliate, 5-lobed almost to base; lobes linear-oblong with one distinctly longer than others, apex acute. Corolla purplish red to blue, 3.5–5 cm, ventricose, outside pubescent; tube basally cylindrical and ca. 2 mm wide for ca. 1.2 cm then slightly curved and gradually widened to ca. 1.2 cm at mouth; lobes orbicular, 5–6 mm in diam. Stamens 4, included; filaments subglabrous, shorter pair ca. 2 mm and strongly reflexed, longer pair ca. 7 mm; anther thecae subspherical, ca. 1.2 mm; pollen type 3. Ovary comose; style 3.2–3.5 cm. Capsule fusiform, ca. 1.2 cm, glabrous except for few trichomes at tip, 4-seeded. Seeds light brown, ovate in outline, ca. 2.5 × 2 mm, densely pubescent; areola small, glabrous. Fl. Aug–Nov.

Dry grasslands and open *Pinus* forests; 1000–2600 m. Guizhou, Sichuan, SE Xizang, Yunnan [Bhutan, India, Nepal].

Strobilanthes lamiifolia was misidentified as *S. oligocephala* by Q. H. Chen (Fl. Guizhou. 10: 257. 2004).

106. *Strobilanthes penstemonoides* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 477. 1867 [*“pentstemonoides”*].

圆苞马蓝 yuan bao ma lan

Goldfussia penstemonoides Nees in Wallich, Pl. Asiat. Rar. 3: 88. 1832 [*“pentstemonoides”*]; *G. flexuosa* Nees; *Ruellia capitata* Buchanan-Hamilton ex D. Don.

Herbs to 1 m tall, anisophyllous. Stems 4-angled, sulcate, subglabrous. Leaves subsessile; leaf blade elliptic to elliptic-lanceolate, 4–15 × 1–4 cm, abaxially glabrous but sometimes pubescent along veins, adaxially glabrous, secondary veins 5–7

on each side of midvein, base cuneate, margin serrulate, apex acute. Inflorescences terminal, abbreviated headlike spikes, simple or 3-furcately branched, sometimes with 1 or a few distant flowers; peduncle gland-tipped pilose; bracts orbicular, 6–9 mm in diam., unequal in size, soon scarious and caducous, glabrous; bracteoles absent. Calyx 0.5–1.2 cm, strongly accrescent in fruit, 5-lobed almost to base; lobes linear, unequal with one slightly longer than others, outside gland-tipped pilose. Corolla violet, ca. 3.5 cm, slightly curved, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then gradually widened to ca. 1.2 cm at mouth; lobes ovate, ca. 4 × 4 mm. Stamens 4, included; filaments subglabrous, shorter pair ca. 4 mm and curved, longer pair 7–8 mm; anther thecae spherical, ca. 1.3 mm in diam., incurved; pollen type 3. Ovary pilose at tip; style ca. 2.8 cm, sparsely hirsute. Capsule clavate, ca. 1.2 cm, gland-tipped pubescent, 4-seeded. Seeds suborbicular in outline, ca. 2.5 mm in diam., pubescent. Fl. Aug–Nov, fr. Sep–Dec.

Mountain slopes; 2100–2300 m. SE Xizang, Yunnan [Bhutan, India, Nepal].

107. *Strobilanthes ningmingensis* D. Fang & H. S. Lo, Guihaia 17: 39. 1997.

宁明马蓝 ning ming ma lan

Goldfussia ningmingensis (D. Fang & H. S. Lo) C. Y. Wu ex C. C. Hu.

Herbs or subshrubs, to 40 cm tall, branched, anisophyllous. Stems 4-angled, sulcate, glabrous except for pubescent nodes. Petiole 3–7 cm; leaf blade ovate-elliptic, smaller of pair 1–1.7 × 0.7–1.2 cm and larger one 3–5.5 × 2–3 cm, both surfaces glabrous, abaxially cystoliths prominent, whitish, and dense along veins, adaxially with prominent linear cystoliths, secondary veins 4–6 on each side of midvein, base subrounded, margin serrulate, apex acute to acuminate. Inflorescences axillary or terminal, headlike simple spikes, 3- or 4-flowered; peduncle ca. 3 cm, apically thickened; bracts elliptic, 6–12 mm, caducous, abaxially densely covered with cystoliths, margin ciliate, apex acute; bracteoles linear, ca. 5 × 1 mm, caducous, abaxially sparsely hirsute. Calyx 5-lobed almost to base; lobes oblong-elliptic, 6–7 × ca. 1.5 mm, slightly unequal with one longer than others, outside glabrous, margin ciliate. Corolla purple, ca. 4 cm, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2.5 mm wide for ca. 1.2 cm then gradually widened to ca. 1.3 cm at mouth; lobes orbicular, ca. 6 mm in diam., apex emarginate. Stamens 4, included; filaments glabrous; shorter filament pair ca. 3 mm, equal, incurved; longer filament pair 6–8 mm, unequal, erect; anther thecae subspherical, ca. 1.3 mm in diam., nodding. Ovary sparsely gland-tipped pilose at tip; style ca. 3 cm, sparsely gland-tipped pilose at base. Capsule not seen. Fl. Dec.

● Limestone hills; 200–300 m. Guangxi (Ningming).

Known only from the type, *Strobilanthes ningmingensis* is very close to, and may be conspecific with, the very variable *S. dimorphotricha*, differing only in the non-glandular calyx, which may be only a development stage.

108. *Strobilanthes dimorphotricha* Hance, J. Bot. 21: 355. 1883.

球花马蓝 qiu hua ma lan

Herbs 40–150 cm tall, perennial, much branched, isophyllous or anisophyllous. Stems apically somewhat zigzag, glabrous or yellowish pubescent. Petiole 0.5–1.5 cm, sparsely pubescent or glabrous; leaf blade elliptic, elliptic-lanceolate, ovate, oblong, or oblong-elliptic, 1.5–15 × 0.5–4.5 cm, smaller of pair 1/3–2/3 size of larger one, adaxially dark green, white appressed pubescent, and with slightly prominent cystoliths, abaxially glabrous or whitish pubescent along veins and with or without multicellular trichomes, secondary veins 5–7 on each side of midvein and sometimes forming a net near margin, base cuneate to attenuate, margin serrulate, apex acuminate, caudate, or acute. Inflorescences axillary or terminal, headlike spikes, subspherical, very compact, 2- or 3-flowered, usually 1–3 spikes forming a forked panicle; peduncle ca. 2.5 cm, glabrous or pubescent; bracts ovate-elliptic, 1–1.3 cm, caducous, glabrous, apex acute to acuminate; bracteoles lanceolate, ca. 5 mm, caducous. Calyx 7–9 mm, accrescent to 1.5–1.7 cm, 5-lobed almost to base; lobes lanceolate, gland-tipped pubescent, one lobe slightly longer than others. Corolla violet, 3–4 cm, slightly curved, outside subglabrous to sparsely pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 5 mm then ventricose and gradually widened to ca. 1.5 cm at mouth; lobes orbicular, 5–6 mm in diam., subequal, apex emarginate. Stamens 4, included; filaments glabrous; shorter filament pair ca. 2 mm, equal, incurved; longer filament pair 5–7 mm, unequal, erect; anther thecae spherical, ca. 1 mm in diam.; pollen type 3. Ovary pilose; style ca. 3.5 cm, pilose. Capsule oblong-clavate, 1.4–1.8 cm, gland-tipped pubescent, 4-seeded. Seeds ca. 2.5 × 2.5 mm, lenticular, pubescent. Fl. Aug–Feb(–Apr).

Thickets on limestone hills, streamsides, thickets by streams; 200–2200 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Laos, Myanmar, Thailand, Vietnam].

Strobilanthes dimorphotricha has mistakenly been considered to be synonymous with *Goldfussia* (= *Strobilanthes*) *penstemonoides* by many authors.

- 1a. Leaf blade ovate, elliptic, or elliptic-lanceolate, pairs at each node quite unequal in size, apex acuminate to caudate 108a. subsp. *dimorphotricha*
 1b. Leaf blade oblong to oblong-elliptic, pairs at each node equal to subequal in size, apex acute 108b. subsp. *rex*

108a. *Strobilanthes dimorphotricha* subsp. *dimorphotricha*

球花马蓝(原亚种) qiu hua ma lan (yuan ya zhong)

Goldfussia chaffanjonii (H. Léveillé) E. Hossain; *G. dimorphotricha* (Hance) Bremekamp; *G. equitans* (H. Léveillé) E. Hossain; *G. geniculata* (C. B. Clarke) Bremekamp; *G. psilostachys* (C. B. Clarke ex W. W. Smith) Bremekamp; *G. seguinii* (H. Léveillé) C. Y. Wu & C. C. Hu; *Strobilanthes burkii* Dunn;

S. chaffanjonii H. Léveillé; *S. equitans* H. Léveillé; *S. geniculata* C. B. Clarke; *S. geniculata* var. *integra* C. B. Clarke; *S. gracilis* T. Anderson (1867), not Beddome (1864); *S. laxicalyx* Hayata; *S. marchandii* H. Léveillé; *S. psilostachys* C. B. Clarke ex W. W. Smith; *S. seguinii* H. Léveillé.

Leaf blade ovate, elliptic, or elliptic-lanceolate, pairs at each node quite unequal in size, apex acuminate to caudate. Fl. Aug–Nov(–Apr).

Thickets on limestone hills, streamsides; 200–2200 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Vietnam].

108b. *Strobilanthes dimorphotricha* subsp. *rex* (C. B. Clarke) J. R. I. Wood, Kew Bull. 61: 19. 2006.

泰国马蓝 tai guo ma lan

Strobilanthes rex C. B. Clarke, Bot. Jahrb. Syst. 41: 68. 1907; *Goldfussia anfractuosa* (C. B. Clarke) Bremekamp; *G. rex* (C. B. Clarke) Bremekamp; *S. anfractuosa* C. B. Clarke; *S. penstemonoides* (Nees) T. Anderson var. *anfractuosa* (C. B. Clarke) Benoist; *S. penstemonoides* var. *rex* (C. B. Clarke) Benoist.

Leaf blade oblong to oblong-elliptic, pairs at each node equal to subequal in size, apex acute. Fl. Dec–Feb.

Thickets by streams; 600–1600 m. Yunnan [Laos, Myanmar, Thailand, Vietnam].

109. *Strobilanthes glandibracteata* D. Fang & H. S. Lo, Guihaia 17: 38. 1997.

腺苞马蓝 xian bao ma lan

Goldfussia glandibracteata (D. Fang & H. S. Lo) C. Y. Wu ex C. C. Hu.

Herbs to 50 cm tall, anisophyllous. Stems 4-angled, sulcate, bifariously pubescent. Petiole (0–)3–7 mm, sparsely pubescent; leaf blade ovate-elliptic to rarely narrowly ovate or lanceolate, smaller of pair 2–3.5 × 0.4–2.9 cm and larger one 5.5–12.5 × 2–4.5 cm, glabrous or sparsely pubescent along veins, cystoliths prominent, secondary veins 4–7 on each side of midvein, base attenuate, margin serrulate, apex caudate to acuminate. Inflorescences axillary, pedunculate heads; peduncle 0.6–3.5 cm, simple or 3-furcately branched, sulcate, bifariously pubescent, apically thickened; bracts elliptic to ovate-elliptic, 6–13 mm, caducous, multicellular gland-tipped pubescent, abaxially densely covered with cystoliths, apex acute; bracteoles lanceolate, ca. 5 × 1 mm. Calyx 5-lobed almost to base; lobes lanceolate to linear, 6–8 mm, unequal with one longer than others, outside multicellular gland-tipped pubescent. Corolla purple, ca. 3.5 cm, outside sparsely gland-tipped pilose but subglabrous at anthesis, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 8 mm then gradually widened to ca. 1.2 cm at mouth; lobes ovate, ca. 3 mm, apex emarginate. Stamens 4, included; filaments pilose; short filament pair ca. 2 mm, equal, incurved; longer filament pair 7–8 mm, unequal; anther thecae subspherical, ca. 1.3 mm in diam., nodding. Ovary brownish gland-tipped pilose; style ca. 2.8 cm, gland-tipped pilose. Capsule not seen. Fl. Oct.

- Limestone hills; 400–600 m. Guangxi (Lingyun).

Known only from the type, *Strobilanthes glandibracteata* is very close to and may be conspecific with the very variable *S. dimorphotricha*, differing only in the densely gland-tipped bracts.

110. *Strobilanthes formosana* S. Moore, J. Bot. 15: 294. 1877.

台湾马蓝 tai wan ma lan

Goldfussia formosana (S. Moore) C. F. Hsieh & T. C. Huang.

Herbs to 80 cm tall, perennial, branched, isophyllous. Stems stout, 4-angled, sulcate, hirsute, basally rooting at nodes. Petiole (0–)2–6 mm; leaf blade lanceolate-ovate to obovate, 3.5–14 × 1–5 cm, sparsely pubescent, secondary veins 5–9 on each side of midvein, base attenuate and decurrent onto petiole, margin serrate, apex acuminate. Inflorescences axillary, headlike spikes, compact, 1–3-flowered, sometimes several spikes forming a terminal panicle; peduncle 1–4 cm, pubescent; bracts variable in shape and size; outermost bracts linear-lanceolate; inner bracts imbricate, broadly ovate, 5–9 × 4–5 mm, concave, caducous but sometimes persistent after anthesis, margin ciliate, apex acuminate. Calyx ca. 1 cm, 5-lobed almost to base; lobes linear, unequal, sometimes slightly long hirsute. Corolla purplish blue, 3–3.5 cm, slightly bent, outside sparsely pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 3 mm wide for ca. 6 mm then slightly ventricose and gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 5 × 6 mm, apex emarginate. Stamens 4, included; short filament pair ca. 2 mm, equal, incurved, glabrous; longer filament pair ca. 6 mm, unequal, erect, pilose; anther thecae spherical, ca. 1.2 mm in diam., incurved; pollen type 3. Capsule ellipsoid, ca. 2 cm, 4-seeded. Seeds ovate in outline, ca. 2 mm, densely appressed pubescent. Fl. Aug–Oct.

- Forests in ravines; 700–2300 m. Taiwan.

111. *Strobilanthes ovatibracteata* H. S. Lo & D. Fang, Guihaia 17: 40. 1997.

卵苞马蓝 luan bao ma lan

Goldfussia ovatibracteata (H. S. Lo & D. Fang) C. Y. Wu ex C. C. Hu.

Herbs or subshrubs, 0.5–2 m tall, branched, anisophyllous. Stems 4-angled to subterete, sulcate, retrorsely pubescent. Petiole 3–10 mm, grooved, pubescent; leaf blade ovate-elliptic to rarely ovate, smaller of pair 1–4 × 0.5–2 cm and larger one 3–10.5 × 1.5–4.5 cm, glabrous, cystoliths prominent, whitish, and dense along veins, secondary veins 3–6 on each side of midvein, base attenuate and oblique, margin serrulate, apex acute. Inflorescences axillary, pedunculate heads, 3- or 4-flowered, sometimes forming small axillary panicles; peduncle 1–3 cm, simple or 3-furcate, pubescent, apically thickened; bracts broadly ovate to rarely obovate, 4–13 mm, caducous, abaxially subglabrous and densely covered with cystoliths, margin ciliate, apex acute; bracteoles linear, ca. 5 × 2 mm. Calyx 5-lobed almost to base; lobes linear to lanceolate, 6–7 mm, slightly unequal with one longer than others, pilose. Corolla purple, 3.5–4.3 cm, ventricose, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2

mm wide for ca. 8 mm then gradually widened to ca. 1 cm at mouth; lobes ovate, ca. 4 mm, apex emarginate. Stamens 4, included; filaments glabrous; shorter filament pair ca. 2 mm, incurved; longer filament pair 7–8 mm, unequal, erect; anther thecae subspherical, ca. 1.3 mm in diam. Ovary gland-tipped pilose at tip; style 2.8–3.5 mm. Capsule 15–16 × 3–4 mm, oblong, apically gland-tipped pilose, 4-seeded. Seeds ovate in outline, ca. 2 × 2 mm, pubescent. Fl. Oct, fr. Dec.

- Forests; 300–900 m. Guangxi.

112. *Strobilanthes hupehensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 193. 1918.

湖北马蓝 hu bei ma lan

Herbs 40–60 cm tall, isophyllous. Stems erect, glabrous. Petiole ca. 1 cm, glabrous; leaf blade lanceolate to ovate-lanceolate, 9–14 × 2.5–4 cm, glabrous, secondary veins 5–8 on each side of midvein, base cuneate, margin serrate, apex acuminate. Inflorescences axillary, headlike spikes, compact, simple; peduncle 1–11 cm, very slender; bracts ovate, ca. 5 × 3 mm, caducous, apex acute; bracteoles absent. Calyx 5–8 mm, outside gland-tipped pilose, 5-lobed almost to base; lobes linear-oblong with one much longer than others, apex acute. Corolla purplish blue, 2.5–3.5 cm, straight, outside pilose, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then gradually widened to ca. 1 cm at mouth; lobes oblong, ca. 4 × 4 mm, apex obtuse. Stamens 4, included; filaments glabrous; shorter filament pair ca. 3 mm, equal, incurved; longer filament pair 6–7 mm, unequal, erect; anther thecae spherical, ca. 1.2 mm in diam., nodding; pollen type 3. Ovary sparsely pilose; style ca. 2.6 cm. Capsule oblong, ca. 1 cm, 4-seeded. Seeds ovate in outline, ca. 3 × 3 mm, pubescent. Fl. Jul–Oct.

- Forests; 200–1800 m. Hubei, Hunan.

The very slender peduncles combined with the isophyllous habit make *Strobilanthes hupehensis* very distinctive.

113. *Strobilanthes oxycalycina* J. R. I. Wood, Edinburgh J. Bot. 51: 250. 1994.

尖萼马蓝 jian e ma lan

Subshrubs 1–2.5 m tall, forming small bushes, isophyllous or slightly anisophyllous. Stems rounded, somewhat sulcate, glabrous, apically densely covered with whitish cystoliths. Petiole 0.5–1.7 cm, glabrous; leaf blade broadly elliptic to oblong-elliptic, 5–14 × 2–7 cm, both surfaces glabrous with prominent cystoliths, secondary veins 6–9 on each side of midvein, base cuneate, margin serrate, apex acuminate. Inflorescences terminal, abbreviate to headlike spikes, simple or 3-furcate branched, often with a few flowers some distant below head; peduncle 2–4 cm, glabrous; bracts ovate, ca. 7 × 3 mm, herbaceous, caducous, thinly pubescent, apex shortly acuminate; bracteoles oblong-obovate, ca. 3 × 1–2 mm, apex acute. Calyx ca. 9 mm, accrescent to ca. 1.1 cm in fruit, 5-lobed almost to base; lobes linear to narrowly oblong-elliptic, equal, outside pubescent with gland-tipped trichomes, inside glabrous, apex acute. Corolla blue, 3–4 cm, straight or slightly curved, outside gland-tipped pubescent, inside glabrous except for trichomes retaining style;

tube basally cylindrical and ca. 1 mm wide for ca. 1 cm then gradually widened to ca. 9 mm at mouth; lobes ovate, ca. 5 × 5 mm, apex obtuse. Stamens 4; filaments finely pubescent, shorter pair ca. 4 mm, longer pair 7–8 mm, unequal, and slightly exerted; anther thecae spherical, ca. 1.3 mm in diam., incurved; pollen type 3. Ovary gland-tipped pilose at tip; style ca. 2.5 cm, pilose. Capsule oblong, 1.1–1.3 cm, gland-tipped pubescent on apical half especially near tip, 4-seeded. Seeds ovate in outline, ca. 3 × 3 mm, densely covered with appressed trichomes. Fl. Dec–Feb.

- Forests; 600–1000 m. Xizang (Médog).

114. *Strobilanthes discolor* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 477. 1867.

异色马蓝 yi se ma lan

Goldfussia discolor Nees in A. Candolle, Prodr. 11: 172. 1847; *Difflugossa nagaensis* Bremekamp; *Strobilanthes discolor* var. *nudicalyx* C. B. Clarke.

Subshrubs to 1.8 m tall, strongly anisophyllous. Stems and branches 4-angled to subterete, sulcate, glabrous, apically somewhat zigzag. Petiole 0.5–2.5 cm, sulcate, glabrous; leaf blade elliptic to ovate-elliptic, 3–14 × 2–6.5 cm, glabrous, both surfaces with prominent cystoliths, abaxially whitish, adaxially dark green, secondary veins 6–8 on each side of midvein, base attenuate, shortly decurrent onto petiole, and often slightly oblique, margin serrate, apex acuminate to caudate and often falcate. Inflorescences axillary, pedunculate heads, often with secondary branching and becoming paniculate; floral bracts oblanceolate to spatulate, 3–5 × 1–2 mm, rapidly caducous, glabrous; bracteoles oblanceolate but often apparently absent. Calyx 5-lobed almost to base; lobes at anthesis linear-oblong, 5–7 × ca. 1 mm, subequal, apically pilose but otherwise glabrous, apex obtuse; lobes in fruit subspatulate, accrescent to ca. 1 cm, often gland-tipped pilose. Corolla violet, 3.2–3.8 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for 8–10 mm then gradually widened to ca. 1 cm at mouth; lobes ovate, 5–6 × 6–7 mm, apex rounded. Stamens 4; shorter filament pair 1.5–2 mm, strongly reflexed, glabrous; longer filament pair 7–8 mm, glabrous or with a few trichomes; anther thecae obliquely ellipsoid, ca. 1.2 mm, incurved; pollen type 3. Ovary glabrous; style 2.3–2.8 cm, hirsute. Capsule narrowly obovoid, ca. 10 × 2.5 mm, glabrous except for a few apical glands, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, pilose. Fl. Nov–Feb. *2n* = 22.

- Forests. Xizang (Cona) [India].

115. *Strobilanthes rhombifolia* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 461. 1884.

短柄马蓝 duan bing ma lan

Goldfussia sessilis Nees.

Herbs or subshrubs, strongly anisophyllous. Stems 4-angled, erect, glabrous. Petiole 0–10 mm but apical leaves sessile; leaf blade rhomboidal-elliptic, 2–15 × 1.5–10 cm, both surfaces green and with abundant cystoliths, secondary veins ca. 6 on each side of midvein, base cuneate and shortly decurrent onto petiole, margin serrate, apex acute. Inflorescences axillary, capi-

tula borne on simple or 2(or 3)-furcately branched peduncles, 2–10 cm; peduncle sulcate, bifariously pubescent with trichomes in sulci; sterile bracts leaflike, ovate, ca. 0.5 × 0.5 mm, relatively persistent; floral bracts obovate to oblong-obovate, ca. 6 × 1.5 mm, soon scarious and caducous; bracteoles not observed. Calyx subequally 5-lobed to base; lobes linear-elliptic, 7–12 × ca. 1.2 mm, pubescent and with sessile glands. Corolla blue, 4–4.5 cm, outside sparsely gland-tipped pilose but glabrescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then widened to 1.2–1.7 cm at mouth; lobes suborbicular, ca. 6 × 7 mm. Stamens 4, included; filaments glabrous, shorter pair ca. 2 mm, longer pair ca. 5 mm; anther thecae obliquely ovoid, ca. 1.5 × 1.2 mm, incurved. Ovary narrowly ovoid, apically gland-tipped; style ca. 2.7 cm, slender, glabrous apart from a few trichomes on basal part. Capsule not seen. Fl. Dec.

- Forests. Xizang (Cona) [India].

116. *Strobilanthes multidentis* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 461. 1884.

分枝马蓝 fen zhi ma lan

Goldfussia multidentis (C. B. Clarke) Bremekamp; *Pteracanthus agrestis* (C. B. Clarke) Bremekamp; *Strobilanthes agrestis* C. B. Clarke; *S. agrestis* var. *hemiotis* C. B. Clarke; *S. penstemonoides* (Nees) T. Anderson var. *multidentis* (C. B. Clarke) Kuntze.

Subshrubs to 2 m tall, usually pubescent, strongly anisophyllous. Leaf blade ovate-elliptic, 2–20 × 1–9.5 cm, usually pubescent at least on veins, base attenuate and oblique, margin serrate, apex shortly acuminate and sometimes falcate. Inflorescences axillary, usually capitate, borne on 3-furcate axillary gland-tipped pilose peduncles, sometimes with scattered flower pairs below heads, rarely of branched spikes with flower pairs only; bracts ovate-suborbicular, 3–6 mm, concave, caducous, gland-tipped pilose, apex acute; bracteoles absent. Calyx 6–10 mm at anthesis, gland-tipped pubescent; lobes linear, accrescent to ca. 1.6 cm with one lobe 2–3 mm longer than others, apex acute. Corolla blue, 3.5–4.8 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow then widened to ca. 1.5 cm at mouth. Stamens 4; shorter filament pair ca. 1 mm, recurved; longer filament pair 5–6 mm, slightly unequal, glabrous; anther thecae subspherical, ca. 1 mm, incurved; pollen type 3. Ovary gland-tipped; style ca. 2.5 cm, glabrous except for a few trichomes basally. Capsule oblong, 13–18 × ca. 3 mm, apically gland-tipped pilose, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, appressed pubescent. Fl. Sep–Apr.

- Streamsidings; 1500–2000 m. Xizang (Cona) [Bhutan, India, Nepal].

117. *Strobilanthes oligocephala* T. Anderson ex C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 461. 1884.

菱叶马蓝 ling ye ma lan

Difflugossa paupera (C. B. Clarke) Bremekamp; *Goldfussia oligocephala* (T. Anderson ex C. B. Clarke) Bremekamp; *G. thomsonii* Hooker; *Strobilanthes oligocephala* var. *treutleri* C. B. Clarke; *S. paupera* C. B. Clarke.

Subshrubs 30–50 cm tall, much branched, anisophyllous. Stems decumbent and basally rooting at nodes but eventually erect, pubescent to subglabrous. Petiole 0.5–4 cm but apical-most leaves sessile; leaf blade rhombic, elliptic, narrowly ovate, or apicalmost suborbicular, 4–12 × 1.5–6 cm, abaxially glaucous and glabrous or pilose along veins and margin, adaxially green, glabrous, and densely covered with prominent cystoliths, secondary veins 5–7 on each side of midvein, base attenuate and decurrent onto petiole, margin serrate, apex abruptly acuminate and falcate. Inflorescences terminal or arising from apical leaf axil, simple or branched, subcapitate with ca. 2 flower pairs to shortly spicate, 4–5 cm; peduncle 1–5 cm, glabrous or pubescent; bracts ovate to oblong, 0.8–1.5 × 0.7–1.3 cm, caducous, green when young but soon scarious, often becoming gland-tipped pilose, apex acute; bracteoles ca. 2 × 1 mm, caducous so often appearing absent. Calyx 1–1.8 cm, gland-tipped pilose, 5-lobed almost to base; lobes narrowly lanceolate with one slightly longer than others, apex acuminate. Corolla blue or white, 3.5–5 cm, ventricose, outside gland-tipped pubescent but sometimes only on lobes, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2.5 mm wide for 1–1.5 cm then bent and widened to ca. 1 cm at mouth; lobes oblong, ca. 6 × 5 mm, apex obtuse. Stamens 4, included; filaments sparsely hirsute, shorter pair ca. 4 mm, longer pair ca. 7 mm; anther thecae oblong-ovoid, ca. 2 × 1.2 mm. Ovary comose; style 2.8–3.2 cm. Capsule ca. 1.4 cm, apically gland-tipped pilose, 4-seeded. Seeds ovate in outline, ca. 3 × 2.5 mm, densely pubescent. Fl. Jul–Nov.

Thickets on limestone hills; 2600–2800 m. Xizang (Cona) [Bhutan, India, Nepal].

118. *Strobilanthes medogensis* (H. W. Li) J. R. I. Wood & Y. F. Deng, Bot. J. Linn. Soc. 150: 383. 2006.

墨脱马蓝 mo tuo ma lan

Goldfussia medogensis H. W. Li, Fl. Xizang. 4: 413. 1985.

Subshrubs 2–3 m tall, anisophyllous. Stems erect, slightly sulcate, bifariously puberulent. Petiole 0–5 mm with smaller leaves subsessile; leaf blade ovate, 3–13 × 2–5.5 cm, smaller of pair ca. 2/3 size of larger one, both surfaces glabrous, abaxially pale green, adaxially green and with numerous cystoliths, base rounded to subcordate, margin serrulate, apex acuminate and falcate. Inflorescences axillary, spikes, 3–6 cm, simple or 2-furcate; peduncle 2–5 cm; rachis bifariously pubescent; bracts obovate-oblong, 2.5–3 mm, herbaceous, caducous, glabrous; bracteoles similar to bracts but ca. 1.5 mm. Flowers 3–11 mm apart on rachis. Calyx ca. 1.2 cm in flower, 5-lobed to base; lobes narrowly oblong-elliptic, subequal, glabrous or gland-tipped pubescent, apex acuminate. Corolla yellowish white but dull purple on lobes, campanulate, ca. 2.5 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then gradually widened to 1–1.5 cm at mouth; lobes broadly ovate, ca. 3 × 8 mm, apex rounded. Stamens 4, ± exerted; filaments basally pilose, apically glabrous, shorter pair 7–8 mm, longer pair 9–10 mm; anther thecae ca. 1 mm, incurved; pollen type 3. Ovary glabrous; style 2.7–2.8 cm, glabrous. Capsule not seen. Fl. Jul–Aug.

• Forests; 1900–2500 m. Xizang (Médog).

119. *Strobilanthes thomsonii* T. Anderson, J. Linn. Soc., Bot. 9: 478. 1867.

汤氏马蓝 tang shi ma lan

Subshrubs 1–2 m tall, pliestesial, anisophyllous. Stems and branches 4-angled, sulcate, glabrous or thinly pubescent. Petiole 2–14 mm or leaves sessile, glabrous; leaf blade ovate to narrowly ovate-elliptic, 12–20 × 4–7 cm, abaxially pale, adaxially glabrous with abundant cystoliths, secondary veins 5–7 on each side of midvein, base cuneate and decurrent onto petiole, margin serrate, apex long acuminate and usually falcate. Inflorescences axillary, simple or branched spikes, 3–9 cm; floral bracts variable in shape, ovate, elliptic, oblanceolate, or spatulate, 4–6 × 2–3 mm, caducous, glabrous or gland-tipped pubescent; bracteoles linear, ca. 2.5 × 0.8 mm, caducous. Flowers imbricate on rachis or to 1 cm apart. Calyx 5–9 mm, accrescent to ca. 1.3 cm in fruit, subequally 5-lobed almost to base; lobes linear, glabrous or pilose, apex acute. Corolla purple, funnel-shaped, 2.5–3.2 cm, curved, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1 cm then curved and widened to 1–1.3 cm at mouth; lobes ovate, ca. 4 × 4 mm, apex rounded. Stamens 4; filaments glabrous, shorter pair ca. 2 mm and strongly incurved, longer pair 3.5–4 mm; anther thecae subspherical, ca. 1 mm, incurved; pollen type 3. Ovary pubescent; style 2.5–3 cm, basally thinly pilose, apically glabrous. Capsule narrowly obovoid, gland-tipped pubescent, 4-seeded. Seeds orbicular in outline, ca. 2 mm in diam., densely covered with appressed trichomes. Fl. Sep–Nov.

Dry forests; ca. 2500 m. Xizang (Cona) [Bhutan, India].

120. *Strobilanthes longgangensis* D. Fang & H. S. Lo, Guihaia 17: 33. 1997.

弄岗马蓝 nong gang ma lan

Perilepta longgangensis (D. Fang & H. S. Lo) C. Y. Wu & C. C. Hu.

Subshrubs to 40 cm tall, strongly anisophyllous. Petiole 2–14 mm; leaf blade narrowly elliptic to rarely ovate-elliptic, smaller of pair (1.5–)3–8.5 × 0.8–3 cm and larger one 6–11.5 × 2.5–4.5 cm, both surfaces glabrous with prominent cystoliths, abaxially paler, secondary veins 4–6 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin denticulate, apex acuminate. Inflorescences axillary, spikes, 2–4 cm, 1–5-flowered; peduncle ca. 8 mm; bracts narrowly triangular, 3–4 × 1–1.5 mm, persistent, apex acute; bracteoles oblong, 5–6 × ca. 1 mm, glabrous. Flowers distant on rachis, usually only 1 sterile per node. Calyx ca. 5 mm, 5-lobed to near base; lobes resembling bracteoles, glabrous. Corolla purple, campanulate, ca. 2.5 cm, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and narrow for ca. 5 mm then gradually widened to ca. 1.5 cm at mouth; lobes oblong, ca. 4 mm, apex emarginate. Stamens 4, included; filaments sparsely pilose, shorter pair ca. 2 mm, longer pair 6–8 mm; anther thecae subspherical, ca. 1 mm, incurved. Ovary glabrous; style ca. 1.8 cm, hirsute. Capsule not seen. Fl. Nov.

- Limestone slopes; 300–600 m. Guangxi (Longzhou).

121. *Strobilanthes secunda* T. Anderson, J. Linn. Soc., Bot. 9: 480. 1867.

偏花马蓝 pian hua ma lan

Shrubs 0.6–1.5 m tall, strongly but variably anisophyllous. Stems and branches 4-angled, often zigzag, sulcate, glabrous on ridges but rufous scurfy pubescent in channels. Petiole 3–8 cm, appressed pubescent; leaf blade oblong-elliptic, 4–18 × 1.5–7.5 cm, abaxially glabrous except for pubescent midvein, adaxially glabrous, secondary veins 6–9 on each side of midvein, base narrowly cuneate, margin entire to sinuate, apex acuminate. Inflorescences axillary, spikes, 3–18 cm, lax; sterile bracts resembling reduced leaves; floral bracts and bracteoles caducous, presence only known from presence of scars. Flowers solitary or in opposite pairs, 1.5–3 cm apart on rachis. Pedicel ca. 1 mm. Calyx 1.6–2 cm, subequally lobed to 3–4 mm above base; lobes linear-lanceolate, 1.2–1.6 cm, glabrous, apex finely acuminate. Corolla yellow, 2.6–3 cm, curved and somewhat ventricose, outside pubescent, inside glabrous except for trichomes retaining style; tube basally cylindrical and 2–3 mm wide for ca. 6 mm then gradually widened to ca. 1.5 cm at mouth; lobes broadly ovate, ca. 9 × 4 mm, apex rounded. Stamens 4, included; shorter filament pair ca. 3 mm, glabrous; longer filament pair ca. 5 mm, basally villous; anther thecae oblong, ca. 2 × 1 mm, erect; pollen type 3. Ovary clavate, comose; style ca. 2.6 cm, pilose. Capsule narrowly oblong, ca. 20 × 2–2.5 mm, very shortly pubescent, 4-seeded, apex acute. Seeds ovate in outline, ca. 3.5 × 2.5 mm, pilose; areola densely pilose. Fl. Dec–Jan, fr. Jan–Apr.

Forests. Xizang (Médog) [Myanmar].

122. *Strobilanthes mastersii* T. Anderson, J. Linn. Soc., Bot. 9: 481. 1867.

瑞丽叉花草 rui li cha hua cao

Difflugossa scoriarum (W. W. Smith) E. Hossain; *D. shweliensis* (W. W. Smith) E. Hossain; *Goldfussia scoriarum* (W. W. Smith) Bremekamp; *Strobilanthes aborensis* Dunn; *S. scoriarum* W. W. Smith; *S. shweliensis* W. W. Smith.

Herbs 1–1.5 m tall, anisophyllous. Stems 4-angled, erect, sulcate, glabrous to gland-tipped pilose. Petiole 0–2 cm with apical leaves sessile, subglabrous; leaf blade ovate to ovate-lanceolate, 10–15 × 4–7 cm, glabrous except for a few cilia in teeth sinus, secondary veins 5–10 on each side of midvein, base broadly cuneate on basal leaves and rounded on apical leaves, margin serrate, apex acuminate. Inflorescences terminal, panicles of spikes, narrowly ovoid, to 30 cm; peduncle and rachis glabrous when young, densely gland-tipped pilose at maturity; sterile bracts leaflike, lanceolate to ovate, 5–15 × 3–8 mm, tardily caducous, apex acuminate; floral bracts elliptic, 5–6 × 2–3 mm, caducous, apex obtuse; bracteoles oblong, ca. 3 × 1 mm, caducous, abaxially glabrous. Flowers in opposite pairs or solitary through abortion. Calyx 0.8–1.2 cm, subglabrous with sessile glands when young but becoming densely gland-tipped pilose and accrescent, 5-lobed almost to base; lobes lanceolate, with 3 lobes slightly longer than other 2, apex acuminate. Corolla purple, 2.5–3 cm, straight, ventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally

cylindric and ca. 2 mm wide for 1–1.3 cm then widened to ca. 1 cm at mouth; lobes orbicular, ca. 5 mm in diam. Stamens 4, included; filaments glabrous, shorter pair ca. 3 mm, longer pair ca. 6 mm; anther thecae obliquely ellipsoid, ca. 0.8 × 1 mm, incurved; pollen type 3. Ovary slightly pilose at tip; style ca. 2.1 cm, slender, sparsely pilose on basal part. Capsule clavate, ca. 1.5 cm, apically gland-tipped pilose, 4-seeded. Seeds brown, ovate in outline, ca. 2.5 × 2 mm; areola small, verrucose. Fl. Sep–Jan.

Forests on mountain slopes; ca. 1500 m. Xizang (Médog), Yunnan [India].

Strobilanthes mastersii, like *S. hamiltoniana*, commonly has a glabrous inflorescence when it is young but becomes gland-tipped pilose as it matures.

123. *Strobilanthes tenax* Dunn, Bull. Misc. Inform. Kew 1920: 209. 1920.

结壮马蓝 jie zhuang ma lan

Subshrubs to 1 m tall. Stems 4-angled, sulcate, gland-tipped pubescent. Petiole 2–5 mm but apical leaves sessile; leaf blade lanceolate, 8–10 × 2.5–4 cm, glabrous, cystoliths numerous, linear, and prominent, secondary veins 4–6 on each side of midvein, base cuneate, margin serrate, apex acuminate. Inflorescences terminal, a panicle of branched spikes, 3–12 cm; rachis gland-tipped pilose; sterile bracts sessile, leaflike, oblong-lanceolate to ovate, 8–12 × 3–5 mm; floral bracts oblong-elliptic, 5–7 × ca. 2 mm, scarious and early caducous, sparsely gland-tipped pilose, apex obtuse; bracteoles apparently absent. Flowers sessile, with opposite pairs 1–2.5 cm apart on rachis. Calyx ca. 1 cm, outside gland-tipped pubescent, 5-lobed almost to base; lobes linear, apex acute. Corolla color unknown, ca. 3 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and 1–2 mm wide for ca. 0.8 cm then abruptly widened to ca. 1 cm at mouth; lobes broadly ovate, 5–6 × ca. 3 mm, apex rounded. Stamens 4, included; filaments glabrous, shorter pair 1–2 mm, longer pair 3–4 mm; anther thecae obliquely ellipsoid, ca. 1.5 mm, incurved; pollen type 3. Ovary obovoid, ca. 2.5 mm, gland-tipped with a few apical trichomes; style ca. 1.9 cm, thinly pilose. Capsule narrowly obovoid, ca. 1.5 cm, gland-tipped pubescent, 4-seeded. Seeds immature. Fl. Mar.

- Forests; ca. 800 m. Xizang (Médog).

Strobilanthes tenax is only known from the type, and there are many errors in the protologue.

124. *Strobilanthes hamiltoniana* (Steudel) Bosser & Heine, Bull. Mus. Natl. Hist. Nat., B, Adansonia, Sér. 4, 10: 148. 1988.

叉花草 cha hua cao

Ruellia hamiltoniana Steudel, Nomencl. Bot., ed. 2, 2: 481. 1841, based on *Goldfussia colorata* Nees in Wallich, Pl. Asiat. Rar. 3: 89. 1832, not *Ruellia colorata* Blume (1826), nor Vellozo (1829); *Difflugossa colorata* (Nees) Bremekamp; *Strobilanthes colorata* (Nees) T. Anderson (1867), not Nees (1837).

Shrubs 0.5–1.5 m tall, much branched, anisophyllous. Stems 4-angled, sulcate, glabrous. Leaves petiolate or apical ones sessile or subsessile; petiole (0–)0.8–5(–8) cm, glabrous;

leaf blade lanceolate to ovate, smaller pair at least 2/3 size of larger one, 5–19 × 2–8.5 cm, glabrous, densely covered with linear cystoliths, secondary veins 4–7 on each side of midvein, base oblique to rarely slightly oblique and attenuate or on very large leaves subcordate, margin serrulate, apex acuminate. Inflorescences axillary or terminal, panicles, to 30 cm, much branched; rachis angled at ca. 60°, glabrous or rarely pubescent, gland-tipped in fruit; bracts green, broadly obovate, 3–5 × ca. 2 mm, concave, caducous, glabrous, becoming gland-tipped in fruit, margin entire, apex retuse; bracteoles green, oblanceolate to narrowly elliptic, 3–4 × ca. 1 mm, concave, caducous, glabrous, margin entire, apex retuse. Flowers solitary on each node, distant on rachis. Pedicel 1.5–5 mm, glabrous. Calyx 8–10 mm, accrescent to ca. 1.3 cm in fruit, glabrous, sometimes apically gland-tipped pubescent, becoming densely gland-tipped in fruit, 5-lobed almost to base; lobes narrowly elliptic with one longer than others, apex acute to sometimes retuse. Corolla white, lilac, or (in cultivated forms) deep pink with a white tube, 3.5–4 cm, subventricose, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 2 mm wide for ca. 1.3 cm then slightly ventricose and gradually widened to 1.4–1.8 cm at mouth; lobes ovate, 4–5 × ca. 6 mm, apex rounded to retuse. Stamens 4, included; filaments glabrous; shorter filament pair ca. 1 mm, equal; longer filament pair 7–9 mm, unequal, erect; anther thecae white, spherical, ca. 1.2 mm in diam., partially recurved; pollen type 3. Ovary ca. 2.5 mm, glabrous; style ca. 3.8 cm, sparsely pubescent. Capsule green then dark purple, fusiform, 1–1.5 cm, glabrous or with gland-tipped trichomes, 4-seeded. Seeds ovate in outline, ca. 3 × 2 mm, with long trichomes; areola small. Fl. Dec–Jan.

Forests on mountain slopes; 800–2000 m. Xizang (Cona) [Bhutan, India, Myanmar, Nepal].

Strobilanthes hamiltoniana is an ornamental plant. It is widely cultivated in tropical countries and in conservatories in temperate climates. The species is sometimes naturalized, occasionally becoming an invasive weed as on the island of Réunion. Cultivated plants and plants of cultivated origin seem always to be glabrous, pink-flowered, and sterile with dispersal being by cuttings or shoots broken off by grazing animals.

"*Goldfussia tengyuehensis*" (C. Y. Wu, Index Fl. Yunnan. 2: 1675. 1984) belongs here but was not validly published.

125. *Strobilanthes tenuiflora* J. R. I. Wood, Kew Bull. 58: 691. 2003.

纤序马蓝 xian xu ma lan

Subshrubs to 1 m tall, anisophyllous. Stems 4-angled, sulcate, glabrous. Petiole 0.1–3.4 cm, usually very short on smaller leaves, often sulcate, glabrous; leaf blade ovate to ovate-elliptic, 1–13 × 0.5–8 cm, smaller of pair 1/4–1/3 size of larger one, glabrous except for multicellular trichomes in teeth sinuses, adaxially cystoliths prominent, secondary veins 5–7 on each side of midvein and abaxially prominent, base oblique and broadly cuneate, rounded, or slightly cordate, margin slightly serrate to subentire, apex acuminate. Inflorescences terminal, panicles, to 10 cm; peduncle to 3 cm, glabrous; rachis slender, glabrous, repeatedly 3-forked and bent to ca. 90°; bracts subulate, ca. 1 mm, caducous; bracteoles similar to bracts. Flowers 1 per node.

Calyx 4–6 mm, accrescent to ca. 8 mm in fruit, glabrous, 5-lobed almost to base; lobes oblong to oblong-lanceolate with one slightly longer than others, margin pale, apex emarginate. Corolla white, 3.2–4 cm, straight, outside glabrous, inside glabrous except for trichomes retaining style; tube basally cylindrical and ca. 1.5 mm wide for 6–10 mm then slightly ventricose and gradually widened to ca. 1.5 cm at mouth; lobes ovate, ca. 5 × 5 mm, apex acute. Stamens 4, included; filaments glabrous, shorter pair ca. 0.5 mm, longer pair 4–5 mm; anther thecae spherical, ca. 1 mm in diam., partially recurved. Ovary glabrous; style 2.5–3.2 mm, glabrous. Capsule oblong, ca. 1.5 cm, glabrous, 4-seeded, apex acuminate. Seeds ovate in outline, ca. 2 × 1.5 mm, puberulent. Fl. Oct.

Forests; ca. 900 m. Yunnan (Cangyuan) [Thailand].

126. *Strobilanthes euantha* J. R. I. Wood, Kew Bull. 58: 697. 2003.

腾冲马蓝 teng chong ma lan

Herbs 0.5–1.5 m tall, perennial, slightly anisophyllous. Stems dark green, deeply sulcate and ridged, glabrous. Petiole 0–2.6 cm, glabrous; leaf blade ovate to ovate-elliptic, 4–20 × 3–12 cm, abaxially paler green and sparsely pilose along veins, adaxially dark green, pilose along margin, and with prominent cystoliths, secondary veins 5–8 on each side of midvein, base cordate to abruptly narrowed and often somewhat oblique, margin serrate, apex acuminate. Inflorescences terminal, open panicles, to 15 cm; peduncle ca. 3 cm, gland-tipped pilose; rachis gland-tipped pilose; bracts obovate, 1–2 mm, caducous before flowers open, apex rounded; bracteoles similar to bracts. Flowers distant on rachis, usually 1 per node. Pedicel ca. 3 mm, gland-tipped pilose. Calyx ca. 4 mm, accrescent to ca. 7 mm in fruit, glabrous, 5-lobed to ca. 1 mm from base; lobes oblong to oblanceolate, apex truncate to emarginate. Corolla pale lavender to pale pink, 2.2–3.5 cm, arcuate, glabrous; tube basally cylindrical and narrow for 0.6–1.9 cm then ventricose and widened to 8–10 mm at mouth; lobes ovate, ca. 4 × 4 mm, apex acute. Stamens 4; filaments glabrous; shorter filament pair ca. 2 mm, incurved; longer filament pair 1–1.2 cm, erect, slightly exserted; anther thecae spherical, ca. 1 mm in diam. Ovary glabrous; style 2.2–2.7 cm, glabrous. Capsule narrowly oblong-obovoid, ca. 1.4 cm, glabrous, 4-seeded, apex acuminate. Seeds ovate-suborbicular in outline, ca. 2.5 × 2 mm, pubescent. Fl. Sep–Oct, fr. Dec.

Forests; 1500–2100 m. Yunnan (Gaoligong Shan) [Myanmar].

127. *Strobilanthes parvifolia* J. R. I. Wood, Kew Bull. 64: 25. 2009.

小叶马蓝 xiao ye ma lan

Herbs, perennial, anisophyllous. Stems somewhat sulcate with distinct small parallel ridges, glabrous, basally geniculate. Petiole 0–4 mm, glabrous; leaf blade lanceolate, ovate, or ovate-elliptic, 1–3.5 × 1–1.8 cm, smaller of pair ca. 1/3 size of larger one, both surfaces glabrous and with somewhat obscure cystoliths or rarely abaxially with a few gland-tipped trichomes on veins, base broadly to narrowly cuneate and somewhat decurrent onto petiole, margin undulate to slightly crenate, apex acute. Inflorescences leaflike with long few-flowered branches; branches strict, densely covered with short stalked glands,

sparingly 3-forked with subsessile flowers in opposite pairs (rarely solitary) in axils of leaflike bracts at tips of ultimate branches; basal sterile bracts variable in size and shape, sessile or nearly so, oblong-lanceolate to sometimes ovate, elliptic, or oblong, 0.5–3.5 × 0.3–1.5 cm, often very unequal at each pair, abaxially densely stalked gland-tipped pubescent toward base, base attenuate, margin undulate and sparsely covered with stalked glands, apex acute; floral bracts oblong, ca. 5 × 1 mm, caducous, gland-tipped pilose; bracteoles oblong, ca. 2 × 1 mm. Calyx ca. 1.1 cm at anthesis, accrescent to ca. 2 cm in fruit, 5-lobed almost to base; lobes narrowly oblong-lanceolate, 1–1.5 mm wide, subequal, densely covered with relatively short gland-tipped trichomes, apex obtuse. Corolla white flushed violet, 2.5–3 cm, outside glabrous, inside pubescent; tube basally cylindrical and ca. 3 mm wide for ca. 1 cm then gradually widened to ca. 1.2 cm and bent to ca. 90° and then and widened to 1.2–1.5 cm at mouth; lobes broadly ovate, ca. 6 × 6 mm, apex obtuse. Stamens 4, included; filaments glabrous, shorter pair 1.5–2 mm, longer pair 5–6 mm; anther thecae oblong, ca. 2 × 0.5 mm; pollen type 16. Ovary glabrous; style ca. 1.5 cm, glabrous. Capsule narrowly clavate, ca. 2.2 cm, glabrous, 4-seeded. Mature seeds not seen. Fl. Sep, fr. Sep–Oct.

- Forest margins on hills; ca. 1600 m. Xizang (Mêdog).

128. *Strobilanthes ferruginea* D. Fang & H. S. Lo, *Guihaia* 17: 29. 1997.

锈背马蓝 xiu bei ma lan

Perilepta ferruginea (D. Fang & H. S. Lo) C. Y. Wu & C. C. Hu.

Shrubs to 4 m tall, almost glabrous throughout, anisophyllous. Stems 4-angled, sulcate. Petiole to 3 cm; leaf blade broadly elliptic, elliptic, or rarely ovate-elliptic, 4–18 × 2–8 cm, smaller of pair ca. 1/3 size of larger one, both surfaces densely covered with cystoliths, abaxially ferruginous when dry, adaxially dark green, secondary veins 7–11 on each side of midvein, base broadly cuneate, margin apically remotely crenate, apex acuminate to caudate. Inflorescences axillary or terminal, spikes, 1–2.5 cm, few flowered; bracts elliptic to oblong, 3.5–4 × ca. 2 mm, persistent, margin ciliate, apex truncate to rounded; bracteoles oblong to elliptic, ca. 7 × 2.5 mm. Flowers distant on rachis, usually only 1 fertile per node. Calyx ca. 9 mm; lobes oblong-oblongate, ca. 4 mm, margin ciliolate, apex obtuse. Corolla purple, 3–3.5 cm, ventricose, outside glabrous; tube basally cylindrical and ca. 2 mm wide for ca. 6 mm then gradually widened to ca. 1.4 cm at mouth; lobes ca. 5 mm, apex emarginate. Stamens 4, included; filaments sparsely hirsute, shorter pair ca. 2 mm, longer pair ca. 8 mm; anther thecae oblong, ca. 2 mm. Ovary glabrous; style ca. 1.8 cm, densely hirsute. Capsule oblong, 1.7–2 cm, glabrous, 4-seeded. Seeds ovate in outline, ca. 3 mm, densely covered with appressed trichomes. Fl. Oct–Dec.

- Dense forests on rocky mountains; 400–800 m. Guangxi (Longzhou).

8. PHAULOPSIS Willdenow, Sp. Pl. 3: 4, 342. 1800 [“*Phaylopsis*”], nom. cons.

肾苞草属 shen bao cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Aetheilema R. Brown; *Micranthus* J. C. Wendland; *Theileamea* Baillon.

Herbs, perennial [or annual], prostrate [to erect], with cystoliths, often anisophyllous. Leaves opposite, long petiole; leaf blade margin entire or crenate. Inflorescences terminal [or axillary], secund strobilate spikes; bracts subleaflike, orbicular or reniform, imbricate; bracteoles [present or] absent. Flowers sessile. Calyx 5-lobed almost to base; lobes unequal, posterior one largest. Corolla small; tube cylindrical, slender; limb ± 2-lipped, lower lip 3-lobed, upper lip 2-lobed; lobes contorted in bud. Stamens 4, didynamous, included in corolla tube; filaments coherent at base; anthers 2-theous; thecae parallel, base minutely mucronate [or not mucronate]. Ovary with 2 ovules per locule; style hairy; stigma 2-lobed, lobes unequal. Capsule shortly stipitate, 4-seeded; retinacula present; septa with attached retinacula separating from inner wall of mature capsule. Seeds discoid, densely covered with hygroscopic trichomes.

Twenty-two species: tropical Africa, E, SE, and S Asia; one species in China.

1. *Phaulopsis dorsiflora* (Retzius) Santapau, *Kew Bull.* [3]: 276. 1948.

肾苞草 shen bao cao

Ruellia dorsiflora Retzius, *Observ. Bot.* 6: 31. 1791; *Aetheilema anisophyllum* (Jussieu) E. Meyer (1837), not R. Brown (1810); *A. parviflorum* Sprengel; *A. reniforme* Nees; *Blechnum anisophyllum* Jussieu; *Micranthus dorsiflorus* (Retzius) C. E. C. Fischer; *M. oppositifolius* J. C. Wendland; *Phaulopsis oppositifolia* (J. C. Wendland) Lindau; *P. parviflora* Willdenow, nom. illeg. superfl.

Herbs 30–50 cm tall, slightly anisophyllous. Stems as-

ending, 4-angled, brown retrorsely pubescent. Petiole 4–6 cm; leaf blade ovate to elliptic, 7.5–11 × 3.5–5 cm, papery, abaxially pubescent along veins, adaxially hirsute, secondary veins ca. 6 on each side of midvein, base cuneate to attenuate and slightly oblique, margin entire, apex acuminate. Spikes terminal, 3–6 cm; bracts orbicular to reniform, ca. 1 × 1.4 cm, gland-tipped pubescent. Calyx lobes outside gland-tipped pubescent; posterior lobe ovate-elliptic, 8–10 mm, bractlike, other lobes linear to subulate and 5–6 mm. Corolla white, ca. 6 mm; lower lip 3-lobed, lobes ovate-oblong and 1–2.4 × 0.6–1 mm; upper lip narrow, 2-lobed. Staminal filaments glabrous. Ovary apex sparsely gland-tipped pubescent; style pilose. Capsule ellipsoid, ca. 6

mm, apex gland-tipped pubescent. Seeds ca. 2×1.5 mm. Fl. Nov–May, fr. Feb–Jul. $2n = 56$, ca. 64, 70.

[Bangladesh, Bhutan, India, Myanmar, Thailand, Vietnam; ?South Africa, Indian Ocean islands (Réunion), ?Madagascar].

Thickets, roadsides, along streams; 300–800 m. S and W Yunnan

Collections identified as *Phaulopsis dorsiflora* from South Africa and Madagascar remain questionable as to their source.

9. HYGROPHILA R. Brown, Prodr. 479. 1810.

水蓼衣属 shui suo yi shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Adenosma Nees (1847), not R. Brown (1810); *Asteracantha* Nees; *Cardanthera* Buchanan-Hamilton ex Benth. & J. D. Hooker; *Hemiadelphis* Nees; *Kita* A. Chevalier; *Nomaphila* Blume; *Physichilus* Nees; *Polychma* Hochstetter; *Santapaua* N. P. Balakrishnan & K. Subramanyam; *Synnema* Benth.; *Tenoria* Dehnhardt & Giordano (1832), not Sprengel (1813).

Herbs, annual or perennial, often aquatic or hygrophilous, sometimes with axillary spines, cystoliths present. Leaves sessile or shortly petiolate; leaf blade margin entire, crenulate, or sometimes undulate. Flowers sessile, in terminal spikes or several in axillary clusters; bracteoles present or absent. Calyx 5-lobed. Corolla ventricose; limb 2-lipped, lower lip 3-lobed, upper lip apex shallowly dentate; lobes contorted in bud. Stamens 2 or 4, didynamous (posterior pair similar to anterior pair or smaller); anthers 2-theccous; thecae equally inserted; staminodes 0 or 2. Ovary with 4 to many ovules per locule; stigma entire or 2-dentate. Capsule linear-ellipsoid to narrowly oblong, many seeded; retinacula present. Seeds discoid, covered with long mucilaginous trichomes.

About 100 species: widely distributed in tropical and subtropical regions; six species (one endemic) in China.

- 1a. Stamens 2 1. *H. polysperma*
 1b. Stamens 4.
 2a. Flowers in terminal spikes 2. *H. biplicata*
 2b. Flowers solitary or clustered in leaf axils.
 3a. Leaf blade glabrous or scabrous-hirsute.
 4a. Leaf blade glabrous or slightly pubescent 3. *H. ringens*
 4b. Leaf blade scabrous-hirsute 4. *H. pogonocalyx*
 3b. Leaf blade densely strigose or hirsute on both surfaces.
 5a. Calyx ca. 0.7 cm; corolla ca. 1.5 cm 5. *H. erecta*
 5b. Calyx ca. 1.1 cm; corolla 1.8–2.2 cm 6. *H. phlomoideis*

1. *Hygrophila polysperma* (Roxburgh) T. Anderson, J. Linn. Soc., Bot. 9: 456. 1867.

小狮子草 xiao shi zi cao

Justicia polysperma Roxburgh, Fl. Ind. 1: 120. 1820; *Adenosma polysperma* (Roxburgh) Sprengel; *Hemiadelphis polysperma* (Roxburgh) Nees.

Annuals [or perennials] 10–20 cm tall. Stems often prostrate, 4-angled, slightly swollen above nodes, puberulent, soon glabrescent. Petiole to 5 mm; leaf blade oblong-lanceolate to ovate, $2\text{--}3.5 \times 0.6\text{--}1.3$ cm, glabrous, base attenuate, margin entire, apex subobtusate. Inflorescences terminal spikes, 1.3–5 cm; bracts imbricate, ovate, elliptic, or obovate, $5\text{--}10 \times 1.5\text{--}3.5$ mm, both surfaces densely hirtellous, apex obtuse; bracteoles lanceolate, $3.5\text{--}5 \times 0.5\text{--}1$ mm, margin ciliate. Calyx 3.5–6 mm; lobes lanceolate, 2.5–3 mm, unequal, pubescent, apex acuminate. Corolla white, ca. 6 mm; tube ca. 3.5 mm; lower lip ca. 2 mm, 3-lobed, lobes orbicular and subequal; upper lip oblong-ovate, ca. 1 mm, 2-lobed. Stamens 2, slightly exerted; filaments ca. 1 mm, coherent into a membrane near base; anther thecae subequal; staminodes 2, bristlelike, short. Capsule linear-oblong, 5.5–8 mm, pubescent with non-gland-tipped trichomes (also glabrous?), 20–30-seeded. Seeds ca. 1×0.5 mm. Fl. Sep–Nov, fr. Oct–Jan. $2n = 32$.

Streamsides; below 600 m. Guangdong, Guangxi, Taiwan, Yunnan [Bhutan, India, Myanmar, Sri Lanka, Vietnam].

Hygrophila polysperma is a problematic (e.g., invasive) naturalized weed in some tropical and temperate regions outside of its native range.

2. *Hygrophila biplicata* (Nees) Sreemadhavan, Bull. Bot. Surv. India 10: 223. 1969.

连丝草 lian si cao

Adenosma biplicata Nees in Wallich, Pl. Asiat. Rar. 3: 79. 1832; *Cardanthera avana* (Wallich ex Benth.) Benth. ex C. B. Clarke; *Hygrophila avana* (Wallich ex Benth.) E. Hossain; *Pedicularis avana* Wallich ex Benth.; *Synnema avanum* (Wallich ex Benth.) Benth.

Annuals to 30 cm tall, ascending. Stems 4-angled, hirsute. Leaves sessile; leaf blade oblong, $2.5\text{--}3.8 \times 1\text{--}1.8$ cm, white pubescent, secondary veins 3–5 on each side of midvein, base truncate to subcordate, margin crenulate, apex obtuse. Inflorescences terminal spikes, 2.5–10 cm; bracts narrowly elliptic, 6–8 \times 3–4 mm, margin crenulate or dentate; bracteoles linear, ca. 8 \times 3 mm. Calyx 8–9 mm, inside white hirsute; lobes linear, margin ciliate. Corolla purple, 1.2–1.6 cm, outside pilose; lower lip elliptic, ca. 8 \times 5 mm, 3-dentate, lobes triangular and ca. 1 \times 1 mm; upper lip oblong-ovate, ca. 6 \times 3 mm, 2-dentate. Stamens 4, slightly exerted; filaments with longer pair ca. 3 mm and shorter pair ca. 2 mm; anther thecae ca. 1 mm. Ovary ca. 3 mm, comose; style ca. 1 cm, hirsute. Capsule ca. 8 mm, pubescent. Fl. Dec, fr. Mar.

Paddy fields, wet places; 800–1000 m. Yunnan [Myanmar, Thailand].

3. *Hygrophila ringens* (Linnaeus) R. Brown ex Sprengel, Syst. Veg. 2: 828. 1825.

水蓑衣 shui suo yi

Perennials to 80 cm tall, branched. Stems erect or decumbent at base, 4-angled, striate, slightly pubescent. Petiole 0.5–1 cm, glabrous; leaf blade narrowly lanceolate to oblanceolate, 3–10 × 0.5–1.5 cm, both surfaces with numerous cystoliths and glabrous or slightly pubescent, secondary veins 8–11 on each side of midvein, base attenuate and decurrent onto petiole, margin entire or slightly undulate, apex acute to obtuse. Flowers (solitary or) 2–10 clustered in leaf axils, sessile; bracteoles narrowly ovate, 3–5 mm, margin pubescent, apex obtuse. Calyx narrowly campanulate, ca. 6 mm, 5-lobed to middle; lobes linear-lanceolate, grayish pubescent or fulvous strigose, apex acuminate. Corolla pale purple, 1–2.5 cm; tube ca. 7 mm, ca. 2 mm wide, glabrous; limb 2-lipped; lower lip obovate, ca. 3 mm, 3-lobed to middle, lobes ovate with an obtuse apex; upper lip elliptic, ca. 3 mm, shallowly 2-lobed, outside puberulent. Stamens 4, included; filaments glabrous, longer pair ca. 5 mm, shorter pair ca. 3 mm; anther thecae 1–2 mm. Ovary glabrous; style filiform, ca. 8 mm, included; stigma unequally 2-lobed. Capsule narrowly oblong, 0.8–2.2 cm, ca. 1.5 mm wide, glabrous, 12–18-seeded. Seeds ca. 1 mm, pubescent. Fl. Aug–Oct, fr. Dec–Feb.

Along streams, wet places; below 1000 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam].

- 1a. Bracts and calyx grayish pubescent 3a. var. *ringens*
1b. Bracts and calyx fulvous strigose 3b. var. *longihirsuta*

3a. *Hygrophila ringens* var. *ringens*

水蓑衣(原变种) shui suo yi (yuan bian zhong)

Ruellia ringens Linnaeus, Sp. Pl. 2: 635. 1753; *Dipteracanthus ringens* (Linnaeus) Abeywickrama; *Hygrophila angustifolia* R. Brown; *H. lancea* (Thunberg) Miquel; *H. megalantha* Merrill; *H. quadrivalvis* (Buchanan-Hamilton) Nees; *H. salicifolia* (Vahl) Nees; *H. salicifolia* var. *megalantha* (Merrill) H. S. Lo & L. D. Chou; *Justicia lancea* Thunberg; *R. quadrivalvis* Buchanan-Hamilton; *R. salicifolia* Vahl.

Calyx grayish pubescent. Corolla to 1.2 cm.

Along streams, wet places; below 1000 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam].

3b. *Hygrophila ringens* var. *longihirsuta* (H. S. Lo & D. Fang) Y. F. Deng, **comb. nov.**

贵港水蓑衣 gui gang shui suo yi

Basionym: *Hygrophila salicifolia* (Vahl) Nees var. *longihirsuta* H. S. Lo & D. Fang, Guihaia 17: 41. 1997.

Flowers 2 to several in a cluster; bracts and calyx fulvous strigose. Corolla 1.2–1.7 cm.

- Along streams; 200–300 m. Guangxi.

4. *Hygrophila pogonocalyx* Hayata, Icon. Pl. Formosan. 9: 81. 1920.

大安水蓑衣 da an shui suo yi

Annuals to 50 cm tall. Stems erect, 4-angled, internodes subglabrous, nodes densely hirsute. Leaves sessile; leaf blade linear-lanceolate, 5–9 × 0.7–1.2 cm, papery, both surfaces scabrous-hirsute, secondary veins 5–7 on each side of midvein, base broadly attenuate, margins subentire, apex obtuse. Flowers several clustered in leaf axils, sessile; bracteoles ovate to lanceolate, ca. 1.5 × 0.4–0.6 cm, abaxially glabrous, adaxially strigose, apex acuminate. Calyx ca. 1.5 cm, 5-lobed to middle; lobes linear, subequal, apex acuminate. Corolla ca. 2.5 cm; lower lip ± spreading, 3-lobed; lobes of lower lip oblong, 2.5–3 × ca. 2 mm, subequal, inside barbate, apex obtuse; upper lip erect, ca. 1 cm, 2-lobed. Stamens 4; anther thecae ca. 3 mm. Ovary ca. 2.5 mm, glabrous; style glabrous. Fl. Aug–Oct, fr. Oct–Jan.

- Wet places. Taiwan.

5. *Hygrophila erecta* (N. L. Burman) Hochreutiner, Candollea 5: 230. 1934.

小叶水蓑衣 xiao ye shui suo yi

Ruellia erecta N. L. Burman, Fl. Indica, 135. 1768; *Hygrophila phlomoides* Nees var. *roxburghii* C. B. Clarke.

Perennials to 1 m tall. Stems erect, 4-angled, 2-sulcate. Petiole (0–)3–5 mm, sulcate, hispid; leaf blade elliptic, obovate, or oblong, 2–9 × 1–3 cm, with numerous cystoliths, both surfaces densely strigose, secondary veins 8–15 on each side of midvein and abaxially prominent, base decurrent onto petiole, margin entire or slightly undulate, apex acute to obtuse. Flowers several clustered in leaf axils, sessile; bracteoles linear-oblong, ca. 6 mm, densely hispid-ciliate. Calyx ca. 1.1 cm, 5-lobed to middle; lobes linear-lanceolate, densely white hispid-ciliate. Corolla purplish blue, 1.8–2.2 cm, pilose; tube basally cylindrical for ca. 5 mm and ca. 2 mm wide then gradually widened to ca. 6 mm at mouth; limb 2-lipped; lower lip oblong, 3-lobed, lobes ovate and ca. 2 × 2 mm; upper lip triangular, 2-lobed. Stamens 4; filaments glabrous, longer pair ca. 6 mm, shorter pair ca. 3 mm; anther thecae ca. 2 mm. Ovary glabrous; style pilose. Capsule 1.2–1.5 cm. Seeds blackish brown, ca. 1.5 × 1 mm, pubescent.

Wet places; below 1000 m. Guangdong, Hainan, Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

6. *Hygrophila phlomoides* Nees in Wallich, Pl. Asiat. Rar. 3: 80. 1832.

毛水蓑衣 mao shui suo yi

Perennials to 1 m tall, erect. Stems 4-angled, brown strigose. Petiole 0–3 mm, hirsute; leaf blade elliptic, obovate, or oblong, 2–9 × 1–3 cm, papery, cystoliths dense, both surfaces hirsute, secondary veins 8–15 on each side of midvein, base

usually attenuate and decurrent onto petiole, margin entire or undulate, apex acute to sometimes obtuse. Flowers axillary, several clustered or in whorls upward; bracteoles linear-oblong, ca. 5 × 2 mm, hirsute. Calyx ca. 1.1 cm, white hirsute, 5-lobed to middle; lobes linear. Corolla 1.8–2.2 cm, pubescent; lower lip oblong, sparsely pilose, 3-lobed; upper lip triangular, 2-lobed.

Stamens 4; filaments glabrous, longer pair ca. 5 mm, shorter pair ca. 3 mm; anther thecae ca. 2 mm. Ovary glabrous; style ca. 1.8 cm, pubescent. Capsule not seen.

Wet places; below 1200 m. Yunnan [Cambodia, India, Indonesia, Laos, Myanmar, Pakistan, Philippines, Thailand, Vietnam].

10. ERANTHEMUM Linnaeus, Sp. Pl. 1: 9. 1753.

可爱花属 ke ai hua shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Daedalacanthus T. Anderson; *Pigafetta* Adanson; *Upudalia* Rafinesque.

Shrubs or perennial erect herbs with cystoliths. Leaves petiolate; leaf blade margin entire or crenate. Inflorescences terminal or rarely axillary, spikes, lax, sometimes several forming a panicle; bracts sometimes colored, subleaflike, large; bracteoles small, narrow. Calyx 5-lobed; lobes narrow, subequal. Corolla subsalverform; tube basally cylindrical, long, slender, throat sometimes inconspicuous; limb 5-lobed; lobes obovate, subequal, contorted in bud. Stamens 2, inserted below throat; anthers 2-theous; thecae parallel, muticous; staminodes 2, clavate or filiform. Ovary with 2 ovules per locule; style filiform, glabrous or pubescent; stigma 2-lobed, lobes unequal. Capsule with a solid stalk at base, clavate, 4-seeded; retinacula present. Seeds discoid, compressed, pubescent with hygroscopic trichomes.

About 15 species: tropical and subtropical Asia; two species (one endemic) in China.

The Himalayan species *Eranthemum splendens* (T. Anderson) Bremekamp & Nannenga-Bremekamp reported from S Yunnan (FRPS 70: 60. 2002) is not treated here because no material has been seen by the authors. *Eranthemum pulchellum* Andrews is widely cultivated in S and SW China as an ornamental.

1a. Petiole ca. 0.5 cm; bracts oblong to lanceolate; stamens included; capsule gland-tipped pubescent 1. *E. tetragonum*
1b. Petiole 0.7–2.5 cm; bracts ovate to elliptic; stamens exerted; capsule glabrous 2. *E. austrosinense*

1. *Eranthemum tetragonum* A. Dietrich ex Nees in A. Can-dolle, Prodr. 11: 454. 1847.

云南可爱花 yun nan ke ai hua

Herbs to 1 m tall. Stems 4-angled, glabrous or pubescent. Petiole ca. 5 mm; leaf blade lanceolate to linear-lanceolate to oblong, 6–20 × 2–4 cm, glabrous, secondary veins ca. 5 on each side of midvein, base attenuate and decurrent onto petiole, margin entire or crenulate, apex acuminate. Spikes 3–8 cm; peduncle 2–37 mm, gland-tipped pubescent; bracts yellowish white with green along veins, oblong to lanceolate, 1–2.2 × 0.2–0.9 cm, apex acuminate; bracteoles lanceolate, ca. 4 mm, gland-tipped pubescent. Calyx ca. 6 mm, outside pilose, 5-lobed to middle; lobes lanceolate, ca. 1 mm wide. Corolla blue to light purple, ca. 4.5 cm, gland-tipped pubescent; tube basally cylindrical for ca. 3 cm; lobes obovate, ca. 6 × 5 mm. Stamens included; filaments ca. 3 mm, glabrous. Ovary gland-tipped pubescent; style hirsute. Capsule 1–1.4 cm, gland-tipped pubescent. Seeds gold to reddish brown to blackish, 3–3.5 × 2.2–2.7 mm. Fl. Dec–Mar.

Forests or thickets; 400–800 m. Yunnan [Cambodia, Laos, Myanmar, Thailand, Vietnam].

Eranthemum tetragonum, at least under this name, was not included by C. C. Hu (FRPS 70: 1–397. 2002).

2. *Eranthemum austrosinense* H. S. Lo, Acta Phytotax. Sin. 17(4): 85. 1979.

华南可爱花 hua nan ke ai hua

Herbs to 50 cm tall. Stems 4-angled, pubescent. Petiole 0.7–2.5 cm, pilose; leaf blade elliptic, ovate, or elliptic-ovate, 2–10 × 1–4.5 cm, abaxially pubescent along veins, adaxially glabrous and cystoliths obviously subulate, secondary veins 4–6 on each side of midvein, base cuneate to subrounded and usually decurrent onto petiole, margin entire, apex acute to acuminate. Spikes 3–11 cm; peduncle 1.5–3 cm, densely villous; bracts yellowish white with green along veins, ovate to elliptic, 1.2–2 × 0.4–0.8 cm, abaxially villous, adaxially glabrous, margin ciliate; bracteoles triangular-ovate, 5–6 × ca. 1.5 mm, margin ciliate, apex acute. Calyx 5–7 mm, outside pilose, 5-lobed to middle; lobes lanceolate, ca. 1 mm wide. Corolla bluish purple, glabrous or pubescent; tube basally cylindrical for 2.5–3 cm, throat ca. 4 mm; lobes obovate, 6–8 × 5–8 mm, apex 2-lobed. Stamens exerted; filaments 3–4 mm. Ovary glabrous or pubescent; style pilose. Capsule 1–1.5 cm, glabrous or pubescent. Seeds black, ca. 4 × 3 mm.

• Forests, thickets in ravines; 100–700 m. Guangdong, Guangxi, Guizhou, Yunnan.

1a. Corolla glabrous; ovary pilose 2a. var. *austrosinense*
1b. Corolla pubescent; ovary glabrous 2b. var. *pubipetalum*

2a. *Eranthemum austrosinense* var. *austrosinense*

华南可爱花(原变种) hua nan ke ai hua (yuan bian zhong)

Corolla glabrous. Ovary pilose.

• Guangdong, Guangxi, Guizhou, Yunnan.

2b. *Eranthemum austrosinense* var. *pubipetalum* (S. Z. Huang ex H. P. Tsui) T. L. Li & Y. F. Deng, *J. Trop. Subtrop. Bot.* 15: 260. 2007.

毛冠可爱花 mao guan ke ai hua

Eranthemum pubipetalum S. Z. Huang ex H. P. Tsui, *Fl. Reipubl. Popularis Sin.* 70: 347. 2002.

Corolla pubescent. Ovary glabrous.

• Forests, thickets in ravines; 100–700 m. Guangxi, Guizhou, Yunnan.

11. *ECHINACANTHUS* Nees in Wallich, *Pl. Asiat. Rar.* 3: 75, 90. 1832.

恋岩花属 lian yan hua shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs or perennial herbs. Leaves opposite; leaf blade margin entire. Inflorescence axillary or terminal, branched cymes; bracts narrow to subleaflike; bracteoles inconspicuous or absent. Calyx often gland-tipped hairy, deeply 5-lobed; lobes equal or subequal. Corolla purple or yellow, funnel-shaped to campanulate; tube ventricose; limb 5-lobed; lobes subequal, contorted in bud. Stamens 4, didynamous; filaments connate at base into 2 pairs; anthers 2-theous; thecae parallel, hirsute, spurred at base. Ovary with 4–8 ovules per locule; stigma 2-lobed, one lobe reduced. Capsule linear-cylindric to linear-oblong, 8–16-seeded; retinacula present. Seeds subovate in outline, compressed, covered with hygroscopic trichomes.

Four species: Bhutan, China, India, Nepal, Vietnam; three species (two endemic) in China.

- 1a. Herbs to 20 cm tall 1. *E. longipes*
 1b. Subshrubs or shrubs more than 50 cm tall.
 2a. Corolla purple, 2–2.5 cm, outside glabrous; anther thecae each with 2 basal spurs 2. *E. longzhouensis*
 2b. Corolla yellow, ca. 4 cm, outside pubescent; anther thecae each with 1 basal spur 3. *E. lofouensis*

1. *Echinacanthus longipes* H. S. Lo & D. Fang, *Acta Bot. Yunnan.* 7: 138. 1985.

长柄恋岩花 chang bing lian yan hua

Herbs 5–20 cm tall, perennial, caulescent or acaulescent. Petiole 1.8–4.5(–5.5) cm, densely hirsute; leaf blade oblong to lanceolate-oblong, rarely ovate or oblanceolate, 3–7(–11) × 1.5–3(–4) cm, papery, both surfaces densely covered with cystoliths, abaxially pilose or sometimes only hairy along veins, adaxially dark grayish brown when dry and subglabrous, midvein raised on both surfaces, secondary veins 5–7 on each side of midvein and raised on both surfaces, base oblique and rounded to broadly cuneate, margin entire or slightly crenulate, apex acuminate to obtuse. Cymes axillary, (1 or)2–4(or 5)-flowered; peduncle 2–10 cm, densely hirsute; bracts subleaflike, ovate to ovate-elliptic, 8–10 × 4–7 mm. Calyx lobes linear, 1–1.2 cm but to 1.7 cm in fruit, white pilose. Corolla purple, ca. 4 cm, straight, outside subglabrous; tube cylindric and ca. 2.5 mm wide for 1.3–1.5 cm then gradually widened to ca. 1 cm at mouth; lobes oblong, 6–8 × 5–6 mm. Staminal filaments 5–6 mm; anther thecae ovoid, ca. 3 mm, subequal, ciliate, each with 1 spur at base. Ovary densely pilose; style ca. 3.2 cm, pilose; stigma 2-lobed, with one lobe longer. Capsule cylindric, ca. 1.1 cm, densely pilose, 12–16-seeded. Seeds elliptic in outline, ca. 1.5 mm, margin white. Fl. Apr–Jun, fr. Aug–Sep.

Limestone hills in forests; 500–2000 m. Guangxi, Yunnan [Vietnam].

2. *Echinacanthus longzhouensis* H. S. Lo, *Acta Bot. Yunnan.* 7: 140. 1985.

龙州恋岩花 long zhou lian yan hua

Shrubs to 3 m tall. Older stems grayish brown, subterete, lenticellate and tuberculate; young stems 4-angled, pilose. Peti-

ole 1–2(–3.5) cm, pubescent; leaf blade elliptic to ovate, 4.5–8.5 × 1.5–4.5 cm, leathery, both surfaces glabrous, secondary veins 6 or 7 on each side of midvein and slender, base broadly cuneate, margin entire, apex acute. Cymes axillary, 1–3-flowered; peduncle 1.5–3 cm, pubescent; bracts narrowly lanceolate, 10–15 × ca. 1 mm, pubescent. Calyx 1–1.2 cm, abaxially gland-tipped hirsute, adaxially hirsute; lobes linear, apex acuminate. Corolla purple, 2–2.5 cm, both surfaces glabrous; tube basally cylindric and ca. 1.5 mm wide for 5–8 mm then gradually widened to ca. 8 mm at mouth; lobes oblong, ca. 4 × 3 mm, apex retuse. Staminal filament longer pair ca. 1 cm and shorter pair ca. 0.6 cm, pilose; anther thecae with 2 spurs at base. Ovary pubescent; style ca. 1.4 cm, pubescent. Capsule linear-oblong, 1.3–1.4 cm, densely pubescent, usually 8-seeded. Seeds globose, ca. 3 × 3 mm. Fl. Aug.

• Limestone hills in forests; 300–400 m. Guangxi.

3. *Echinacanthus lofouensis* (H. Léveillé) J. R. I. Wood, *Edinburgh J. Bot.* 51: 186. 1994.

黄花恋岩花 huang hua lian yan hua

Strobilanthes lofouensis H. Léveillé, *Repert. Spec. Nov. Regni Veg.* 12: 99. 1913; *Echinacanthus flaviflorus* H. S. Lo & D. Fang.

Shrubs 1–3 m tall. Stems 4-angled, lenticellate, subglabrous. Petiole 0.5–2 cm, shortly hirsute; leaf blade ovate, lanceolate, or narrowly lanceolate, (2–)6–12 × (1–)1.5–3 cm, abaxially pubescent in vein axils, adaxially glabrous, midvein usually barbate, secondary veins 5 or 6 on each side of midvein, base broadly cuneate to subrounded, margin entire, apex acuminate. Cymes axillary, usually (1–)3-flowered; peduncle 1–2 cm, pubescent; bracts subleaflike, 1–1.5 × 0.5–1 cm, caducous. Calyx 1.2–1.4 cm but to 1.8 cm in fruit, both surfaces densely white pubescent; lobes linear, apex acuminate. Corolla yellow,

ca. 4 cm, outside pubescent; tube basally ca. 3 mm wide for ca. 1 cm then expanding to mouth; lobes semicircular, ca. 5 mm. Staminal filaments 1–1.3 cm, densely villous; anther thecae ovoid, ca. 3 mm, each with 1 spur at base. Ovary densely vil-

lous; style pilose. Capsule linear-oblong, ca. 1.5 cm, densely pubescent, 8–12-seeded. Fl. May–Oct.

- Limestone hills in forests; 500–1000 m. Guangxi, Guizhou.

12. PARARUELLIA Bremekamp & Nannega-Bremekamp, Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 45(1): 25. 1948.

地皮消属 di pi xiao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, perennial. Stems short. Leaves opposite, rosulate, petiolate; leaf blade margin undulate, crenulate, or rarely subentire. Inflorescences terminal, spikes or thyrses; bracts usually subleaflike; bracteoles present. Flowers sessile. Calyx subequally to equally 5-lobed. Corolla white, bluish, or pink; tube basally cylindrical and slender, apically expanded into a throat; limb 5-lobed; lobes subequal, contorted in bud, apex rounded or obtuse. Stamens 4, didynamous, inserted at base of throat; filaments glabrous; anthers 2-theous; thecae usually widely separated by a broad connective, \pm parallel; staminodes absent. Ovary glabrous, with 4–8 ovules per locule; style pubescent; stigma pubescent, 2-cleft, upper lobe very short or reduced. Capsule cylindrical, not stipitate, 8–16-seeded; retinacula present. Seeds lenticular, pubescent with hygroscopic hairs.

About ten species: SE Asia, China; five species (all endemic) in China.

Pararuellia is purported to differ from *Ruellia* by its pollen, which has “minute prickles, papillae or granules (not a honey-combed pattern)” (C. B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74: 649. 1908) or at least papillae on the muri of reticulations (C. C. Hu et al., Acta Phytotax. Sin. 43: 123–150. 2005). Because such structures are also known from some species of *Ruellia* (C. A. Furness & M. C. Grant, Grana 35: 231–239. 1996), the generic status of *Pararuellia* is questionable and deserves additional study.

- 1a. Bracts longer than rachis internodes, imbricate, homomorphic; spikes cylindrical; flowers imbricate on rachis 1. *P. glomerata*
 1b. Bracts shorter than rachis internodes, distant, usually heteromorphic; spikes not cylindrical; flowers distant on rachis.
 2a. Spikes usually with 1 or 2(or 3) nodes 5. *P. delavayana*
 2b. Spikes with 4 to many nodes.
 3a. Rachis usually zigzag, winged below nodes 2. *P. alata*
 3b. Rachis straight, wingless.
 4a. Bracts oblong, elliptic, or ovate, usually subtending many flowers 3. *P. cavaleriei*
 4b. Bracts cordate to suborbicular, usually subtending only 1 flower 4. *P. hainanensis*

1. Pararuellia glomerata Y. M. Shui & W. H. Chen, Bot. Stud. (Taipei) 50: 261. 2009.

云南地皮消 yun nan di pi xiao

Herbs to 20 cm tall, often rooting at nodes. Stems 1–2 cm, with 2–4 internodes; internodes constricted, 0.5–1.1 cm. Petiole 1.3–3.4 cm, densely hispid; leaf blade oblanceolate, obovate-oblong, or spatulate, 4–6.2 \times 1.8–3.2 cm, abaxially densely hispid, adaxially slightly hispid, secondary veins 6–9 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin erose to crenate, apex rounded to obtuse. Spikes cylindrical, (0.6–)3.2–5.4 cm, several flowered; peduncle 0.7–5 cm and elongating to 13 cm in fruit, densely hispid; rachis (0.6–)3–5.5 cm and elongating in fruit, densely hispid, with (3 or)4–10 nodes; bracts imbricate, ovate to spatulate, 8–10 \times 6–9 mm, densely hispid, apex acute; bracteoles linear-lanceolate, 3–4 \times ca. 1 mm, abaxially hispid especially apically, apex acuminate. Calyx ca. 5 mm; lobes linear, ca. 4 \times 0.7 mm and elongating to ca. 6 mm in fruit, subequal, outside hispid. Corolla light purple, bluish, or pink, 1.4–1.7 cm, outside slightly hispid, inside glabrous; lobes suborbicular, 7–8 \times 5–7 mm, equal, apex rounded to truncate. Stamens longer pair 1.5–3 mm, shorter pair ca. 0.5 mm; anther thecae ca. 1.1 mm. Ovary 2–2.5 mm, with 5 or 6 ovules per locule; style 0.8–1.4 cm. Capsule 1–1.5 cm, pu-

bescent, 10–12-seeded. Seeds broadly ovate to subcircular in outline, 1–1.5 \times 1–1.5 mm, covered with dense long white appressed trichomes. Fl. Apr–Jul, fr. Jun–Aug.

- Thickets on limestone hills in hot dry valleys; 200–500 m. SE Yunnan (Hong He valley).

2. Pararuellia alata H. P. Tsui, Novon 18: 33. 2008.

节翅地皮消 jie chi di pi xiao

Herbs to 27 cm tall. Stems hispid. Petiole 2.5–3.5 cm; leaf blade oblong-elliptic to oblanceolate-elliptic, 5–8.5 \times 1.5–3.5 cm, glabrous, secondary veins 7–10 on each side of midvein, base cuneate, margin entire, apex rounded to acute. Spikes 3–5 cm, with 4–6 nodes; rachis usually zigzag, winged for ca. 2 mm below nodes; bracts ovate to elliptic, 1.2–6 \times 0.8–3 cm, reduced in size apically on rachis, glabrous except for ciliate margin, base rounded, apex acute; bracteoles lanceolate, ca. 5 \times 2.5 mm, glabrous except for ciliate margin, margin serrate. Calyx ca. 7 mm, glabrous; lobes linear-triangular, ca. 6 \times 1.5 mm, equal. Corolla pink, ca. 1 cm, glabrous; tube basally cylindrical and ca. 2 mm wide for ca. 5 mm; lobes oblong, ca. 2 \times 2 mm, equal, apex emarginate. Staminal filaments ca. 1 mm; anther thecae ca. 1 mm. Ovary ca. 2 mm; style ca. 7 mm. Capsule ca. 15 \times 2.7 mm, glabrous. Seeds broadly ovate to subcircular in outline, ca.

1.3 × 1.3 mm, covered with dense long white appressed trichomes. Fl. Aug–Oct, fr. Nov–Jan.

- Streamsides in forests; 700–800 m. Chongqing, Hubei, Yunnan.

3. *Pararuellia cavaleriei* (H. Léveillé) E. Hossain, Notes Roy. Bot. Gard. Edinburgh 32: 409. 1973.

罗甸地皮消 luo dian di pi xiao

Ruellia cavaleriei H. Léveillé, Repert. Spec. Nov. Regni Veg. 12: 21. 1913.

Herbs to 15 cm tall. Stems ca. 1.5 cm. Petiole 0.7–2.7 cm; leaf blade oblanceolate to spatulate, 4–12 × 1–3 cm, both surfaces sparsely strigose, secondary veins 4–6 on each side of midvein, base attenuate and decurrent onto petiole, margin undulate, apex rounded to acute. Spikes ca. 3 cm, with 4–6 nodes; rachis sparsely strigose; bracts ovate, 1–4 × 0.5–1.5 cm, reduced in size apically on rachis, glabrous, 4–6-veined, base broadly cuneate, apex acute; bracteoles triangular-lanceolate, ca. 3.5 × 1 mm, glabrous. Calyx ca. 5 mm, outside apically glandular pubescent; lobes triangular-lanceolate, ca. 3 × 0.7 mm, equal. Corolla purple, light blue, yellow, or white, ca. 1.5 cm, outside pubescent but soon glabrescent on limb and throat; tube basally cylindrical and narrow for ca. 6 mm, throat ca. 4 mm; lobes oblong, ca. 6 × 6 mm, equal, apex emarginate. Stamen longer pair ca. 3 mm, shorter pair ca. 1.5 mm; anther thecae glabrous. Ovary ca. 3 mm; style ca. 1 cm. Capsule ca. 15 × 3 mm, glabrous, 8–12-seeded. Seeds broadly ovate in outline, ca. 1.4 × 1 mm, covered with dense appressed trichomes. Fl. Aug–Oct, fr. Nov–Jan.

- Thickets, forests; 100–1400 m. Guangxi, Guizhou, Yunnan.

4. *Pararuellia hainanensis* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 593. 1974.

海南地皮消 hai nan di pi xiao

Herbs. Petiole 0.5–1.5 cm; leaf blade obovate to oblanceolate, ca. 4.5 × 2.5–4.3 cm, abaxially pubescent, adaxially sparsely strigose, secondary veins ca. 6 on each side of midvein, base cuneate, margin entire, apex rounded, sometimes obtuse, or rarely acute. Spikes with 2–6 nodes; rachis pubescent; bracts cordate-ovate to orbicular, 0.5–3(–6.5) × 0.5–1.8(–6.5)

cm, abaxially strigose, adaxially glabrous; bracteoles lanceolate, 2.5–3 × ca. 0.6 mm. Calyx 5–6 mm, inside sparsely strigose; lobes linear-lanceolate, ca. 3 × 1 mm. Corolla white or blue, ca. 1.2 cm, outside pubescent, inside glabrous; tube basally cylindrical and ca. 1 mm wide for ca. 7 mm, throat ca. 2.3 × 4 mm; lobes oblong, ca. 2.5 × 2 mm, subequal. Stamen longer pair ca. 1.9 mm, shorter pair ca. 1 mm; anther thecae ca. 1 mm, glabrous. Ovary ca. 3 mm; style ca. 1.6 cm, white comose. Capsule ca. 1.4 cm, glabrous. Seeds obovate in outline, ca. 1 × 1 mm, covered with dense appressed trichomes. Fl. Jun–Sep, fr. Dec–Mar.

- Rocks or wet places along streams, forests; 100–600 m. Guangxi, Hainan.

5. *Pararuellia delavayana* (Baillon) E. Hossain, Notes Roy. Bot. Gard. Edinburgh 32: 409. 1973.

地皮消 di pi xiao

Ruellia delavayana Baillon, Hist. Pl. 10: 408. 1891; *Hemigraphis drymophila* Diels; *Pararuellia drymophila* (Diels) C. Y. Wu & H. S. Lo; *R. arcuata* Lingelsheim & Borza; *R. drymophila* (Diels) Handel-Mazzetti; *R. esquirolii* H. Léveillé.

Herbs. Stems 1–2 cm. Petiole 0.5–2 cm; leaf blade oblong to oblong-elliptic, sometimes obovate, elliptic, or lanceolate, 4–12 × 2.5–4 cm, abaxially pubescent, adaxially strigose, secondary veins 7–9 on each side of midvein, base cuneate and decurrent onto petiole, margin undulate to crenate, apex acute, obtuse, or rounded. Spikes ca. 4 cm, with 1–3 nodes; bracts elliptic to ovate, 1–4.7 × 0.5–2.5 cm, reduced in size apically on rachis, both surfaces sparsely strigose, base rounded, margin ciliate, apex acute to obtuse; bracteoles linear, ca. 7 × 1 mm. Calyx ca. 8 mm; lobes triangular-lanceolate, ca. 7 × 1 mm, margin apically ciliate. Corolla white, light blue, or pink, ca. 1.3 cm; tube basally cylindrical and narrow for ca. 4 mm, throat ca. 5 mm; lobes orbicular, ca. 4 × 4 mm, subequal, apex emarginate. Stamen longer pair ca. 3.5 mm, shorter pair ca. 1.5 mm; anther thecae oblong, ca. 1 mm. Ovary ellipsoid; style ca. 1.4 cm, white hirsute. Capsule to 2 cm, 16-seeded. Seeds ovate to subcircular in outline, 1.1–1.4 × 1.1–1.4 mm, covered with dense appressed trichomes. Fl. Jul–Sep, fr. Nov–Feb.

- Forests, slopes; 700–3000 m. Guizhou, S Sichuan, Yunnan.

13. *RUELLIA* Linnaeus, Sp. Pl. 2: 634. 1753.

芦莉草属 lu li cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Blechum P. Browne; *Cryphiacanthus* Nees; *Dipteracanthus* Nees.

Herbs [or shrubs], perennial, prostrate to erect, with cystoliths. Leaves sessile or petiolate; leaf blade margin entire, crenulate, or dentate. Inflorescences axillary or terminal, reduced or expanded dichasia, sometimes forming dichasiate spikes, thyrses, or panicles, sometimes reduced to a solitary flower; bracts opposite, usually green, margin entire; bracteoles 2 [or absent]. Flowers [sessile or] subsessile to pedicellate. Calyx deeply 5-lobed; lobes equal or subequal. Corolla funnel-shaped; tube basally with a narrowly cylindrical portion, usually expanded apically into a distinct throat; limb 5-lobed; lobes usually ovate to orbicular, equal to unequal in size, contorted in bud. Stamens 4, didynamous, usually included in corolla tube; filaments sometimes connate in pairs at base; anthers 2-thealous; thecae equal, parallel to subsagittate, mucicous at base; staminode 1 or absent. Ovary with up to 10 ovules per locule; style usually included in corolla tube or slightly exserted; stigma 2-lobed, lobes equal or unequal. Capsule stipitate or not stipitate, [4–]12–26-seeded; retinacula present; septa with attached retinacula remaining attached (or separating in *Ruellia blechum*) to inner wall of mature capsule. Seeds discoid, usually pubescent with hygroscopic trichomes.

About 250 species: tropical to temperate regions worldwide; four species (one endemic, two introduced) in China.

Blechum and *Dipteracanthus* are included in *Ruellia* based on morphological and molecular data (C. Ezcurra, Ann. Missouri Bot. Gard. 80: 787–845. 1993; E. Tripp, Syst. Bot. 32: 628–649. 2007; E. Tripp et al., Taxon 58: 893–906. 2009).

- 1a. Flowers in terminal dense 4-sided spikes; septa with retinacula separating from inner wall of mature capsule 1. *R. blechum*
 1b. Flowers otherwise; septa with retinacula remaining attached to inner wall of mature capsule.
 2a. Creeping herbs; corolla white, 1.2–2 cm 2. *R. repens*
 2b. Erect herbs; corolla purplish, 2.2–5.5 cm.
 3a. Roots lacking tuberlike swellings; flowers sessile 3. *R. venusta*
 3b. Roots with tuberlike swellings; flowers pedicellate 4. *R. tuberosa*

1. *Ruellia blechum* Linnaeus, Syst. Nat., ed. 10, 2: 1120. 1759.

赛山蓝 sai shan lan

Barleria pyramidata Lamarck; *Blechum brownei* Jussieu; *B. pyramidatum* (Lamarck) Urban.

Herbs to 50 cm tall. Roots lacking tuberlike swellings. Stems slightly 4-angled, often prostrate and rooting at nodes, sparsely pubescent to subglabrous. Petiole 0.5–2.5 cm, strigose; leaf blade ovate, 3–6 × 2–4 cm, abaxially paler and subglabrous, adaxially green, sparsely strigose and densely pilose along veins, secondary veins 5–8 on each side of midvein, base obtuse to rounded and slightly decurrent onto petiole, margin entire, apex acute. Inflorescences terminal, dense spikes, 2–6 cm, subsessile to shortly pedunculate; rachis strigose; bracts subleaflike, ovate, ca. 1.5 × 1.3 cm, abaxially slightly pubescent, margin ciliate; bracteoles 2, lanceolate-ovate, 5–9 × 1.5–3 mm, margin ciliate. Calyx lobes linear to subulate, outside pilose. Corolla white to pale blue, ca. 1.5 cm (cleistogamous flowers sometimes present, these much smaller and budlike), outside puberulent on lobes; lobes ovate, ca. 3 × 2 mm. Stamens with longer pair ca. 4 mm and shorter pair ca. 3 mm; filaments glabrous; anther thecae ca. 1 mm. Ovary comose; style 6–10 mm, slightly hirsute; stigma usually with only 1 lobe evident. Capsule substipitate, ovoid to ellipsoid, ca. 6 mm, puberulent, 8–12-seeded; septa with attached retinacula separating from inner wall of mature capsule. Seeds ca. 1.5 mm in diam., margin with a conspicuous band of appressed hygroscopic trichomes. Fl. Nov, fr. Nov. $2n = 34$.

Disturbed sites, drainage ditches; sea level to below 100 m. Naturalized in Taiwan [native to tropical America].

Ruellia blechum is widely naturalized in tropical and subtropical areas.

2. *Ruellia repens* Linnaeus, Syst. Nat., ed. 12, 2: 424; Mant. Pl. 1: 89. 1767.

楠草 nan cao

Dipteracanthus lanceolatus Nees; *D. repens* (Linnaeus) Hasskarl.

Herbs 15–50 cm tall, perennial, creeping. Roots lacking tuberlike swellings. Stems almost 4-angled, finely pubescent or glabrescent. Petiole 3–5 mm; leaf blade ovate to linear-lanceolate, 1.4–4 × 0.8–2 cm, thinly papery, both surfaces sparsely strigose, secondary veins 4 or 5 on each side of midvein, base broadly cuneate to rounded, margin subentire, apex acuminate to acute. Flowers axillary, solitary [or clustered]; bracteoles subleaflike, ovate to ovate-oblong, 8–10 mm. Pedicel to 1 mm.

Calyx lobes lanceolate, ca. 5 mm, margin sparingly ciliate. Corolla white [or pink to light purple], 1.2–2 cm, outside pilose; tube basally ca. 2 mm wide for ca. 5 mm then ventricose and gradually widened to ca. 5 mm at mouth; lobes ovate, ca. 3 × 3 mm, apex obtuse. Stamens with longer pair ca. 5 mm and shorter pair ca. 2 mm; filaments glabrous; anther thecae ca. 1 mm. Ovary comose; style ca. 1 cm, hirsute; stigma lobes unequal. Capsule brownish yellow, stipitate, ca. 1.2 cm, slightly pilose, 12–16-seeded; septa with attached retinacula remaining attached to inner wall of mature capsule. Seeds discoid, ca. 3 mm in diam., margin with a conspicuous band of appressed hygroscopic trichomes. Fl. May–Aug, fr. Jul–Aug. $2n = 24$.

Grasslands, roadsides; 100–900 m. Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Indonesia, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Vietnam].

3. *Ruellia venusta* Hance, J. Bot. 6: 92. 1868.

飞来蓝 fei lai lan

Leptosiphonium venustum (Hance) E. Hossain; *Ruellia seclusa* S. Moore.

Herbs to 70 cm tall, unbranched or rarely branched. Petiole 3–8 mm; leaf blade oblong-lanceolate, lanceolate, or oblanceolate, 4–14 × 1–3.5 cm, both surfaces glabrous, secondary veins 5–8 on each side of midvein, base cuneate to attenuate and decurrent onto petiole, margin slightly undulate to crenate, apex acute to acuminate. Flowers in axils of leaves or leaflike bracts, solitary or in dichasial clusters, sessile; bracteoles subleaflike, lanceolate to elliptic, 7–30 × 1.5–6.5 mm, abaxially glabrous. Calyx 7–8 mm; lobes lanceolate, outside sparsely pubescent with non-glandular trichomes, adaxially gland-tipped puberulent. Corolla purplish white, 4–5.5 cm; tube basally cylindrical and ca. 2 mm wide for 2.2–3.5 cm; lobes 7–17 × 4–6 mm, subequal, apically undulate. Stamens with longer pair ca. 7 mm and shorter pair ca. 4 mm; filaments glabrous; anther thecae ca. 2 mm. Ovary glabrous; style sparsely villous. Capsule ca. 1.3 cm. Fl. Aug–Sep.

• Forests, along streams; 100–800 m. Anhui, Fujian, Guangdong, Guangxi, Hubei, Hunan, Jiangxi.

Ruellia venusta was treated under *Leptosiphonium* F. Mueller by C. C. Hu (FRPS 70: 56–58. 2002). *Leptosiphonium* is often treated as a section of *Ruellia*. The generic distinctions between *Leptosiphonium* and most *Ruellia* are based on floral form and color (white or yellowish corollas that are hypocrateriform in *Leptosiphonium*) and likely reflect different pollinators. It is doubtful that the genera are distinct, but the Chinese plants (with their purplish and funnelliform corollas) more closely resemble those of *Ruellia* than *Leptosiphonium*.

4. *Ruellia tuberosa* Linnaeus, Sp. Pl. 2: 635. 1753.

芦莉草 lu li cao

Herbs to 45 cm tall, perennial, erect. Roots with elongate tuberlike swellings. Stems slightly swollen above nodes, almost 4-angled, strigulose on angles. Petiole to 8 mm, glabrous; leaf blade oblong-obovate, 4–8 × 1.5–4.2 cm, both surfaces glabrous, veins abaxially somewhat prominent, base cuneate and tapering onto petiole, margin undulate to subentire, apex acute. Inflorescences axillary, lax dichotomous cymes; peduncle to 2.3 cm; bracts oblong-lanceolate, to 3–9 × 1–3 mm; bracteoles linear-oblong, to 1.5 mm. Pedicel 6–10 mm, minutely pilose. Calyx tube to 6 mm, outside tomentose; lobes linear-lanceolate, 0.9–2 cm. Corolla pale blue, 2.2–5.5 cm, outside hirtellous;

lobes suborbicular, ca. 1.6 × 1.5 cm. Stamens with longer pair ca. 8 mm and shorter pair ca. 4 mm; filaments glabrous; anther thecae white, hairy on dorsal side. Ovary glabrous except for a few gland-tipped trichomes at apex; style ca. 2.1 cm, sparsely hirsute; stigma 2-lamellate. Capsule not stipitate, linear-ellipsoid, 1.8–2.5 × 0.3–0.4 cm, glabrous except for a few gland-tipped trichomes at apex, 20–26-seeded; septa with attached retinacula remaining attached to inner wall of mature capsule. Seeds discoid, ca. 2 × 2 mm, covered with appressed hygroscopic trichomes. Fl. Dec–Jan, fr. May–Jul. $2n = 32, 34$.

Disturbed sites such as roadsides; below 100 m. Naturalized in Taiwan and Yunnan (Hekou) [native to tropical America].

Ruellia tuberosa is widely naturalized in tropical areas.

14. ASYSTASIA Blume, Bijdr. 796. 1826.

十万错属 shi wan cuo shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Intrusaria Rafinesque.

Herbs or subshrubs, with cystoliths. Leaves petiolate; leaf blade margin entire to crenate. Inflorescences terminal or axillary, unilateral spikes or racemes, or panicles of these; bracts small, shorter than calyx; bracteoles similar to bracts or sometimes absent. Calyx 5-lobed; lobes equal to subequal. Corolla funnel-shaped; tube expanded distally into a throat; limb ± 2-lipped, often appearing subactinomorphic with 5 ± equal lobes; lobes ascending cochlear in bud. Stamens 4, included in or partially exerted from corolla tube; anthers 2-theous; thecae parallel to sagittate to subperpendicular, equally to unequally inserted, base mucous or with a small basal appendage; staminodes 0. Ovary with 2 ovules per locule; stigma capitate, 2-lobed or 2-dentate. Capsule with a solid stalk at base, clavate, up to 4-seeded; retinacula present. Seeds lenticular, lacking trichomes.

About 40 species: tropical and subtropical regions of Old World; four species (one introduced) in China.

- 1a. Corolla ± subsalverform with cylindric basal portion of tube at least 1.5 × as long as throat and limb combined 1. *A. neesiana*
 1b. Corolla ± campanulate with cylindric basal portion of tube less than 1.5 × as long as throat and limb combined.
 2a. Leaf blade ovate to elliptic, base truncate to rounded; corolla yellow or white 2. *A. gangetica*
 2b. Leaf blade lanceolate to ovate-lanceolate or narrowly ovate, base attenuate; corolla red or purplish red.
 3a. Leaf blade (1.2–)1.8–2.8 cm wide, margin entire; corolla 3.5–4 cm, lobes ca. 5 mm wide 3. *A. salicifolia*
 3b. Leaf blade 3–5 cm wide, margin undulate-crenulate; corolla ca. 2.2 cm, lobes ca. 3.2 mm wide 4. *A. nemorum*

1. *Asystasia neesiana* (Wallich) Nees in Wallich, Pl. Asiat. Rar. 3: 89. 1832.

白接骨 bai jie gu

Ruellia neesiana Wallich, Pl. Asiat. Rar. 1: 73. 1831; *Asystasia chinensis* S. Moore; *Asystasiella chinensis* (S. Moore) E. Hossain; *A. neesiana* (Wallich) Lindau.

Herbs to 1 m tall. Stems 4-angled, sulcate, 2-fariously puberulent to subglabrous. Petioles 0.5–5 cm, glabrous or sparsely pubescent; leaf blade lanceolate to ovate to elliptic to oblong or uppermost sometimes ovate-cordate, 4–25 × 2–11 cm, both surfaces glabrous or slightly pubescent, secondary veins 6–8, base attenuate and decurrent onto petiole (or cordate for uppermost leaves), margin entire to sinuate-crenate to subdentate, apex acuminate. Inflorescences terminal, spikes or racemes, unbranched or with one or more basal branches forming a panicle, 6–15 cm; rachis usually gland-tipped pubescent; bracts and bracteoles triangular, 1–2 × ca. 1 mm, minutely pubescent. Pedicel (0–)1–3 mm. Calyx 4–6.5 mm; lobes linear-lanceolate, usually gland-tipped pubescent. Corolla pink to purplish blue,

4–6 cm, outside gland-tipped pubescent; tube with cylindric basal portion narrow, elongate, 3–4 cm, at least 2 × as long as throat and limb combined; lobes of lower lip ovate, ca. 6 × 8 mm; lobes of upper lip suborbicular, ca. 7 × 7 mm. Stamens with longer pair ca. 5 mm, shorter pair ca. 2 mm; anther thecae subequally inserted. Style 3.6–5.2 cm, glabrous. Capsule 1.8–2.8 cm, gland-tipped pubescent, 4-seeded, basal stalk 1–1.5 cm. Seeds ovate in outline, ca. 4 × 3 mm, compressed. Fl. Jul–Sep, fr. Oct–Jan.

Evergreen broad-leaved forests, moist banks, streamsides, disturbed sites, ditches, trails; 100–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

Asystasia neesiana is sometimes treated in *Asystasiella* Lindau, a genus of two species with spheroidal, 4- or 5-porate, and spinulate (vs. prolate-spheroidal to subprolate, 3-colporate, and reticulate) pollen (see K. Ensermu et al., Kew Bull. 47: 669–675. 1992). The generic position of *Asystasia neesiana* s.l. and some of its relatives has yet to be thoroughly investigated.

This species is used medicinally.

2. *Asystasia gangetica* (Linnaeus) T. Anderson, Enum. Pl. Zeyl. 235. 1860.

宽叶十万错 kuan ye shi wan cuo

Herbs to 0.5 m tall, ascending. Stems 4-angled, pilose. Petiole 3–5 mm, pubescent; leaf blade ovate to elliptic, 3–12 × 1–5 cm, glabrous or sparsely pilose especially on veins, adaxially with numerous cystoliths, base truncate to rounded, margin entire or slightly crenulate, apex acuminate. Racemes axillary or terminal, to 16 cm; bracts triangular, ca. 5 mm, pilose; bracteoles linear-lanceolate, 1–2.5 mm, pilose. Pedicel 2–3 mm, pilose. Calyx ca. 7 mm; lobes linear-lanceolate, 5–7 × 1–1.2 mm, outside glandular pilose, margin ciliate. Corolla yellow or white, 1.2–3.5 cm, outside gland-tipped pilose, inside glabrous; tube basally cylindrical and ca. 3 mm wide for ca. 8 mm then gradually widened to ca. 1 cm; lobes obovate to semicircular, 0.7–1.2 × 0.8–1 cm; middle lobe of lower lip with violet or maroon markings. Stamens included; filaments glabrous, longer pair ca. 5 mm, shorter pair ca. 3 mm; anther thecae ca. 3 × 1 mm. Ovary ellipsoid, ca. 3.5 mm; style ca. 1.8 cm, velutinous; stigma slightly capitate, 2-lobed. Capsule ca. 1.3 × 2 cm, pubescent. Seeds irregularly obovate in outline, 3–5 × 0.5–3 mm, tuberculate-rugose. Fl. Sep–Dec, fr. Dec–Mar. $2n = 26, 52$.

Forest margins, roadsides. Naturalized in Guangdong, Guangxi, Taiwan, and Yunnan [paleotropical; SW Asia].

Cultivated plants of *Asystasia gangetica* have corollas that vary from white to cream to lavender to purple.

- 1a. Corolla 3–3.5 cm, ca. 1 cm wide at mouth, lobes erect 2a. subsp. *gangetica*
 1b. Corolla 1.2–1.5 cm, ca. 0.5 cm wide at mouth, middle lobe of lower lip slightly reflexed 2b. subsp. *micrantha*

2a. *Asystasia gangetica* subsp. *gangetica*

宽叶十万错(原亚种) kuan ye shi wan cuo (yuan ya zhong)

Justicia gangetica Linnaeus, Cent. Pl. 2: 3. 1756; *Asystasia coromandeliana* Nees.

Corolla 3–3.5 cm, ca. 1 cm wide at mouth, lobes erect.

Forest margins. Naturalized in Guangdong, Guangxi, and Yunnan [tropical Asia; Pacific islands].

Asystasia gangetica subsp. *gangetica* occurs from India and Sri Lanka through SE Asia and Malesia to several Pacific islands. Exactly where the subspecies is native in E Asia and eastward is not confirmed.

2b. *Asystasia gangetica* subsp. *micrantha* (Nees) Ensermu in Seyani & Chikuni, Proc. XIII Plenary Meeting AETFAT 1: 343. 1994.

小花十万错 xiao hua shi wan cuo

Asystasia coromandeliana var. *micrantha* Nees in A. Candolle, Prodr. 11: 165. 1847; *A. micrantha* (Nees) Y. F. Deng & N. H. Xia.

Corolla 1.2–1.5 cm, ca. 0.5 cm wide at mouth, middle lobe of lower lip slightly reflexed.

Forest margins, roadsides. Naturalized in Guangdong and Taiwan [Africa, SW Asia, Indian Ocean islands, Madagascar].

3. *Asystasia salicifolia* Craib, Bull. Misc. Inform. Kew 1918: 367. 1918.

囊管花 nang guan hua

Herbs to 1 m tall. Stems 4-angled, pilose. Petiole ca. 5 mm, sparsely hirsute; leaf blade lanceolate, (5–)12–18 × (1.2–)1.8–2.8 cm, glabrous or hirsute along veins, secondary veins 6–9 on each side of midvein, base attenuate and decurrent onto petiole, margin entire, apex acuminate. Racemes terminal or rarely axillary, 5–10 cm; bracts triangular, 2–3 × ca. 1 mm, pilose with gland-tipped trichomes; bracteoles similar to bracts. Pedicel 1–3 mm, pilose. Calyx 5–6 mm, outside pilose with gland-tipped trichomes; lobes lanceolate. Corolla red to purplish red, 3.5–4 cm, outside gland-tipped pilose, inside pubescent in throat; lobes ovate, 5–6 × ca. 5 mm. Stamens included; filaments glabrous, longer pair ca. 1 cm, shorter pair ca. 0.8 cm; anther thecae oblong, ca. 3 mm. Ovary pilose; style ca. 2.8 cm, base pilose; stigma apically 2-cleft. Capsule and seeds not seen. Fl. Aug–Oct, fr. Nov–Jan.

Forests. Yunnan [India, Laos, Myanmar, Thailand].

Specimens identified as "*Asystasia henryi*" (C. Y. Wu, Index Fl. Yunnan. 2: 1669. 1984), which is not a validly published name, belong here.

Outside of China variation in *Asystasia salicifolia* also includes corollas pinkish to purplish (or rarely entirely white) and leaf blade margins entire to subsinuate.

4. *Asystasia nemorum* Nees in Wallich, Pl. Asiat. Rar. 3: 90. 1832.

十万错 shi wan cuo

Herbs to 1 m tall, perennial. Stems pilose. Leaf blade narrowly ovate to ovate-lanceolate, 6–12 × 3–5 cm, abaxially pilose along veins, adaxially glabrous or pilose along veins, secondary veins 6–9 on each side of midvein, base attenuate, margin undulate-crenulate, apex acuminate. Racemes terminal or axillary, 5–9 cm; bracts triangular, 2–3 × ca. 1 mm, pilose with gland-tipped trichomes; bracteoles similar to bracts. Pedicel 1–2 mm. Calyx 5–6 mm, outside pilose with gland-tipped trichomes; lobes lanceolate. Corolla red to purplish red, ca. 2.2 cm, outside pilose with gland-tipped trichomes, inside barbate in throat; lobes ovate, 4–5 × ca. 3.5 mm, unequal. Ovary and style pilose; stigma slightly 2-cleft. Capsule 1.8–2.2 cm. Seeds irregularly obovate in outline, 2–4 × ca. 2.5 mm, tuberculate-rugose. Fl. Aug–Oct, fr. Nov–Feb.

Paddy fields, streamsides, thickets. Guangdong, Guangxi, Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

The plants misidentified as *Asystasia chelonoides* Nees by C. C. Hu (FRPS 70: 215. 2002) belong here.

Asystasia salicifolia can be difficult to distinguish from *A. nemorum*, and Chinese plants treated as these taxa might be conspecific. Indeed, according to R. Kiew and K. Vollesen (Kew Bull. 52: 965–971. 1997), *A. nemorum* has a compact inflorescence with flowers clustered toward the apex, a long and slender corolla tube, blue corollas, and is known only from Peninsular Malaysia (where cultivated) and Java (where native). It is possible that the plants treated here as *A. nemorum* are either not that species or represent cultivated plants of that species (which is used medicinally). *Asystasia* remains much in need of revisionary studies.

15. PSEUDERANTHEMUM Radlkofer, Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 13: 282. 1883.

山壳骨属 shan ke gu shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs or shrubs, with cystoliths. Leaves sessile or petiolate; leaf blade margin entire or subentire [or lobed]. Flowers in axillary or terminal thyrses, racemes, or spikes; bracts and bracteoles present, mostly shorter than calyx. Calyx deeply 5-lobed; lobes equal to subequal. Corolla salverform; tube slender, not or scarcely apically enlarged; limb 5-lobed or 2-lipped; lobes \pm equal or 3 of lower lip slightly larger than 2 of upper lip, ascending cochlear in bud. Stamens 2, included in corolla tube or exerted from corolla mouth (some species heterostylous); anthers 2-theous; thecae equal to subequal, parallel, inserted at same height, mucicous; staminodes 2 or absent. Style included or exerted; stigma 2-lobed, lobes equal. Capsule clavate with a long solid stalk, 4-seeded; retinacula present. Seeds lenticular, ornamented or smooth, lacking trichomes.

About 50 species: pantropical; seven species (two endemic) in China.

- 1a. Flowers in thyrses, imbricate on rachis.
 2a. Calyx lobes pubescent with gland-tipped trichomes 1. *P. polyanthum*
 2b. Calyx lobes pubescent with non-glandular trichomes.
 3a. Bracts ca. 7 mm; ovary pubescent; leaf blade 5–15 cm 2. *P. crenulatum*
 3b. Bracts ca. 3 mm; ovary glabrous; leaf blade 2.5–5.5 cm 3. *P. shweliense*
 1b. Flowers in racemes (thyrses in *P. coudercii*), distant on rachis.
 4a. Racemes terminal or axillary 4. *P. teysmannii*
 4b. Racemes terminal only (or terminal and also rarely in apical leaf axils in *P. haikangense*).
 5a. Leaf blade lanceolate, length greater than $4 \times$ width; filaments of fertile and sterile stamens connate at base 5. *P. coudercii*
 5b. Leaf blade elliptic-ovate or elliptic, length less than $3.5 \times$ width; filaments of fertile and sterile stamens distinct at base.
 6a. Stems terete, glabrous; bracts and bracteoles 1–3 mm; corolla ca. 4 cm 6. *P. haikangense*
 6b. Stems 4-angled, pubescent; bracts and bracteoles 4–6 mm; corolla 2–3 mm 7. *P. latifolium*

1. Pseuderanthemum polyanthum (C. B. Clarke ex Oliver) Merrill, Brittonia 4: 175. 1941.

多花山壳骨 duo hua shan ke gu

Eranthemum polyanthum C. B. Clarke ex Oliver, Hooker's Icon. Pl. 20: t. 2000. 1891.

Herbs. Stems grayish, subterete, glabrescent. Petiole ca. 2.5 cm; leaf blade broadly ovate to oblong, $7\text{--}17 \times (3\text{--})4\text{--}9$ cm, both surfaces glabrous, secondary veins 7–9 on each side of midvein, base cuneate and decurrent onto petiole, margin entire, apex acute. Thyrses 5–12 cm; bracts triangular, $3.5\text{--}4 \times$ ca. 1.5 mm; bracteoles ca. 2×0.5 mm. Pedicel 1.5–2.5 mm. Calyx ca. 1 cm; lobes lanceolate. Corolla bluish purple; tube 3–3.5 cm; lower lip 3-lobed, lobes oblong and ca. 1.5×0.6 cm; upper lip 2-lobed, lobes ca. 11×3 mm. Staminal filaments short, distinct, inserted at throat. Ovary pilose; style basally pilose; stigma spherical. Capsule clavate, ca. 2.5 cm, pubescent. Seeds ovate in outline, ca. 3×3 mm, verrucose, glabrous. Fl. Apr–Jun, fr. Aug.

Forests, thickets; 300–1600 m. Guangxi, Yunnan [India, Malaysia, Myanmar, Thailand, Vietnam].

Plants misidentified as *Rhinacanthus calcaratus* (Wallich) Nees by C. C. Hu (FRPS 70: 268. 2002) belong here.

2. Pseuderanthemum crenulatum (Wallich ex Lindley) Radlkofer, Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 13: 286. 1883.

云南山壳骨 yun nan shan ke gu

Eranthemum crenulatum Wallich ex Lindley, Bot. Reg. 11: t. 879. 1825; *E. graciliflorum* Nees; *E. malaccense* C. B. Clarke; *Pseuderanthemum graciliflorum* (Nees) Ridley; *P. malaccense* (C. B. Clarke) Lindau.

Subshrubs or shrubs, to 3 m tall. Stems blackish brown, subterete, pubescent. Petiole 1–4 cm, puberulent; leaf blade ovate-elliptic to oblong-lanceolate, $5\text{--}15 \times 3\text{--}5.5$ cm, abaxially light green and pubescent along veins, adaxially slightly pubescent, secondary veins ca. 7 on each side of midvein, base cuneate to broadly cuneate, margin entire, apex acute to acuminate. Thyrses 3–10 cm, densely flowered; bracts triangular, ca. 7×3 mm, brown tomentose; bracteoles subulate, $3\text{--}4 \times$ ca. 1.5 mm, brown tomentose. Pedicel 1–3 mm, pubescent. Calyx 4–5 mm; lobes linear-lanceolate, densely pubescent with non-glandular trichomes. Corolla white or light purplish, 3.5–4.5 cm, outside finely and sparingly pubescent with gland-tipped trichomes; tube 2.5–3.5 cm; lower lip 3-lobed, lobes oblong and ca. 1 cm; upper lip 2-lobed to middle. Stamens slightly exerted; filaments ca. 3 mm, glabrous; anther thecae ovoid. Ovary pilose; style basally white pilose; stigma spherical. Capsule clavate, ca. 2.5 cm. Seeds subcircular in outline, ca. 3.5 mm in diam., verrucose, glabrous. Fl. Apr–Jun, fr. Aug.

Forests, thickets; 200–1700 m. Guangxi, Guizhou, Yunnan [India, Laos, Malaysia, Thailand, Vietnam].

3. Pseuderanthemum shweliense (W. W. Smith) C. Y. Wu & C. C. Hu, Fl. Reipubl. Popularis Sin. 70: 226. 2002.

瑞丽山壳骨 rui li shan ke gu

Eranthemum shweliense W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 176. 1918.

Shrubs 1–2 m tall. Stems woody, grayish, hispid when young. Petiole 3–5 mm, densely brownish hirsute; leaf blade lanceolate, ovate-lanceolate, or elliptic, 2.5–5.5 × 1–2 cm, abaxially sparsely pilose or glabrous but densely brown hairy along veins, adaxially sparsely pilose along veins, base cuneate and decurrent onto petiole, margin entire, apex obtuse to acute. Inflorescences terminal, 7–15 cm; rachis densely yellowish pilose, with flowers fascicled at each node; bracts linear to linear-lanceolate, ca. 3 mm, pilose; bracteoles subulate, ca. 2 mm. Pedicel ca. 2 mm, pilose. Calyx ca. 5 mm; lobes linear-oblong, pilose, apex acute. Corolla white with violet spot on 2 lobes; tube ca. 2.2 cm, outside and inside pilose; lobes 5, ovate, 1.8–1.9 cm. Stamens exserted. Ovary glabrous; style basally sparsely pilose; stigma slightly 2-cleft. Capsule clavate, ca. 2.5 cm. Seeds ovate in outline, ca. 3 mm, verrucose, glabrous. Fl. Feb–May, fr. Jun–Aug.

- Thickets, forest margins; 1200–1800 m. Yunnan.

4. *Pseuderanthemum teysmannii* (Miquel) Ridley, Fl. Malay. Penin. 2: 592. 1923 [*“teysmannii”*].

红河山壳骨 hong he shan ke gu

Strobilanthes teysmannii Miquel, Fl. Ned. Ind. 2: 799. 1858 [*“teysmannii”*].

Shrubs. Stems reddish brown, 4-angled, glabrous. Petiole to 2.5 cm; leaf blade ovate, 3.5–9.5 × 1.5–4.5 cm, abaxially pubescent along veins, adaxially sparsely pubescent along midvein, secondary veins 8–10 on each side of midvein, base broadly cuneate and decurrent onto petiole, margin subentire, apex acuminate. Racemes terminal or axillary; rachis with flowers 0.5–1.5 cm apart, yellowish brown pubescent; bracts triangular, 2–3 mm, margin ciliate; bracteoles similar to bracts. Pedicel 0–4 mm, pilose. Calyx ca. 5 mm, pubescent; lobes linear, slightly unequal. Corolla pale purple, ca. 3.5 cm; tube ca. 2.5 cm; limb 5-lobed, slightly 2-lipped. Stamens inserted at corolla throat; anthers as long as filaments. Ovary pilose; style ca. 2 cm, slightly white villous; stigma 2-cleft. Capsule clavate, ca. 2.3 cm, sparsely pubescent. Seeds ovate in outline, ca. 3 × 3 mm, verrucose, glabrous. Fl. Apr–Jun, fr. Aug.

- Thickets; 100–300 m. Yunnan [Indonesia, S Thailand].

5. *Pseuderanthemum coudercii* Benoist, Notul. Syst. (Paris) 5: 111. 1936 [*“couderci”*].

狭叶钩粉草 xia ye gou fen cao

Subshrubs or perennial herbs, 30–50 cm tall. Stems subterete to 4-angled, pubescent, glabrescent. Petiole ca. 5 mm; leaf blade oblong, lanceolate, or linear, 3–11 × 0.2–2.5 mm, both surfaces glabrous, secondary veins 6–12 on each side of midvein, base cuneate, margin entire or slightly undulate, apex acuminate to rarely acute. Thyrses terminal, to 20 cm; rachis pubescent; dichasia 1–4-flowered; basal bracts 1–3, large, leaflike, longer than calyx; apical bracts linear, shorter than calyx, villous; bracteoles linear, villous. Calyx 5–6 mm; lobes linear, vil-

lous. Corolla light purplish red, slightly pubescent; tube ca. 3 cm; lower lip ca. 1.2 cm, lobes ovate to ovate-elliptic; upper lip 2-lobed, lobes oblong. Stamens 2; filaments connate at base; staminodes 2, smaller than stamens. Capsule ca. 1.8 cm, sparsely pubescent. Seeds obovate in outline, ca. 3.5 mm, tuberculate-punctate, glabrous. Fl. Jun–Aug, fr. Sep.

- Forests, streamsides; 100–400 m. Hainan [Cambodia].

6. *Pseuderanthemum haikangense* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 595. 1974.

海康钩粉草 hai kang gou fen cao

Shrubs 40–100 cm tall. Stems terete, glabrous; bark straw-yellow. Petiole 0.5–1.5 cm; leaf blade elliptic-orbicular, oblong, ovate, or rarely lanceolate-elliptic, 5–11.5 × 2–3.5 cm, both surfaces glabrous, secondary veins 5–7 on each side of midvein, base broadly cuneate to rounded, margin entire or inconspicuously undulate, apex shortly acuminate to caudate. Racemes terminal or rarely in apical leaf axils, to 30 cm; bracts narrowly triangular, 2–3 mm; bracteoles 1–2 mm. Pedicel 0–3 mm. Calyx ca. 5 mm; lobes linear-lanceolate, apex acuminate. Corolla white or pink and with red spots on lobes of lower lips, ca. 4 cm, pilose; tube basally ca. 1.5 mm wide for ca. 3 cm; lower lip 3-lobed, lobes narrowly elliptic, ca. 10 × 4 mm, and apex obtuse; upper lip 2-lobed, lobes elliptic, ca. 10 × 6 mm, and apex obtuse. Stamens 2; filaments ca. 2 mm; anther thecae oblong, ca. 1.5 mm; staminodes ca. 1.3 mm. Ovary pilose; style ca. 3 cm, slightly pubescent; stigma slightly 2-cleft. Capsule clavate, 1.9–2 cm, pubescent. Seeds broadly ovate in outline, ca. 3.5 mm, tuberculate-punctate. Fl. Jun–Aug, fr. Sep.

- Forests; 200–900 m. Guangdong, Hainan, Yunnan.

7. *Pseuderanthemum latifolium* (Vahl) B. Hansen, Nordic J. Bot. 9: 213. 1989.

山壳骨 shan ke gu

Justicia latifolia Vahl, Symb. Bot. 2: 4. 1791; *Antheliacanthus micranthus* Ridley; *Eranthemum palatiferum* (Wallich) Nees; *J. palatifera* Wallich; *Pseuderanthemum palatiferum* (Wallich) Radlkofer.

Herbs to 1 m tall, perennial. Stems 4-angled, pubescent. Petiole 1–2.5 mm; leaf blade elliptic, 11.5–12 × 3.5–6 cm, abaxially glabrous except villous on midvein, adaxially glabrous, secondary veins 5 or 6 on each side of midvein, base cuneate, margin subentire to slightly undulate-crenulate, apex acuminate. Racemes to 30 cm; rachis pubescent, usually with 3-flowered clusters at nodes; bracts triangular, 4–6 × ca. 2 mm, pubescent; bracteoles similar to bracts. Pedicel 0.5–2 mm. Calyx 5–6 mm, outside pubescent; lobes linear, 4.5–5.5 × ca. 1 mm. Corolla light purple with purple dots on lower lip, 2–3 cm; tube linear, 1.5–2.5 cm; lobes 3–4 × ca. 3 mm. Style basally pubescent. Capsule ca. 2.5 cm, pubescent. Seeds ovate in outline, ca. 4 × 4 mm, rugose. Fl. Apr–Jun, fr. Aug–Sep.

- Forests; 100–1600 m. Guangdong, Guangxi, Hainan, Yunnan [Cambodia, India, Laos, Malaysia, Myanmar, Thailand, Vietnam].

16. MACKAYA Harvey, Thes. Cap. 1: 8. 1859, nom. cons., not Arnott (1838),
nor *Mackaia* Gray (1821).

太平爵床属 tai ping jue chuang shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, perennial, with cystoliths. Leaves petiolate. Inflorescences axillary or terminal, secund racemes; bracts linear-lanceolate [or narrowly deltoid]; bracteoles 2, borne at base of pedicel. Calyx much shorter than corolla tube, 5-lobed almost to base; lobes linear-lanceolate. Corolla subactinomorphic; tube basally cylindric, campanulate toward apex; limb 2-lipped, lower lip 3-lobed, upper lip 2-lobed; lobes suborbicular [ovate or oblong], ascending cochlear in bud. Stamens 2, inserted at base of campanulate portion of corolla tube, subincluded; anthers 2-theous; thecae oblong, dorsally pubescent; staminodes 2, lacking anthers. Disk obsolete. Ovary subellipsoid, with ovules 2 per locule; style subglabrous or pubescent near base; stigma 2-lobed. Capsule (not seen for *Mackaya tapingensis*) stipitate, 2- or 4-seeded; retinacula present. Seeds (not seen for *M. tapingensis*) somewhat rugose.

Three species: disjunctly distributed in Himalayan region and South Africa; one species in China.

1. *Mackaya tapingensis* (W. W. Smith) Y. F. Deng & C. Y. Wu,
Novon 19: 308. 2009.

太平爵床 tai ping jue chuang

Eranthemum tapingense W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 177. 1918; *Pseuderanthemum tapingense* (W. W. Smith) C. Y. Hu & H. S. Lo.

Herbs to 1 m tall, perennial. Stems subterete, glabrous or subglabrous. Petiole 2–3.5 cm, sparsely puberulent or glabrescent; leaf blade lanceolate to oblong-lanceolate, 12–17 × 3–5(–7) cm, membranous, both surfaces glabrous or glabrescent, abaxially paler, adaxially dark green, secondary veins 8–12 on

each side of midvein, base cuneate, margin entire to undulate, apex acuminate. Inflorescences axillary or terminal, racemes, 7–20 cm; peduncle sparsely pilose or glabrescent; bracts linear-lanceolate, 2–3 mm, pilose or glabrescent; bracteoles linear, ca. 1 mm. Pedicel 2–3 mm. Calyx 6–8 mm; lobes linear-lanceolate, 3–4 × 1.5–2 mm, glabrous, apex acuminate. Corolla rose, 3–4 cm, outside glabrous; tube basally cylindric for ca. 1 cm; lobes suborbicular, 7–12 mm, subequal, margin dentate. Staminal filaments 6–12 mm, pilose; anther thecae 4–5 mm, mucinous at base; staminodes 1–4 mm. Ovary glabrous; style ca. 1.8 cm, pubescent. Capsule not seen. Fl. Oct–Jan.

Forests; 600–1800 m. Yunnan [Myanmar].

17. ISOGLOSSA Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn
1854: 155. 1854, nom. cons.

叉序草属 cha xu cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Chingiacanthus Handel-Mazzetti; *Ecteinanthus* T. Anderson; *Leda* C. B. Clarke (1908), not Bory (1822) [Algae]; *Rhytiglossa* Nees; *Strophacanthus* Lindau.

Shrubs or herbs, with cystoliths, isophyllous or slightly anisophyllous. Leaves petiolate. Inflorescences terminal and/or sometimes axillary, open panicles or thyrses; bracts small, shorter than calyx. Calyx deeply 5-lobed, lobes similar. Corolla funnel-shaped, 2-lipped; lower lip 3-lobed; upper lip shortly 2-lobed, lacking a styler furrow (i.e., erugulate); lobes ascending cochlear in bud. Stamens 2; anthers 2-theous; thecae equal or unequal, parallel (to perpendicular), subequally to unequally inserted, base mucinous; staminodes absent; pollen 2-pororate [elsewhere also 3-colporate and 6-pseudocolporate]. Ovary with 2 ovules per locule. Capsule clavate with a solid sterile basal stalk, 4-seeded; retinacula present; septa with attached retinacula remaining attached to inner wall of mature capsule. Seeds subdiscoid.

About 50 species: tropical Africa and Asia; two species (one endemic) in China.

- 1a. Calyx lobes subulate, widest at base; inflorescence long branched, widely paniculate 1. *I. collina*
1b. Calyx lobes spatulate-oblancheolate, widest above middle; inflorescence shortly branched, narrowly paniculate or
thyrsoid 2. *I. glabra*

1. *Isoglossa collina* (T. Anderson) B. Hansen, Nordic J. Bot. 5:
12. 1985.

叉序草 cha xu cao

Justicia collina T. Anderson, J. Linn. Soc., Bot. 9: 515. 1867; *Chingiacanthus patulus* Handel-Mazzetti; *Dianthera collina* (T. Anderson) C. B. Clarke; *D. sinensis* W. W. Smith.

Herbs 40–100 cm tall. Stems prostrate and rooting at base

but apically erect, terete, slender, slightly puberulent when young, later glabrescent. Petiole 1–3 cm, brownish pubescent; leaf blade ovate to ovate-elliptic, 3.5–11 × 2–4.8 cm, abaxially sparsely puberulent especially along veins, adaxially glabrous, secondary veins 5–7 on each side of midvein, base cuneate or on uppermost leaves rounded, margin ± entire, apex acuminate. Inflorescences terminal or axillary from upper leaf axils, panicles, 5–18 × 3–10 cm; rachis gland-tipped puberulent or subgla-

brous with few sessile glands; branches slightly flattened; bracts lanceolate, 1.5–2 × ca. 0.5 mm, glabrous or slightly gland-tipped pubescent. Calyx 5–8 mm; lobes subulate, glabrous or gland-tipped puberulent. Corolla white with purplish dots, 1.7–4.5 cm, outside glabrous; tube basally cylindric for ca. 1/3 of its length then gradually widening into a funnel-shaped throat; lips 8–10 mm; lobes of lower lip oblong-elliptic, 3–6 mm, unequal with lateral 2 narrower. Staminal filaments 4–10 mm, glabrous; anther thecae to 4.5 mm, equal, parallel, overlapping for ca. 1/2 their length or more. Ovary glabrous; style glabrous. Capsule 1–1.4 cm, glabrous. Seeds coarsely corrugated with irregular ridges and often with minute acute protuberances. Fl. Aug–Nov.

Evergreen broad-leaved forests, wetlands by streams; 300–2200 m. Guangdong, Guangxi, Hunan, Jiangxi, Xizang, Yunnan [Bhutan, India, Thailand].

2. *Isoglossa glabra* (Handel-Mazzetti) B. Hansen, *Nordic J. Bot.* 5: 12. 1985.

光叉序草 *guang cha xu cao*

Chingiacanthus glaber Handel-Mazzetti, *Sinensia* 5: 12. 1934.

Herbs 40–100 cm tall, erect. Stems terete, glabrous. Petiole 0.8–1.5 cm, minutely puberulent; leaf blade ovate-elliptic, 5.8–7.5 × 3–3.5 cm, glabrous except puberulent on margin and midvein, secondary veins 6 or 7 on each side of midvein, base rounded to constricted cuneate, apex attenuate. Inflorescences terminal, interrupted panicles composed of cymes, ca. 10 × 2 cm; rachis glabrous; bracts triangular, ca. 1.2 × 1 mm, glabrous. Calyx ca. 4.5 mm; lobes spatulate-oblongate, glabrous, apex acute. Corolla to 3.5 cm, outside glabrous, inside pubescent; tube basally cylindric for ca. 1/3 of its length then gradually widening into a funnel-shaped throat; lobes of lower lip 3–5 mm. Staminal filaments 4–6 mm, glabrous; anther thecae to 2.5 mm, ± equal or with lower theca smaller, ± parallel, slightly or not overlapping. Ovary glabrous; style glabrous. Capsule not seen. Fl. Aug–Sep.

• Forests; ca. 1000 m. Guangxi.

18. *CLINACANTHUS* Nees in A. Candolle, *Prodr.* 11: 511. 1847.

鳄嘴花属 *e zui hua shu*

Hu Jiaqi (胡嘉琪 *Hu Chia-chi*), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs or perennial herbs, with cystoliths. Leaves petiolate; leaf blade margin entire or sinuate-crenate. Inflorescences axillary or terminal, thyrsoid racemes; bracts and bracteoles narrow. Calyx deeply 5-lobed, lobes narrow. Corolla putatively resupinate (apparently by geniculation rather than torsion); tube long, geniculate, apically widened; limb 2-lipped; lower lip slightly recurved, much broader than upper lip, 3-lobed; upper lip shortly 2-lobed; lobes ascending cochlear in bud. Stamens 2; anthers 1-theous, base muticous; staminodes absent. Stigma shortly 2-cleft. Capsule oblong, with a short basal stalk, 4-seeded; retinacula present.

Three species: tropical Asia; one species in China.

1. *Clinacanthus nutans* (N. L. Burman) Lindau, *Bot. Jahrb. Syst.* 18: 63. 1893.

鳄嘴花 *e zui hua*

Justicia nutans N. L. Burman, *Fl. Indica*, 10. 1768; *Clinacanthus burmanni* Nees, nom. illeg. superfl.; *C. nutans* var. *robinsonii* Benoist.

Shrubs to 1 m tall. Stems terete, striate, glabrescent. Petiole 0.3–2 cm, sulcate, bifariously pubescent; leaf blade lanceolate-ovate, lanceolate, or linear-lanceolate, 7–12 × 1–4 cm, both surfaces pubescent when young then glabrescent except abaxially pilose along veins, secondary veins 4–6 on each side of midvein and abaxially elevated, base cuneate to rounded, margin subentire to sinuate-crenate, apex acuminate. Racemes 1 to several at or near shoot apex, usually 3 to several forming a terminal panicle; rachis gland-tipped pubescent; bracts and

bracteoles linear, ca. 8 × 2 mm, abaxially gland-tipped pilose, apex acute. Calyx 0.9–1.3 cm; lobes linear, outside gland-tipped pilose, apex acute. Corolla dull red with a green base, 3–4.2 cm, outside gland-tipped pilose, inside glabrous except for a ring of trichomes ca. 5 mm above base; tube basally cylindric for ca. 5 mm and ca. 3 mm wide then gradually widened to ca. 6 mm at mouth; lower lip 1–2 × ca. 1 cm, with yellow streaks; upper lip triangular, 1–2 × ca. 0.5 cm, erect, apex emarginate; lobes ovate, 3–5 × 1–2 mm. Stamens exerted from mouth of corolla; filaments 1–1.5 cm, glabrous; anthers ovate-linear, 4–5 × ca. 1 mm, muticous. Style 3–3.7 cm, base sparsely pubescent. Capsule ca. 2 cm, pilose. Seeds ca. 2 mm in diam. Fl. Oct–Jan, fr. Mar.

Thickets; below 700 m. Guangdong, Guangxi, Hainan, Yunnan [Indonesia, Malaysia, Thailand, Vietnam].

This species is used medicinally.

19. *KUDOACANTHUS* Hosokawa, *Trans. Nat. Hist. Soc. Formosa* 23: 94. 1933.

银脉爵床属 *yin mai jue chuang shu*

Hu Jiaqi (胡嘉琪 *Hu Chia-chi*), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, decumbent, often rooting at basal nodes. Leaves petiolate. Inflorescences terminal, spikes or sometimes in panicles with spicate branches, bracteate; bracteoles 2. Calyx 5-lobed. Corolla tube short, distally slightly enlarged into a throat; limb 2-lipped; lower lip 3-lobed, lobes subequal; upper lip 2-cleft, lacking a stylar furrow (so far as known); lobes ascending cochlear in bud.

Stamens 2, inserted slightly above throat; anthers 2-theous; thecae equally to subequally inserted, parallel, subequal, base mucous; staminodes absent. Disk without an annulus. Capsule unknown.

- One species: China (Taiwan).

Kudoacanthus was recently shown to pertain to the “*Tetramerium* lineage” of Justiceae (L. McDade et al., Amer. J. Bot. 95: 1136–1152. 2008). Whether *K. albonervosa* is generically distinct remains to be determined; it appears very similar to *Leptostachya wallichii*.

1. *Kudoacanthus albonervosa* Hosokawa, Trans. Nat. Hist. Soc. Formosa 23: 95. 1933.

银脉爵床 yin mai jue chuang

Codonacanthus albonervosa (Hosokawa) Yuen P. Yang.

Herbs to 40 cm tall. Stems hirsute. Petiole 3–15 mm; leaf blade ovate to orbicular-ovate, 0.7–4.5 × 0.7–2.5 cm, membranous, both surfaces pilose, abaxially slightly paler, adaxially green, secondary veins 3–5 pairs on each side of midvein, prominent, and white, base broadly cuneate, margin remotely undulate to entire, apex obtuse to acuminate. Spikes to 4 cm, simple or branched into a panicle, few flowered; rachis gland-tipped pilose; bracts linear to oblanceolate, 2–3 × ca. 1 mm, abaxially gland-tipped pilose, adaxially glandular punctate. Flowers sessile; bracteoles linear, ca. 2 × 0.8 mm, abaxially gland-tipped pilose, adaxially glandular punctate. Calyx ca. 4

mm, outside gland-tipped pilose, inside glandular punctate, 5-lobed almost to base; lobes linear, outside pubescent, margin ciliate. Corolla white, ca. 5 mm, outside glabrous, inside slightly puberulent on throat; tube basally cylindrical for 2.5–3 mm then slightly enlarged into a throat; lobes of lower lip obovate-elliptic, spreading, apex obtuse; lobes of upper lip erect, concave. Staminal filaments ca. 1 mm, glabrous; anther thecae ca. 0.8 mm. Ovary oblong-ellipsoid, ca. 1.5 mm, glabrous, with 2 ovules per locule; style filiform, ca. 4 mm, glabrous; stigma minutely 2-cleft. Capsule and seeds unknown. Fl. Apr, Aug.

- Evergreen broad-leaved forests; 600–700 m. Taiwan.

Kudoacanthus albonervosa is known from few collections (but collected as recently as 2002) and remains poorly characterized. Its pollen is described as 3-porate (C. F. Hsieh & T. C. Huang, Fl. Taiwan, ed. 2, 4: 669. 1998).

20. RUNGIA Nees in Wallich, Pl. Asiat. Rar. 3: 77, 109. 1832.

孩儿草属 hai er cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, decumbent to erect, with cystoliths. Leaves petiolate; leaf blade margin entire. Inflorescences axillary or terminal spikes, secund or 4-sided, sometimes reduced to a single flower; bracts 2- or 4-ranked but usually only 2 ranks fertile, homomorphic or heteromorphic, usually imbricate, margin usually scarious or hyaline; bracteoles similar to bracts or narrower. Calyx deeply 5-lobed; lobes equal or subequal. Corolla small; tube basally cylindrical, distally ± expanded; limb 2-lipped; lower lip spreading, 3-lobed; upper lip erect, rugula (stylar furrow) present, margin entire to emarginate; lobes ascending cochlear in bud. Stamens 2, inserted in corolla throat; anthers 2-theous; thecae subequal in size, superposed, lower one white spurred at base. Ovary with 2 ovules per locule; stigma entire or slightly 2-cleft. Capsule shortly stalked, ovoid or oblong, 4-seeded; retinacula present; septa (with attached retinacula) separating from inner wall of mature capsule. Seeds compressed, verrucose, lacking trichomes.

About 50 species: Old World tropics and subtropics; 16 species (12 endemic) in China.

- 1a. Flowers solitary in apical leaf axils or in 2-sided spikes; bracts 2- or 4-ranked, all fertile.
 - 2a. Flowers solitary in apical leaf axils 1. *R. axilliflora*
 - 2b. Flowers in axillary or terminal spikes.
 - 3a. Plants 6–10 cm tall; spikes globose or ovoid, 0.5–1 cm 2. *R. mina*
 - 3b. Plants more than 20 cm tall; spikes cylindrical, 1–7 cm.
 - 4a. Bracts without hyaline margin 3. *R. densiflora*
 - 4b. Bracts with hyaline margin.
 - 5a. Bracteoles elliptic, ca. 1/2 as long as bracts 4. *R. chinensis*
 - 5b. Bracteoles ovate-lanceolate, as long as bracts 5. *R. stolonifera*
- 1b. Spikes 1-sided; bracts 4-ranked, each 2 fertile or sterile.
 - 6a. Bract margins not ciliate.
 - 7a. Sterile and fertile bracts different in shape; fertile bracts oblong, ca. 0.7 cm, apex rounded 6. *R. guangxiensis*
 - 7b. Sterile and fertile bracts similar in shape; fertile bracts oblong to elliptic-oblong, ca. 1.5 cm, apex acute 7. *R. pinpienensis*
 - 6b. Bract margins ciliate.
 - 8a. Fertile bracts circular, obovate, elliptic, obovate-elliptic, or sphenoid, apex rounded, obtuse, or emarginate.
 - 9a. Fertile bracts circular to obovate, apex rounded to obtuse to emarginate and mucronate 8. *R. pectinata*
 - 9b. Fertile bracts sphenoid, elliptic, obovate, or obovate-elliptic, apex rounded and not mucronate.
 - 10a. Fertile bracts sphenoid 9. *R. monetaria*

- 10b. Fertile bracts elliptic, obovate-elliptic, or obovate.
 11a. Fertile bracts elliptic to obovate-elliptic 10. *R. longipes*
 11b. Fertile bracts obovate 11. *R. bisaccata*
- 8b. Fertile bracts lanceolate-linear, oblong-lanceolate, lanceolate, ovate, or elliptic, apex acute, acuminate, or cuspidate.
 12a. Bracts abaxially gland-tipped pubescent 12. *R. pungens*
 12b. Bracts glabrous or non-glandular pubescent.
 13a. Fertile bracts elliptic, broader at middle.
 14a. Leaf blade pubescent abaxially 13. *R. napoensis*
 14b. Leaf blade glabrous on both surfaces 14. *R. yunnanensis*
 13b. Fertile bracts ovate to ovate-lanceolate to lanceolate-linear, broader at base.
 15a. Leaf blade glabrous 15. *R. taiwanensis*
 15b. Leaf blade pubescent along veins and ciliate on margin 16. *R. hirpex*

1. *Rungia axilliflora* H. S. Lo, Acta Phytotax. Sin. 16(4): 92. 1978.

腋花孩儿草 ye hua hai er cao

Herbs 10–20 cm tall. Branches slender, bifariously retrorsely pubescent. Petiole 2–7 mm, pubescent; leaf blade ovate to broadly ovate, 5–20 × 4–14 mm, secondary veins ca. 4 on each side of midvein, base cuneate to rounded, margin entire or slightly undulate, apex obtuse to rounded. Flowers solitary in apical leaf axils, sessile; bracteoles 2, broadly ovate, 4–4.5 × ca. 2.5 mm, margin yellow, 0.1–0.2 mm broad, membranous, and ciliate. Calyx 3–3.5 mm; lobes lanceolate, glabrous, apex acuminate. Corolla light bluish, 1.1–1.2 cm, outside glabrous; tube ca. 6 mm, straight; lower lip ca. 6 mm, patent, apex 3-lobed, lobes orbicular and ca. 1.5 mm in diam.; upper lip triangular, erect, apex emarginate. Staminal filaments ca. 5 mm; anther thecae ovoid. Ovary glabrous; style 8.5–9 mm; stigma 2-lobed. Capsule not seen. Fl. Sep–Nov.

- Streamsides; 400–700 m. Guangxi, Guizhou.

2. *Rungia mina* H. S. Lo, Acta Phytotax. Sin. 16(4): 93. 1978.

矮孩儿草 ai hai er cao

Herbs 6–10 cm tall. Stems ca. 1 mm in diam., erect, usually unbranched, white retrorsely gland-tipped pubescent. Petiole 2–5 mm, densely pubescent; leaf blade ovate or broadly ovate, 5–20 × 4–10 mm, both surfaces sparsely pubescent, secondary veins 2 or 3 on each side of midvein, base broadly cuneate, margin entire, apex obtuse. Spikes terminal or axillary, sessile, globose to ovoid, 5–10 mm, 2-sided, contracted; bracts all fertile, obovate to spatulate-obovate, ca. 4 × 3 mm, abaxially pilose, margin hyaline and ciliolate, apex obtuse to sometimes acute; bracteoles boat-shaped, ca. 3 × 2 mm, concave, margin ciliolate. Calyx 5-lobed almost to base; lobes linear-lanceolate, 1.5–1.7 mm, apex acuminate. Corolla purple, ca. 3.8 mm; tube ca. 2 mm; lower lip ca. 1.8 mm, patent, 3-lobed, lobes suborbicular, ca. 0.5 mm in diam., and outside slightly pubescent on central one; upper lip broadly triangular, ca. 1.5 mm, erect, apex emarginate. Staminal filaments ca. 1.5 mm; anther thecae ovoid. Ovary glabrous; style ca. 4 mm, glabrous. Capsule ca. 2.7 mm, glabrous. Fl. Sep.

- Wet places in forests; ca. 1400 m. Yunnan.

3. *Rungia densiflora* H. S. Lo, Acta Phytotax. Sin. 16(4): 94. 1978.

密花孩儿草 mi hua hai er cao

Herbs to 50 cm tall. Stems stout, bifariously retrorsely pubescent. Petiole 0.5–2 cm, pubescent; leaf blade elliptic-ovate, ovate, or ovate-lanceolate, 2–8.5 × 1–3 cm, papery, both surfaces glabrous or minutely hirsute, secondary veins 6–8 on each side of midvein, base cuneate and slightly decurrent onto petiole, margin entire, apex acuminate to slightly obtuse. Spikes terminal or axillary, sessile, to 3 cm; bracts 4-ranked, all fertile, homomorphic, usually spatulate to sometimes obovate, 7–11 × 1.5–3 mm, 3-veined, margin not hyaline but ciliate and densely so apically, apex rounded to obtuse; bracteoles 2, obovate, ca. 6 × 2–3 mm, margin hyaline. Calyx ca. 4 mm; lobes linear-lanceolate. Corolla 1.1–1.7 cm, outside pilose; tube basally cylindrical for 6–9 mm; lower lip oblong, 5–8 mm, apex 3-lobed, central lobe smaller; upper lip triangular-ovate, erect, shortly 2-lobed. Staminal filaments 5–7 mm, glabrous; anther thecae ovoid. Capsule ca. 6 mm. Fl. Sep–Oct, fr. Nov–Dec.

- Forests, streamsides; 400–800 m. Anhui, Guangdong, Jiangxi, Zhejiang.

4. *Rungia chinensis* Bentham, Fl. Hongk. 166. 1861.

中华孩儿草 zhong hua hai er cao

Herbs to 70 cm tall, spreading to erect. Stems slender, 4-angled, sulcate, slightly puberulent, usually rooting at basal nodes. Petiole 0.5–3 cm, pubescent; leaf blade ovate to oblong-lanceolate, 2.5–9 × 1.8–3 cm, membranous, glabrous except sparsely hirsute along veins, secondary veins 5 or 6 on each side of midvein, base cuneate to attenuate, margin entire or slightly undulate, apex acute to obtuse. Spikes terminal or axillary, 1–7 cm, 2-sided; bracts 4-ranked, all fertile, elliptic, 7–8 × 2–4 mm, margin sparsely ciliate, apex acute; bracteoles elliptic, 4–5 × ca. 2.5 mm, margin membranous and sparsely ciliate, apex mucronate. Calyx deeply 5-lobed; lobes linear-lanceolate, ca. 5 mm. Corolla bluish, 6–8 mm, outside slightly pilose and glandular punctate; lower lip 3-lobed, lobes ca. 7 mm; upper lip shallowly dentate. Ovary subglabrous; style ca. 1 cm, glabrous; stigma obtuse. Capsule ovoid, ca. 6 mm, 4-seeded. Seeds lenticular, ca. 1.5 mm wide, minutely tuberculate. Fl. Sep–Oct, fr. Nov–Dec.

Grasslands; 300–1200 m. Anhui, Fujian, Guangdong, Guangxi, Jiangxi, Taiwan, Zhejiang [Vietnam].

This species is used medicinally.

5. *Rungia stolonifera* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 547. 1885.

匍匐鼠尾黄 pu fu shu wei huang

Justicia stolonifera (C. B. Clarke) B. Hansen.

Herbs 30–60 cm tall, erect, branched, rooting at basal nodes. Stems 4-angled, sulcate, pubescent along groove. Petiole 5–10 mm; leaf blade ovate, 2.5–7.5 × 1.8–3.8 cm, subglabrous except for some pubescence on margin, secondary veins ca. 5 on each side of midvein, base broadly cuneate, margin entire or undulate, apex acute. Spikes terminal or axillary; bracts obovate to spatulate, ca. 4 × 3 mm, minutely pubescent, margin hyaline, apex rounded; bracteoles ovate-lanceolate, similar to bracts. Calyx ca. 1.3 cm, glabrous; lobes lanceolate, margin hyaline. Corolla 1.2–1.6 cm; tube basally cylindrical, 2–3 mm in diam., and straight for ca. 8 mm; limb ca. 4 mm; lower lip 3-lobed, pendent, lobes oblong and ca. 1 × 1 mm; upper lip triangular, erect, subentire. Staminal filaments white, glabrous; anther thecae purplish black. Ovary sparsely hirsute; style 1.5–1.8 cm, exerted; stigma orbicular. Capsule 3–4 mm, subglabrous. Seeds ovate in outline, ca. 2 × 1.5 mm, minutely gland-tipped papillose. Fl. Sep–Oct, fr. Nov–Dec.

Forests, trailsides; 200–2300 m. Yunnan [Bangladesh, India].

6. *Rungia guangxiensis* H. S. Lo & D. Fang, Guihaia 17: 46. 1997.

广西孩儿草 guang xi hai er cao

Herbs to 70 cm tall, erect. Stems subterete, subglabrous or pubescent when young. Petiole 0.5–2.5 cm, bifariously pubescent; leaf blade elliptic to ovate, 9–17 × 2.5–4 cm, abaxially puberulent, adaxially glabrous, secondary veins ca. 7 on each side of midvein, base cuneate, margin entire, apex shortly acuminate. Spikes terminal, 1-sided; peduncle absent or less than 3 mm; bracts 4-ranked; fertile bracts oblong, ca. 7 × 3.5 mm; sterile bracts broadly obovate, 7–8 × 4–5 mm, glabrous, apex rounded. Calyx ca. 2.5 mm, 5-lobed. Corolla red, ca. 1.7 cm, outside glabrous; tube basally cylindrical and ca. 1.5 mm in diam.; lower lip 3-lobed, patent; upper lip ovate-triangular, apex obtuse. Stamens slightly exerted; anther thecae ovoid, lower thecae spurred. Capsule not seen. Fl. Jan–Apr.

• Dense forests; 500–600 m. Guangxi.

7. *Rungia pinpienensis* H. S. Lo, Acta Phytotax. Sin. 16(4): 91. 1978.

屏边孩儿草 ping bian hai er cao

Herbs to 1 m tall, erect. Stems 4-angled when young then subterete, subglabrous. Petiole 2–5 cm, subglabrous; leaf blade elliptic to broadly elliptic, 13–15 × 6–8 cm, cystoliths white, abaxially glabrous or puberulent along veins, adaxially glabrous, secondary veins 9 or 10 on each side of midvein and netted near margin, base broadly cuneate, margin slightly undulate, apex cuspidate. Spikes terminal, ca. 9 cm, 1-sided; peduncle ca. 1 cm; bracts 4-ranked, each 2 sterile or fertile, oblong to elliptic-oblong, ca. 15 × 4–5 mm, homomorphic, glabrous, margin narrowly hyaline, apex acute. Calyx ca. 5 mm; lobes linear.

Corolla not seen. Capsule ca. 1.2 cm, glabrous. Seeds blackish brown, ovate in outline, densely verrucose. Fr. Apr–Jun.

• Streamsides; 900–1900 m. Yunnan.

8. *Rungia pectinata* (Linnaeus) Nees in A. Candolle, Prodr. 11: 470. 1847.

孩儿草 hai er cao

Justicia pectinata Linnaeus, Amoen. Acad. 4: 299. 1760; *Rungia parviflora* Nees subsp. *pectinata* (Linnaeus) L. H. Cramer; *R. parviflora* var. *pectinata* (Linnaeus) C. B. Clarke; *R. pectinata* var. *clarkeana* Handel-Mazzetti.

Herbs 20–50 cm tall, annual or perennial. Stem basally prostrate and rooting at nodes then erect, minutely pubescent. Petiole 0–7 mm; leaf blade oblong-elliptic, 1–4 × 0.4–1.4 cm, glabrous except for a few trichomes along veins, secondary veins ca. 4 on each side of midvein, base cuneate and decurrent onto petiole, margin entire, apex acute. Spikes axillary or terminal, 0.5–2 cm, 1-sided, solitary or sometimes 2 or 3 compound; bracts dimorphic; sterile bracts green, elliptic, ca. 4 × 0.7 mm, glabrous, apex acute; fertile bracts circular to obovate, 4–5 × ca. 2 mm, pubescent, margin broadly hyaline, apex obtuse to rounded to emarginate and mucronulate; bracteoles elliptic, 2–3 mm, margin ciliate, apex 2-cleft and subacute. Calyx colorless, pubescent; lobes linear-lanceolate, ca. 3 × 0.5 mm, margin narrowly hyaline, apex mucronulate. Corolla blue or white, ca. 5 mm, outside pubescent; lower lip 3-lobed, lobes triangular; upper lip ovate, 1–2 mm, apex emarginate. Staminal filaments glabrous. Ovary glabrous. Capsule ellipsoid, ca. 2.5 mm, glabrous, 2–4-seeded, apex apiculate. Seeds orbicular in outline, ca. 1 mm in diam., minutely verrucose. Fl. Nov–Jan, fr. Jan–Apr. *2n* = 26, 52.

Wastelands. Guangdong, Guangxi, Hainan, Yunnan [Bangladesh, Bhutan, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

Rungia pectinata is a common weed in disturbed habitats.

This species is used medicinally.

9. *Rungia monetaria* (Benoist) B. Hansen, Nordic J. Bot. 9: 211. 1989.

中越孩儿草 zhong yue hai er cao

Justicia monetaria Benoist, Bull. Soc. Bot. France 81: 605. 1934.

Herbs to 1.5 m tall, perennial. Stems sulcate, glabrescent. Petiole 1–2.5 cm; leaf blade elliptic to ovate-elliptic, 6–17 × 3–8.5 cm, both surfaces densely covered with prominent cystoliths and glabrous, secondary veins 4–7 on each side of midvein, base cuneate and to decurrent and asymmetric or symmetric, margin entire, apex acute to acuminate. Spikes terminal or borne from leafless lateral branches, (2–)5–8(–19) cm; peduncle ca. 1 cm, glabrous; rachis glabrous; bracts 4-ranked; sterile bracts yellowish green, circular, rhombic, or obovate, 1.2–1.6 × 1.1–1.6 cm, glabrous, base rounded to cuneate, margin entire or apically serrate, apex rounded to acute; fertile bracts yellowish brown, sphenoid, 1.2–1.4 × 0.8–1.1 cm, glabrous, base cuneate, margin entire, apex rounded; bracteoles yellowish brown, narrowly lanceolate, 9–11 × ca. 2 mm, mem-

braneous, abaxially glabrous, margin ciliate. Calyx yellowish brown, 6–7 mm, glabrous, 5-lobed almost to base; lobes 5–6 × ca. 1 mm. Corolla white with purple dotted stripe in throat, ca. 1.5 cm; tube ca. 6 × 3 mm; lower lip oblong, ca. 7 × 6 mm, 3-lobed, middle lobe ca. 3 × 2 mm, lateral lobes ca. 2 × 1 mm; upper lip triangular, ca. 5 × 6 mm, apex emarginate. Stamens 2, inserted at base of throat; filaments ca. 3 mm, glabrous; anther thecae ovoid. Ovary ca. 1.5 × 1 mm, glabrous; style ca. 8 mm, glabrous. Capsule obovoid-ellipsoid, ca. 10 × 3 mm, glabrous, 2-seeded. Seeds orbicular in outline, ca. 3 mm in diam., glabrous. Fl. Sep–Oct, fr. Nov–Jan.

Streamsides; 300–900 m. Yunnan [Vietnam].

10. *Rungia longipes* D. Fang & H. S. Lo, *Guihaia* 17: 49. 1997.

长柄孩儿草 *chang bing hai er cao*

Herbs to 50 cm tall. Stems subterete, bifariously pubescent. Petiole (1–)4–4.5 cm, pubescent; leaf blade ovate to elliptic, 10–17 × 4–8.5 cm, thinly papery to papery, abaxially pubescent along veins, adaxially densely covered with white linear cystoliths and glabrous, secondary veins 6 or 7 on each side of midvein, base broadly cuneate and slightly oblique, margin undulate-denticulate, apex acuminate. Spikes axillary, 2.5–11 cm, 1-sided; bracts 4-ranked, heteromorphic; sterile bracts elliptic to ovate-elliptic, (6–)10–12 × 3–4 mm, abaxially subglabrous, hyaline margin ca. 0.5 mm and ciliate, apex obtuse; fertile bracts elliptic to obovate-elliptic, ca. 12 × 5 mm, abaxially puberulent, margin slightly ciliate, apex rounded; bracteoles obovate-elliptic, ca. 7 × 3 mm, apex obtuse. Calyx 6–10 mm; lobes subulate, margin ciliolate. Corolla not seen. Capsule ca. 1 cm, pubescent. Seeds ovate in outline, ca. 2 × 2 mm, verrucose. Fr. Apr–Jun.

• Forests in valleys. Guangxi.

11. *Rungia bisaccata* D. Fang & H. S. Lo, *Guihaia* 17: 48. 1997.

囊花孩儿草 *nang hua hai er cao*

Herbs 20–40 cm tall. Stems subterete when young then 4-angled, 2-sulcate, pubescent along furrow. Petiole 0.8–2.5 cm, pubescent; leaf blade ovate-elliptic, 5–13 × 2.3–5.7 cm, papery, abaxially subglabrous or puberulent along veins, adaxially glabrous, secondary veins 5–7 on each side of midvein, base broadly cuneate to attenuate, margin slightly undulate, apex acuminate to obtuse. Spikes axillary, 1-sided; bracts 4-ranked, sterile and fertile ones similar, obovate, 7–11 × 4–8 mm, abaxially glabrous, margin slightly ciliate, apex rounded; bracteoles oblong-elliptic, ca. 10 × 4 mm, margin hyaline and ciliolate. Calyx ca. 7 mm; lobes subulate, margin ciliolate. Corolla white with rose dots, ca. 1.8 cm, outside and inside slightly gland-tipped puberulent; tube cylindrical and ca. 2.5 mm in diam. for ca. 9 mm, inside with a saccate papilla; lower lip ca. 6 × 3 mm, patent, 3-lobed, central lobe larger; upper lip ca. 5 mm, erect, 2-lobed. Staminal filaments ca. 5 mm, glabrous; anther thecae ca. 2 mm. Ovary glabrous; style ca. 1.3 cm, glabrous. Capsule not seen. Fl. Jan–Feb.

• Rocky mountains. Guangxi.

12. *Rungia pungens* D. Fang & H. S. Lo, *Guihaia* 17: 47. 1997.

尖苞孩儿草 *jian bao hai er cao*

Herbs 0.5–1.5 m tall, isophyllous. Stems erect or basal portion prostrate and rooting at nodes, 4-angled, glabrous or bifariously pubescent. Petiole 0.4–5.5 cm, glabrous; leaf blade elliptic to ovate-elliptic, 2.5–16 × 0.9–5.5 cm, densely covered with linear cystoliths, glabrous, secondary veins 4–9 on each side of midvein, base broadly cuneate, margin slightly undulate, apex acuminate. Spikes terminal or axillary, 2–5 cm, 1-sided; peduncle 1–9 cm; rachis pubescent or gland-tipped pubescent; bracts 4-ranked, heteromorphic; sterile bracts elliptic, 7.5–8 × 4–6 mm, abaxially gland-tipped puberulent, hyaline margin 0.8–1.5 mm broad and ciliate, apex cuspidate; fertile bracts lanceolate, 6.5–7.5 × ca. 4 mm, abaxially gland-tipped puberulent, hyaline margin ca. 1 mm wide and ciliate, apex cuspidate; bracteoles elliptic, ca. 6 × 4 mm, abaxially scabrid, adaxially glabrous. Calyx 6–7 mm; lobes linear, unequal, scabrid. Corolla light yellowish green outside and white with purple dots inside, ca. 1.5 cm, gland-tipped pubescent and pubescent; tube ca. 7 mm; lower lip 3-lobed, middle lobe larger; upper lip ca. 6 mm, apex emarginate. Staminal filaments ca. 5 mm, glabrous; anther thecae ca. 1.5 mm. Ovary hirsute; style ca. 1 cm, basal portion hirsute. Capsule ca. 8 mm, gland-tipped puberulent or puberulent. Seeds ovate in outline, ca. 2 × 1.5 mm, verrucose. Fl. Dec–Feb, fr. Apr–May.

• Limestone hills, forests; 600–1000 m. Guangxi, Yunnan.

13. *Rungia napoensis* D. Fang & H. S. Lo, *Guihaia* 17: 46. 1997.

那坡孩儿草 *na po hai er cao*

Herbs 70–90 cm tall. Stems 4-angled when young then subterete, sulcate, bifariously pubescent. Petiole 0.5–2.5 cm, bifariously pubescent; leaf blade narrowly elliptic to lanceolate, 3–10 × 1–4 cm, papery, both surfaces densely covered with linear cystoliths, abaxially pubescent along veins, adaxially glabrous, secondary veins 4–7 on each side of midvein, base cuneate, margin subentire, apex acuminate. Spikes axillary or terminal, 1–5 cm, 1-sided; peduncle 3–5 mm, pubescent; bracts 4-ranked; sterile bracts lanceolate-elliptic, ca. 4 × 1–2 mm, abaxially glabrous, margin hyaline and ciliate, apex acute; fertile bracts purplish, elliptic, ca. 9 × 4 mm, covered with cystoliths, abaxially glabrous, hyaline margin ca. 0.5 mm broad and ciliate, apex acute; bracteoles purple at tip, elliptic, ca. 9 × 5 mm, abaxially puberulent. Calyx ca. 6 mm; lobes linear. Corolla white, ca. 1.6 cm, outside sparsely pubescent; tube ca. 7 × 2 mm; lower lip ca. 7 mm, 3-lobed, central lobe larger; upper lip triangular, ca. 6 mm, apex emarginate. Staminal filaments ca. 3 mm, glabrous; anther thecae ca. 1.5 mm. Ovary glabrous; style ca. 1.2 cm, subglabrous. Capsule not seen. Fl. Dec–Mar.

• Limestone hills, streamsides; 200–500 m. Guangxi.

14. *Rungia yunnanensis* H. S. Lo, *Acta Phytotax. Sin.* 16(4): 92. 1978.

云南孩儿草 *yun nan hai er cao*

Herbs. Stems stout, subterete, sulcate, bifariously re-

trorsely pubescent. Petiole 1.5–2 cm, pubescent; leaf blade ovate, 6–10 × 2.5–3.5 cm, papery, both surfaces glabrous, secondary veins 10–12 on each side of midvein and netted near margin, base attenuate and slightly decurrent onto petiole, margin entire, apex acuminate. Spikes terminal or axillary, to 8 cm, 1-sided; bracts 4-ranked; sterile bracts ovate, 10–12 × 5–6 mm, hyaline margin broad, apex acuminate; bracts fertile, elliptic, ca. 9 × 3 mm, margin hyaline; bracteoles elliptic, ca. 6.5 × 3 mm. Calyx ca. 7 mm; lobes linear, slightly scabrid, apex acuminate. Corolla ca. 1 cm, outside pilose. Staminal filaments glabrous; anther thecae ovoid. Ovary hirsute; style glabrous. Capsule ca. 9 mm, tomentose. Fl. Nov–Dec, fr. Jan–Mar.

- Thickets, valleys, streamsides; 400–1000 m. Yunnan.

15. *Rungia taiwanensis* T. Yamazaki, J. Jap. Bot. 43: 61. 1968.

台湾明萼草 tai wan ming e cao

Herbs 30–50 cm tall. Stems prostrate and rooting at nodes on basal portion, bifariously hirsute. Petiole 1–3 cm, pubescent; leaf blade ovate-oblong to oblong-lanceolate, 2.5–8 × 2.1–3.5 cm, membranous, glabrous, secondary veins 4–7 on each side of midvein, base cuneate to attenuate, margin entire or slightly undulate, apex acuminate. Spikes terminal or axillary, to 4 cm, often solitary; peduncle 1–2 cm; bracts 4-ranked; sterile bracts oblong-lanceolate, 8–9 × 2–3 mm, hyaline margin narrow and ciliate; fertile bracts ovate to ovate-lanceolate, hyaline margin broad and ciliate; bracteoles ovate, ca. 6 × 3.5 mm. Calyx ca. 5 mm, 5-lobed almost to base; lobes lanceolate. Corolla blue, ca.

1.5 cm, outside slightly gland-tipped pubescent; throat ca. 3 mm; lower lip 3-lobed; upper lip broad. Stamens exerted; filaments ca. 5 mm, glabrous. Ovary glabrous; style ca. 1 cm, glabrous. Capsule ovoid, ca. 6 mm. Seeds suborbicular, ca. 1.5 × 1.5 mm, minutely tuberculate.

- Thickets, streamsides; 1000–1500 m. Taiwan.

16. *Rungia hirsuta* Benoist, Bull. Mus. Natl. Hist. Nat., sér. 2, 2: 149. 1930.

金沙鼠尾黄 jin sha shu wei huang

Herbs to 60 cm tall. Stems 4-angled, sulcate, bifariously pubescent along sulcae. Petiole 1–3 cm, pubescent; leaf blade ovate to oblong, 2.5–9 × 1.5–4.5 cm, slightly pubescent along veins, secondary veins 3–5 on each side of midvein and inconspicuous, base cuneate and decurrent onto petiole, margin entire and ciliate, apex acuminate. Spikes terminal, 3–5 cm; bracts homomorphic but sterile ones slightly larger than fertile ones, lanceolate-linear, 10–14 × 2–2.5 mm, abaxially pubescent, margin ciliate, apex acute; bracteoles oblong-lanceolate, ca. 6 × 2 mm, margin ciliate, apex acuminate. Calyx 5-lobed almost to base; lobes linear, ca. 5 × 2 mm, glabrous, apex acute. Corolla ca. 1.4 cm; tube cylindrical; lower lip ca. 2 × 3 mm, 3-lobed, lobes ovate and apex rounded; upper lip 2-lobed. Stamens white, ca. 4 mm, glabrous. Ovary glabrous. Capsule 7–8 mm, glabrous. Seeds ovate in outline, ca. 1 mm in diam. Fl. Aug–Oct, fr. Oct–Dec.

- Streamsides; 500–600 m. Yunnan.

21. *LEPTOSTACHYA* Nees in Wallich, Pl. Asiat. Rar. 3: 76, 105. 1832, nom. cons. prop., not *Leptostachia* Adanson (1763).

纤穗爵床属 xian sui jue chuang shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, perennial with cystoliths. Leaves petiolate. Inflorescences a panicle of spikes, usually reduced to a single terminal spike; bracts mostly shorter than calyx; bracteoles linear, minute. Calyx deeply 5-lobed, lobes similar (or posterior lobe shorter). Corolla tube cylindrical, short; limb 2-lipped; lower lip 3-lobed; upper lip emarginate and galeate, lacking a styler furrow; lobes ascending cochlear in bud. Stamens 2; anthers 2-theous; thecae equally to subequally inserted, parallel, muticous at base; staminodes 0. Pollen 3–5-aperturate. Ovary with 2 ovules per locule. Capsule clavate with a solid sterile stalk at base, 4-seeded; retinacula present, not rising from base. Seeds lenticular.

One species: tropical Asia.

The genus is similar to *Justicia* but differs from it by the combination of its muticous anthers, galeate upper lip of the corolla, and lack of a styler furrow (rugula) on the upper lip. B. Hansen (Nordic J. Bot. 5: 469–473. 1985) discussed typification, taxonomy, and morphological/geographic variation of this genus.

1. *Leptostachya wallichii* Nees in Wallich, Pl. Asiat. Rar. 3: 105. 1832.

纤穗爵床 xian sui jue chuang

Codonacanthus spicatus Handel-Mazzetti; *Dianthera leptostachya* C. B. Clarke; *Justicia wallichii* (Nees) T. Anderson; *Odontomella leptostachya* (C. B. Clarke) Lindau; *Ptyssiglotitis leptostachya* (C. B. Clarke) S. Moore.

Herbs 30–100 cm tall. Stems prostrate at base then ascending. Branches subterete, striate, bifariously pubescent then glabrescent. Petiole 1.5–4 cm, puberulent; leaf blade ovate, lan-

ceolate, or elliptic, 2–11(–17) × 1–5 cm, abaxially subglabrous except sparsely pubescent on margin and veins, adaxially glabrous or with few scattered trichomes, secondary veins 4–7 on each side of midvein, base rounded to broadly cuneate, margin entire, apex acute. Inflorescences with 1–3 spikes, 4–12 cm; rachis gland-tipped pubescent; bracts oblong-lanceolate, oblanceolate, or obovate, 1.2–2.5 mm; bracteoles lanceolate, 1–3 mm, apex acute. Calyx 2.5–3 mm; lobes subulate, outside gland-tipped pubescent. Corolla white, 5–8 mm, outside pilose; tube basal portion narrowly cylindrical, 4–5 × ca. 0.5 mm; lobes of lower lip triangular-ovate, subequal. Stamens inserted in co-

rolla throat; filaments 1.5–4 mm, glabrous or puberulent; anther thecae 1–1.5 mm. Ovary glabrous or apically hirsute; style glabrous or hirsute at basal portion; stigma 2-cleft. Capsule 1–1.5 cm, finely pubescent. Seeds ca. 2×2 mm, with concentric

ridges of short linear warts. Fl. Jun–Sep.

Moist forests; 900–1600 m. Guangdong, Guangxi, Hainan [Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

22. CODONACANTHUS Nees in A. Candolle, Prodr. 11: 103. 1847.

钟花草属 zhong hua cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, small, erect, perennial, with cystoliths. Leaves petiolate; leaf blade margin entire to subsinuate. Inflorescences of axillary or terminal racemes, loose, when terminal sometimes branched and forming a panicle, pedicellate; bracts and bracteoles minute. Flowers 1(–3 or more) in only 1 axil per node. Calyx deeply 5-lobed; lobes subequal. Corolla white with colored markings on lower lip, broadly campanulate; tube short; limb slightly 2-lipped; lower lip 3-lobed; upper lip 2-lobed; lobes ascending cochlear in bud. Stamens 2, included in to slightly emergent from corolla tube; anthers 2-theous; thecae unequal, subparallel, \pm equally to subequally inserted; staminodes 2, short. Ovary with 2 ovules per locule; stigma capitate to shallowly 2-lobed. Capsule with a solid stalk at base, fertile region ellipsoid, usually with a medial constriction, up to 4-seeded; retinacula present. Seeds \pm discoid, surfaces and margin smooth to \pm rugose, lacking trichomes.

Two species: E and S Asia; one species in China.

1. Codonacanthus pauciflorus (Nees) Nees in A. Candolle, Prodr. 11: 103. 1847.

钟花草 zhong hua cao

Asystasia pauciflora Nees in Wallich, Pl. Asiat. Rar. 3: 90. 1832; *Codonacanthus acuminatus* Nees; *Leptostachya repanda* Q. H. Chen.

Herbs 20–60 cm tall, much branched or unbranched. Stems 4-angled, sulcate, 2-fariously pubescent. Petiole 3–15 mm, puberulent or glabrous; leaf blade elliptic, ovate, or lanceolate, (2–)4–12 \times (0.5–)1.5–4.5 cm, thin, abaxially pale green and glabrous or sparsely pubescent on major veins, adaxially green, glabrous or with few large-celled hairs, and with numerous cystoliths, secondary veins 5–7 on each side of midvein, base rounded, cuneate, or attenuate and decurrent onto petiole, apex

acute or acuminate. Racemes simple or terminal ones usually forming a panicle up to 15 cm; rachis puberulent; bracts lanceolate to linear, 1–2.5 mm, puberulent; bracteoles lanceolate, 1–2 mm, puberulent. Pedicel 1–7 mm, puberulent. Calyx 2.5–4 mm; lobes lanceolate, puberulent. Corolla white with purple spots at base of lower lip, 6.5–10 mm, glabrous; tube basally cylindrical for 1–2 mm and 1–1.5 mm wide then abruptly widened to 3.5–6.5 mm at mouth; lobes of lower lip 3.5–5.5 \times 2–3.5 mm. Staminal filaments ca. 2.5 mm, glabrous; anther thecae 1.2–1.4 mm. Ovary glabrous; style 4–6.5 mm. Capsule 1–1.9 cm, glabrous. Seeds 2–3 mm. Fl. and fr. Aug–Apr.

Evergreen broad-leaved forests, wet places in ravines; below 100–1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Jiangxi, Taiwan, Yunnan [Bhutan, Cambodia, India, Japan, Myanmar, Thailand, Vietnam].

23. COSMIANTHEMUM Bremekamp, Blumea 10: 166. 1960.

秋英爵床属 qiu ying jue chuang shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, often prostrate then ascending, rarely erect, with cystoliths, isophyllous. Leaves petiolate or sessile; leaf blade margin entire. Inflorescences terminal thyrsoid racemes or thyrses, sometimes with many-flowered cymes proximally and 1–3-flowered cymes distally; bracts small; bracteoles smaller than bracts. Calyx usually deeply 5-lobed; lobes subequal or slightly unequal, posterior or one sometimes shorter. Corolla white, greenish, or yellowish; tube straight or curved, sometimes with a dorsal pouch; throat short or absent; limb 2-lipped; lower lip 3-lobed; upper lip emarginate or 2-lobed [or entire]; lobes ascending cochlear in bud. Stamens 2, inserted at throat; anthers 2-theous; thecae equal or subequal, parallel, muticous at base; staminodes 2, inserted at base of upper lip. Stigma 2-cleft. Capsule stalked, 4-seeded; retinacula present.

About ten species: SE Asia, especially Borneo; three species (two endemic) in China.

Cosmianthemum resembles *Pseuderanthemum* in fruit and androecium but differs by the generally smaller corolla being distinctly 2-lipped (the upper lip only shallowly lobed) and lacking an elongate, narrow, cylindrical tube; see B. Hansen (Nordic J. Bot. 5: 195–197. 1985) and B. L. Burtt and R. M. Smith (Notes Roy. Bot. Gard. Edinburgh 26: 365–381. 1965).

- 1a. Leaf blade ovate to broadly ovate, 4–9 cm wide 1. *C. viriduliflorum*
 1b. Leaf blade elliptic-lanceolate, ovate-elliptic, or oblong-lanceolate, 1.4–7.3 cm wide.
 2a. Bracts abaxially gland-tipped pubescent; calyx outside gland-tipped pubescent 2. *C. knoxiifolium*
 2b. Bracts abaxially non-gland-tipped pubescent; calyx outside non-glandular pubescent 3. *C. guangxiense*

1. *Cosmianthemum viriduliflorum* (C. Y. Wu & H. S. Lo) H. S. Lo, *Guihaia* 17: 42. 1997.

海南秋英爵床 *hai nan qiu ying jue chuang*

Graptophyllum viriduliflorum C. Y. Wu & H. S. Lo, *Fl. Hainan*. 3: 594. 1974.

Herbs to 60 cm tall, erect, perennial. Stems terete, glabrous; branches yellowish brown, pubescent. Petiole 1–2.5 cm, pubescent; leaf blade ovate to broadly ovate, 7–15 × 4–9 cm, both surfaces glabrous, abaxially light green, adaxially dark green and lustrous, secondary veins 5–7 on each side of midvein and netted near margin, base broadly cuneate to subrounded, margin entire or inconspicuously undulate, apex acuminate, caudate, or sometimes acute. Thyrses terminal, 4–10 cm; peduncle 1–4 cm; rachis pubescent; bracts linear, 1–1.5 × ca. 0.5 mm; bracteoles linear, ca. 1 × 0.5 mm. Pedicel 2–2.5 mm. Calyx ca. 5 mm, gland-tipped pubescent; lobes linear-lanceolate, apex acuminate. Corolla light greenish yellow, ca. 1.2 cm, outside and inside pubescent; lobes of lower lip oblong-lanceolate, ca. 3 × 0.6 mm, subacute at apex; upper lip erect, apex 2-cleft to emarginate. Staminal filaments ca. 4 mm, pubescent; anther thecae ca. 2 mm; staminodes ca. 2 mm, sparsely pubescent. Ovary glabrous; style ca. 6 mm, sparsely pubescent. Capsule ca. 2 cm. Seeds not seen. Fl. Jul–Oct.

• Forests; 700–1000 m. Hainan.

2. *Cosmianthemum knoxiifolium* (C. B. Clarke) B. Hansen, *Nordic J. Bot.* 5: 195. 1985.

秋英爵床 *qiu ying jue chuang*

Gymnostachyum knoxiifolium C. B. Clarke, *J. Asiat. Soc. Bengal*, Pt. 2, Nat. Hist. 74: 663. 1908; *Pseuderanthemum parviflorum* Ridley; *Ptyssiglottis parviflora* (Ridley) Ridley; *Sphinctacanthus malayanus* Ridley.

Shrubs to 50 cm tall or more. Stems terete, puberulent. Petiole 1–1.5 cm, glabrous; leaf blade elliptic-lanceolate, 8–20 × 1.8–7.3 cm, leathery, abaxially puberulent along veins and margin, adaxially glabrous, secondary veins 8–10 on each side of midvein, base cuneate, margin remotely serrate or suben-

tire, apex acuminate to attenuate. Thyrses terminal, (5.5–)10–30(–60) cm; rachis brownish pubescent with few gland-tipped trichomes; bracts lanceolate, 2–3 × 0.5–1 mm, gland-tipped pubescent; bracteoles subulate, 1–2 × ca. 0.5 mm. Pedicels 1–3 mm, pubescent. Calyx 2.5–5 mm, outside gland-tipped pubescent; lobes lanceolate, outside scaly hairy. Corolla white to pale yellow with purple spots on lower lip, ca. 1.5 cm, outside pubescent; tube ca. 5 mm; upper lip erect, apically 2-lobed to emarginate. Staminal filaments 6–7 mm, glabrous; staminodes ca. 1 mm, pubescent. Ovary gland-tipped pubescent; style pubescent. Capsule 2–2.7 cm, puberulent. Seeds ovate in outline, ca. 2 × 2 mm, flattened, irregularly ridged or warty, lacking trichomes. Fl. May–Sep, fr. Sep–Dec.

Dense montane forests; 400–500 m. Hainan [Malaysia, Thailand, Vietnam].

3. *Cosmianthemum guangxiense* H. S. Lo & D. Fang, *Guihaia* 17: 42. 1997.

广西秋英爵床 *guang xi qiu ying jue chuang*

Cosmianthemum longiflorum D. Fang & H. S. Lo.

Herbs to 70 cm tall, branched or unbranched. Stems 4-angled to subterete, sulcate, sparsely pubescent. Petiole 0.5–1 cm, grooved, pilose; leaf blade ovate-elliptic to oblong-lanceolate, 2–13.5 × 1.4–4 cm, abaxially glabrous, adaxially pilose toward base or along veins, secondary veins 5–7 on each side of midvein, base rounded to cuneate, margin entire, apex acuminate. Thyrses terminal, 3–10 cm; rachis pilose; peduncle (0.5–)1–3 cm, pubescent; cymes 1–6-flowered; bracts triangular-subulate, ca. 1.5 × 0.5 mm, pilose; bracteoles similar to bracts. Pedicel 1–3 mm. Calyx 3–4 mm, outside pilose; lobes linear, apex acute. Corolla white or yellowish green, 1–1.5 cm, outside sparsely pubescent to subglabrous, inside glabrous; tube ca. 1.5 mm wide for 4–5 mm; lower lip 6–7 × 3.5–5 mm, lobes ovate and ca. 1 × 1 mm; upper lip ovate, 5–6 × ca. 5 mm. Staminal filaments 4–5 mm, glabrous; thecae ca. 2 mm. Ovary glabrous; style 0.9–1.1 cm, sparsely hirsute to subglabrous. Capsule and seeds not seen. Fl. Oct.

• Forests; ca. 400 m. Guangxi.

24. JUSTICIA Linnaeus, *Sp. Pl.* 1: 15. 1753.

爵床属 *jue chuang shu*

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Adatoda Adanson; *Adhatoda* Miller; *Calophanoides* Ridley; *Ecbolium* Kuntze (1891), not Kurz (1871); *Gendarussa* Nees; *Mananthes* Bremekamp; *Rhaphidospora* Nees; *Rostellaria* Nees (1832), not C. F. Gaertner (1807); *Rostellularia* Reichenbach.

Herbs, subshrubs, or shrubs, cystoliths present. Leaves sessile or petiolate; leaf blade margin usually entire but sometimes sinuate or slightly serrate. Inflorescences dichasia (sometimes reduced to a single flower) in leaf axils or axillary or terminal spikes, racemes, or thyrses, sometimes branched and becoming panicles; bracts variable in shape, sometimes prominent and/or brightly colored; bracteoles 2, similar to or smaller than bracts. Calyx deeply 4- or 5-lobed; lobes equal or subequal. Corolla tubular or funnel-shaped; limb strongly 2-lipped; lower lip 3-lobed; upper lip entire to 2-lobed, internally rugulate (i.e., with a stylar furrow); lobes ascending cochlear in bud. Stamens 2; anthers 2-theous; thecae equally or unequally inserted, parallel to perpendicular, one or both spurred at base or sometimes lacking basal appendages; staminodes absent. Ovary with 2 ovules per locule; stigma slightly 2-lobed. Capsule with a sterile basal stalk and a fertile head (i.e., ± clavate), 2–4-seeded; retinacula present. Seeds compressed [to spheric].

About 700 species: tropical and temperate regions worldwide; 43 species (26 endemic, three introduced) in China.

Justicia betonica Linnaeus, *J. brandegeana* Wasshausen & L. B. Smith, and *J. carnea* Lindley are only cultivated in China so are not treated here.

- 1a. Calyx equally 4-lobed or unequally 5-lobed (i.e., with one lobe conspicuously smaller than others).
- 2a. Leaves sessile.
- 3a. Plants diffuse, to 8 cm tall; leaf blade lanceolate to narrowly lanceolate, glabrous 1. *J. demissa*
- 3b. Plants usually erect, to 100 cm tall; leaf blade oblong to broadly ovate, pubescent 2. *J. mollissima*
- 2b. Leaves petiolate.
- 4a. Leaf blade linear, to 5 mm wide 3. *J. neolinearifolia*
- 4b. Leaf blade ovate to elliptic to subcircular, usually wider than 5 mm.
- 5a. Bracts obovate-elliptic, broadest at or above middle, 2–3 mm wide 6. *J. hayatae*
- 5b. Bracts ovate to elliptic-lanceolate to oblong-lanceolate, mostly broadest near base, 0.6–1.3 mm wide.
- 6a. Spikes dense and cylindrical, ± densely pubescent 4. *J. procumbens*
- 6b. Spikes neither dense nor cylindrical, sparsely pubescent 5. *J. diffusa*
- 1b. Calyx equally 5-lobed.
- 7a. Flowers in axillary abbreviated spikes, spikes ca. 1 cm, usually solitary or several clustered.
- 8a. Leaf blade glabrous.
- 9a. Leaf blade linear to linear-lanceolate 7. *J. neesiana*
- 9b. Leaf blade ovate to broadly elliptic (rarely lanceolate).
- 10a. Bracts subcircular 8. *J. kwangsiensis*
- 10b. Bracts lanceolate 9. *J. alboviridis*
- 8b. Leaf blade ± pubescent (sometimes glabrous or only pubescent along veins in *J. quadrifaria*).
- 11a. Corolla ca. 2 cm 10. *J. wardii*
- 11b. Corolla less than 1.5 cm.
- 12a. Bracts linear, lanceolate, or ovate, broadest at base, 1-veined.
- 13a. Bracts 2–3 mm 20. *J. siccanca*
- 13b. Bracts 5–6 mm 21. *J. xantholeuca*
- 12b. Bracts ovate to circular to elliptic to obovate to spatulate-obovate, broadest above base, pinnately veined.
- 14a. Leaf blade (2–)5.5–11.5 cm.
- 15a. Bracts ovate to obovate, with 3–4 mm petiole, apex obtuse; calyx 5–6 mm 17. *J. quadrifaria*
- 15b. Bracts obovate to circular, with 1–2 mm petiole, apex retuse or rounded; calyx ca. 1 cm 18. *J. kouytcheensis*
- 14b. Leaf blade 0.8–7(–10.5) cm.
- 16a. Leaf blade adaxially glabrous 13. *J. xylopoda*
- 16b. Leaf blade adaxially pubescent at least when young.
- 17a. Leaf blade sparsely pubescent, soon glabrescent or abaxially pilose along midvein 11. *J. championii*
- 17b. Leaf blade hispid, or densely grayish or white or yellowish pubescent.
- 18a. Bracts circular to subcircular 16. *J. hainanensis*
- 18b. Bracts not circular (sometimes subcircular in *J. xerobatica* and *J. xerophila*).
- 19a. Corolla white.
- 20a. Stems yellow pilose; leaf blade 3–5 mm wide 12. *J. xerophila*
- 20b. Stems minutely white sericeous; leaf blade 5–8 mm wide 19. *J. xerobatica*
- 19b. Corolla whitish yellow, yellow, or yellowish green.
- 21a. Stems villous 14. *J. albovelata*
- 21b. Stems sericeous 15. *J. yunnanensis*
- 7b. Flowers in terminal or axillary elongated spikes (or racemes or panicles), or in axillary cymes, or in thyrses of 3-flowered cymes.
- 22a. Flowers in terminal thyrses of 3-flowered cymes; both anther thecae spurred at base 22. *J. grossa*
- 22b. Flowers in spikes or axillary cymes; only lower anther theca spurred at base.
- 23a. Corolla 2.5–3 cm 23. *J. adhatoda*
- 23b. Corolla 2.2 cm or less.
- 24a. Flowers in axillary cymes 24. *J. vagabunda*
- 24b. Flowers in terminal or axillary spikes (or panicles of spikes), or sometimes in racemes.
- 25a. Bracts (at least lower ones) longer than calyx.
- 26a. Bracts 1–1.5 cm 25. *J. ventricosa*
- 26b. Bracts to 1 cm.
- 27a. Leaf blade narrowly lanceolate, to 1.5 cm wide; basal bracts longer than calyx then gradually smaller with apicalmost ones shorter than calyx 26. *J. gendarussa*
- 27b. Leaf blade lanceolate to ovate to elliptic to subcircular, often wider than 1.5 cm; all bracts longer than calyx.

- 28a. Spikes interrupted; flowers distant on rachis; corolla yellow with purplish spots 27. *J. pseudospicata*
 28b. Spikes continuous; flowers dense on rachis; corolla pale white or yellowish green
 with purplish red dots or stripes.
 29a. Leaf blade margin entire; bracts ovate to elliptic, basally pale green and purplish red
 above middle, apex acuminate 28. *J. latiflora*
 29b. Leaf blade margin entire or crenate; bracts broadly obovate or flabellate, green, apex
 acuminate to obtuse and mucronate with 1–3 teeth 29. *J. austrosinensis*
- 25b. Bracts equaling or shorter than calyx.
 30a. Leaves sessile.
 31a. Leaf blade oblanceolate to rarely lanceolate, 8–17 × 2.5–6.5 cm, abaxially rust-colored
 when dry 30. *J. ferruginea*
 31b. Leaf blade obovate, 15–26 × 7.5–15 cm, abaxially dark green when dry 31. *J. panduriformis*
- 30b. Leaves petiolate.
 32a. Leaf blade base cordate to truncate.
 33a. Flowers usually 1 per rachis node; stems 4-angled; calyx ca. 4 mm; calyx and corolla
 pubescent with gland-tipped trichomes outside 32. *J. lianshanica*
 33b. Flowers usually 2–5 per rachis node; stems terete; calyx ca. 2 mm; calyx and corolla
 pubescent with non-glandular trichomes outside 33. *J. cardiophylla*
- 32b. Leaf blade base (rounded to) cuneate to attenuate.
 34a. Stems short; leaves in a basal rosette 34. *J. austroguangxiensis*
 34b. Stems elongated; leaves cauline.
 35a. Flowers more than 1 per rachis node.
 36a. Shrubs to 2 m tall; leaf blade (2–)3–5.5 × 1.5–2.5 cm; inflorescences unbranched
 spikes 36. *J. microdonta*
 36b. Herbs to 1 m tall; leaf blade 4–12.5(–18) × 2.5–6.5(–8) cm; inflorescences
 unbranched or branched.
 37a. Leaf blade 10.5–12.5(–18) × 5–6.5(–8) cm; flowers in spikes 35. *J. leptostachya*
 37b. Leaf blade 4–9 × 2.5–4.5 cm; flowers in spiciform racemes (pedicel ca. 1 mm) 37. *J. damingensis*
- 35b. Flowers 1 per rachis node.
 38a. Calyx lobes elliptic-lanceolate, apex obtuse or rounded 38. *J. amblyosepala*
 38b. Calyx lobes linear to lanceolate or narrowly triangular, apex acute.
 39a. Stems sharply 4-angled, slightly winged along angles 39. *J. acutangula*
 39b. Stems subterete to 4-angled, wingless.
 40a. Corolla tube 2–3 × as long as limb 40. *J. patentiflora*
 40b. Corolla tube less than 2 × as long as limb.
 41a. Calyx puberulent on both surfaces 41. *J. poilanei*
 41b. Calyx glabrous adaxially.
 42a. Leaf blade lanceolate, broadest below middle, 4.3–5 cm wide; bracts
 ca. 1.5 mm 42. *J. kamptiana*
 42b. Leaf blade elliptic to obovate-elliptic, broadest at or above middle,
 1.2–4.2 cm wide; bracts 3–4 mm 43. *J. caudatifolia*

1. *Justicia demissa* N. H. Xia & Y. F. Deng, *J. Trop. Subtrop. Bot.* 13: 534. 2005.

矮爵床 ai jue chuang

Rostellularia humilis H. S. Lo, *Fl. Hainan.* 3: 598. 1974, not *Justicia humilis* Michaux (1803).

Herbs 6–8 cm tall, diffuse, annual. Stems 4-angled, glabrous. Leaves sessile; leaf blade lanceolate to narrowly lanceolate, 1–2 × ca. 0.3 cm, glabrous, cystoliths inconspicuous, base cuneate, margin entire, apex obtuse. Spikes terminal, 2–4.5 cm, glabrous; bracts linear-lanceolate, ca. 3 mm, glabrous, margin membranous; bracteoles similar to bracts. Calyx ca. 5 mm, glabrous, 4-lobed to base; lobes linear, margin membranous, apex obtuse. Corolla not seen. Capsule ca. 6 mm, glabrous.

• Hainan.

2. *Justicia mollissima* (Nees) Y. F. Deng & T. F. Daniel, **comb. nov.**

喀西爵床 ka xi jue chuang

Basionym: *Rostellaria mollissima* Nees in Wallich, *Pl. Asiat. Rar.* 3: 101. 1832; *Justicia khasiana* C. B. Clarke; *J. procumbens* Linnaeus var. *latispica* C. B. Clarke; *Rostellularia khasiana* (C. B. Clarke) J. L. Ellis; *R. khasiana* var. *latispica* (C. B. Clarke) C. Y. Wu ex C. C. Hu; *R. mollissima* (Nees) Nees.

Herbs 60–100 cm tall. Stems 4-angled, erect, hispid. Leaves sessile; leaf blade oblong to broadly ovate, 3–4.5 × 0.3–0.5 cm, both surfaces hispid, secondary veins 4–6 on each side of midvein, base broadly cuneate, margin entire, apex acute to obtuse. Spikes 2.5–4 cm, hispid; bracts linear-oblong, ca. 8 × 2–3 mm, hispid; bracteoles linear, ca. 6 mm. Calyx ca. 8 mm, out-

side hispid, 4-lobed almost to base; lobes linear, margin ciliate. Corolla purplish red, 0.8–1.2 cm; lower lip spreading, 3-lobed; upper lip erect, apex emarginate. Staminal filaments ca. 6 mm, sparsely hirsute; anther thecae superposed, lower one white spurred at base. Ovary hirsute at tip; style ca. 8 mm, basal portion hirsute. Capsule ellipsoid, ca. 8 mm, pubescent. Seeds minutely reticulate. $2n = 18$.

Trailsides; 2100–2700 m. Yunnan [India].

"*Justicia mollissima*" was published as a nomen nudum (Wallich, Numer. List, no. 2445. 1830). The earliest name for this species is *Rostellaria mollissima*, dating from 1832. Nees' name has not been transferred previously to *Justicia*.

3. *Justicia neolinearifolia* N. H. Xia & Y. F. Deng, J. Trop. Subtrop. Bot. 13: 534. 2005.

线叶爵床 xian ye jue chuang

Rostellularia linearifolia Bremekamp, Proc. Kon. Ned. Akad. Wetensch. C 60: 5. 1957; *Justicia linearifolia* (Bremekamp) H. S. Lo (1997), not Lamarck (1785); *J. linearifolia* subsp. *liangkhwangensis* (H. S. Lo) H. S. Lo; *J. neolinearifolia* subsp. *liangkhwangensis* (H. S. Lo) N. H. Xia & Y. F. Deng; *R. linearifolia* subsp. *liangkhwangensis* H. S. Lo.

Herbs to 50 cm tall. Stems 4-angled, sulcate, pubescent. Petiole 2–4 mm, pubescent; leaf blade linear, 2–4 × 0.2–0.5 cm, sparsely pubescent, secondary veins 3–5 on each side of midvein, base rounded, margin entire, apex acute. Spikes terminal, 2–3.5 cm; rachis sparsely hirsute to subglabrous; bracts linear, ca. 6 × 1 mm, subglabrous, apex acute; bracteoles linear, ca. 5 × 1 mm, sparsely hirsute, apex acute. Calyx ca. 6 mm, outside sparsely hirsute, 4-lobed almost to base; lobes linear, apex acuminate. Corolla purplish red, ca. 8 mm; lower lip 3-lobed; upper lip 2-lobed. Staminal filaments ca. 5 mm, sparsely hirsute; anther thecae superposed, lower one spurred at base. Ovary hirsute; style ca. 8 mm, basal portion hirsute. Capsule ca. 6 mm, pubescent. Seeds ovate in outline, ca. 1 × 1 mm, verrucose.

Wetlands, trailsides. Guangdong, Guangxi, Yunnan [Thailand].

4. *Justicia procumbens* Linnaeus, Sp. Pl. 1: 15. 1753.

爵床 jue chuang

Ecbolium procumbens (Linnaeus) Kuntze; *Justicia hayatae* Yamamoto var. *decumbens* Yamamoto; *J. procumbens* var. *hirsuta* Yamamoto; *J. procumbens* var. *linearifolia* Yamamoto; *Rostellularia procumbens* (Linnaeus) Nees; *R. procumbens* var. *hirsuta* (Yamamoto) S. S. Ying; *R. procumbens* var. *linearifolia* (Yamamoto) S. S. Ying; *R. trichochila* Miquel.

Herbs 20–50 cm tall, procumbent. Stems 4-angled, sulcate, pubescent. Petiole 3–8 mm, pubescent; leaf blade elliptic, ovate-elliptic, or elliptic-oblong, 1.5–4 × 0.8–1.5 cm, subglabrous to sparsely hispid, cystoliths numerous, secondary veins 3–6 on each side of midvein and prominent, base broadly cuneate to subrounded and slightly decurrent onto petiole, margin entire or slightly undulate, apex acute to obtuse. Spikes terminal or axillary in upper leaf axils, cylindrical, 1–6 cm, dense; peduncle 0.5–7 cm, densely pilose; bracts ovate to elliptic-lanceolate, 2.5–8 × 0.6–1.3 mm, abaxially pilose, margin ciliate; bracteoles

lanceolate, 2.5–5 mm, abaxially pilose, margin ciliate. Calyx 4–6 mm, 4-lobed to base; lobes linear, outside pilose along veins, 1-veined, margin yellowish white and ciliate. Corolla pink or white and red-spotted on lower lip, 5–8.5 mm; lower lip ca. 3 × 3.5 mm, 3-lobed, lobes ovate, middle lobe slightly larger and ca. 1 × 1–1.5 mm; upper lip ca. 3 mm, apex emarginate. Stamens exerted; filaments ca. 4 mm, glabrous; anther thecae superposed, lower one spurred at base, upper one mucous. Ovary pubescent; style ca. 5 mm, pubescent. Capsule 4–6 mm, 4-seeded. Seeds ovate in outline, ca. 1 × 1 mm, rugose. Fl. and fr. all year. $2n = 18, 36$.

Wastelands, roadsides, lawns, open fields, littoral forests; near sea level to 1500 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

5. *Justicia diffusa* Willdenow, Sp. Pl. 1: 87. 1797.

小叶散爵床 xiao ye san jue chuang

Justicia diffusa var. *prostrata* Roxburgh ex C. B. Clarke; *Rostellaria hedyotidifolia* Nees; *Rostellularia diffusa* (Willdenow) Nees; *R. diffusa* var. *hedyotidifolia* (Nees) Kumari; *R. diffusa* var. *prostrata* (Roxburgh ex C. B. Clarke) H. S. Lo; *R. hedyotidifolia* (Nees) Nees.

Herbs 10–30 cm tall. Stems 4-angled, procumbent and diffuse, sulcate, sparsely pubescent. Petiole ca. 2 mm, pubescent; leaf blade lanceolate-elliptic, subcircular, or ovate, (0.7–)2–5 × 0.7–1.5 cm, glabrous or minutely pubescent, secondary veins 2–4 on each side of midvein, base cuneate, margin entire, apex acute. Spikes (1.5–)2.5–5 cm, neither dense nor cylindrical, sparsely hirsute; bracts oblong-lanceolate, 2–3 × ca. 1 mm, sparsely pubescent; bracteoles linear, ca. 2.5 × 1 mm, sparsely pubescent. Calyx 3.5–5 mm, outside sparsely pubescent, 4- or 5-lobed; lobes lanceolate, margin ciliate, apex acute. Corolla purplish red, ca. 6 mm; lower lip, 3-lobed, sparsely puberulent; upper lip emarginate. Staminal filaments ca. 4 mm, hirsute; anther thecae superposed, lower one spurred at base. Ovary pubescent; style ca. 5 mm, pubescent. Capsule oblong, ca. 5 mm, subglabrous to pubescent. Seeds subsmooth. $2n = 18$.

Grasslands, streamsides, sandy places. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Yunnan [Bangladesh, India, Myanmar, Sri Lanka, Thailand, Vietnam].

6. *Justicia hayatae* Yamamoto, Icon. Pl. Formosan. Suppl. 2: 34. 1926 ["*hayatai*"].

早田氏爵床 zao tian shi jue chuang

Justicia ciliata (Yamamoto) C. F. Hsieh & T. C. Huang (1974), not Jacquin (1762); *J. hayatae* var. *ciliata* Yamamoto; *J. procumbens* Linnaeus var. *hayatae* (Yamamoto) Ohwi; *Rostellularia hayatae* (Yamamoto) S. S. Ying; *R. procumbens* (Linnaeus) Nees var. *ciliata* (Yamamoto) S. S. Ying.

Herbs 30–50 cm tall. Stems 4-angled, sulcate, bifariously pubescent along sulcae. Petiole 1–9 mm, glabrous; leaf blade ovate, 1.5–3.5 × 0.8–2 cm, glabrous, abaxially pale green and without cystoliths, adaxially green and with numerous cysto-

liths, secondary veins 3 or 4 on each side of midvein, base attenuate and decurrent onto petiole, margin entire, apex acute. Spikes mostly terminal or axillary at upper leaf axils, 1–4 cm, elongate to 7 cm in fruit; peduncle (0–)0.5–2 cm, glabrous; bracts obovate-elliptic, 4–5 × 2–3 mm, glabrous, margin white, apex acute; bracteoles lanceolate-elliptic, ca. 5 × 1.2 mm. Calyx 4-lobed almost to base; lobes lanceolate, ca. 4 × 1 mm, glabrous, margin white. Corolla ca. 6 mm, glabrous, 2-lipped to half its length; lower lip oblong, ca. 3 × 3 mm, minutely 3-lobed; upper lip ovate, ca. 3 × 2 mm, apex emarginate. Stamens exserted; filaments ca. 2.5 mm, glabrous except for trichomes at base; anther thecae ovoid, ca. 1.3 mm, superposed, lower one spurred at base, upper one mucous. Ovary glabrous; style ca. 6 mm, glabrous. Capsule with a brownish yellow short stipe, oblong, ca. 4 mm, glabrous, 4-seeded. Seeds ovate in outline, ca. 1 mm, rugose, glabrous.

- Seashores, sandy places. Hong Kong, Taiwan.

7. *Justicia neesiana* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 513. 1867.

狭叶爵床 *xia ye jue chuang*

Gendarussa neesiana Nees in Wallich, Pl. Asiat. Rar. 3: 105. 1832; *Adhatoda neesiana* (Nees) Nees; *Calophanoides multinodis* (Benoist) C. Y. Wu & H. S. Lo; *Justicia multinodis* Benoist.

Subshrubs to 30 cm tall. Stems basally woody, decumbent, and often rooting at nodes, then erect, apical portion much branched; branchlets blackish brown when dry, terete or ± 4-angled, pubescent at nodes. Leaves subsessile; leaf blade linear to linear-lanceolate, 1–3.5 × 0.2–0.8 cm, papery, glabrous, secondary veins 4 on each side of midvein, base attenuate, margin entire, apex obtuse to rounded. Spikes axillary, ca. 1 cm, 1–3-flowered; bracts lanceolate to spatulate-lanceolate, 4–6 mm; bracteoles subulate, ca. 1 mm, glabrous. Calyx ca. 5 mm, 5-lobed almost to base; lobes lanceolate-linear. Corolla white, 7–8 mm, pubescent; lower lip 3-lobed, lobes triangular and with an acute apex; upper lip triangular, 2-lobed. Staminal filaments pubescent on basal portion; anther thecae superposed, lower one with a white spur at base. Capsule ca. 5 mm, glabrous. Fl. Jun–Aug, fr. Aug–Oct.

On rocks, streamsides; 200–800 m. Hainan, Yunnan [Laos, Thailand, Vietnam].

Specimens misidentified as *Calophanoides loheri* (C. B. Clarke) Bremekamp by C. C. Hu (FRPS 70: 284. 2002) belong here.

8. *Justicia kwangsiensis* (H. S. Lo) H. S. Lo, Guihaia 17: 50. 1997.

广西爵床 *guang xi jue chuang*

Calophanoides kwangsiensis H. S. Lo, Acta Phytotax. Sin. 17(4): 86. 1979; *C. buxifolia* (H. S. Lo & D. Fang) C. Y. Wu & T. Y. Ding ex C. C. Hu; *Justicia buxifolia* H. S. Lo & D. Fang.

Shrubs to 50 cm tall, erect. Branches stout, 4-angled, sulcate; branchlets glabrous, densely punctate with grayish white cystoliths. Petiole 4–10 mm; leaf blade ovate to broadly elliptic, (0.5–)2–9 × 1–4 cm, leathery, glabrous, densely covered with

cystoliths, secondary veins ca. 5 on each side of midvein, base broadly cuneate, margin entire, apex acuminate and sometimes shortly caudate. Spikes axillary, ca. 1 cm, 1–3-flowered; bracts subcircular, (1.5–)4–5 mm in diam., glabrous; bracteoles subulate, ca. 2 × 1 mm, glabrous. Calyx 5–6 mm, glabrous, 5-lobed almost to base; lobes narrowly lanceolate, apex acuminate. Corolla white, 7–9 mm; lower lip 3-lobed; upper lip triangular, 2-toothed. Staminal filaments glabrous; anther thecae superposed, lower one spurred at base. Capsule fusiform, ca. 8 mm, glabrous, 4-seeded. Seeds yellowish brown, tuberculate. Fl. Sep–Nov, fr. Dec–Feb.

- Limestone hills; below 700 m. Guangdong, Guangxi, Hainan.

9. *Justicia alboviridis* Benoist, Notul. Syst. (Paris) 5: 115. 1936.

大叶杜根藤 *da ye du gen teng*

Calophanoides alboviridis (Benoist) C. Y. Wu & H. S. Lo.

Herbs to 50 cm tall, perennial. Stems basally slightly decumbent then erect; young branches 4-angled, sulcate and striate, bifariously pubescent, glabrescent. Petiole 3–8 mm; leaf blade ovate to rarely lanceolate, (1–)3–9 × (0.5–)1.5–4 cm, papery, both surfaces glabrous, secondary veins 4 or 5 on each side of midvein, base slightly oblique and cuneate to subrounded, margin subentire, apex shortly acuminate. Spikes axillary, ca. 1 cm, (1–)3–5-flowered; bracts lanceolate, 1–3 mm, glabrous; bracteoles linear, ca. 1.5 mm. Calyx ca. 4 mm, 5-lobed; lobes lanceolate, outside glabrous except pubescent along midvein. Corolla white or greenish white, 8–9 mm, outside pubescent; lower lip elliptic, 3-lobed, lobes ovate with an obtuse apex; upper lip narrowly triangular, 2-lobed. Ovary slightly hirsute at tip; style basally hirsute. Capsule ca. 7 mm, glabrous. Seed light yellow, papillate. Fl. Aug–Sep, fr. Nov–Jan.

Wet places, streamsides; 200–600 m. Hainan [Vietnam].

10. *Justicia wardii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 184. 1918.

高山杜根藤 *gao shan du gen teng*

Calophanoides wardii (W. W. Smith) C. Y. Wu ex C. C. Hu.

Shrubs to 60 cm tall, diffuse. Stems straw-colored, much branched, flexuous, densely grayish tomentose, soon glabrescent. Petiole ca. 5 mm, gray pilose; leaf blade elliptic, elliptic-lanceolate, oblanceolate, or sometimes obovate, to 4.5 × 2 cm, papery, both surfaces first white tomentose then sparsely pilose, base cuneate, margin slightly undulate, apex shortly acuminate, acute, or rarely retuse. Spikes axillary, ca. 1 cm, (1–)3–5-flowered; peduncles 0–3 mm; bracts linear-lanceolate, ca. 5 mm, densely white villous; bracteoles linear, ca. 2 mm. Calyx to 8 mm, 5-lobed almost to base; lobes oblanceolate, outside densely villous, apex acute. Corolla ca. 2 cm, outside white villous; tube longer than limb; lower lip 3-lobed to middle, lobes oblong; upper lip 7–8 mm, shallowly 2-lobed. Staminal filaments glabrous, basally whitish; anther thecae superposed, lower one spurred at base. Ovary glabrous; style white villous. Capsule not seen. Fl. May.

- On rocks, thickets; ca. 1000 m. Yunnan.

11. *Justicia championii* T. Anderson in Benth. Fl. Hongk. 264. 1861.

圆苞杜根藤 yuan bao du gen teng

Adhatoda chinensis Benth. Hooker's J. Bot. Kew Gard. Misc. 5: 134. 1853; *Calophanoides chinensis* (Benth.) C. Y. Wu & H. S. Lo; *Dicliptera cyclostegia* Handel-Mazzetti; *Justicia chinensis* (Benth.) Druce (1917), not Linnaeus (1753).

Herbs to 50 cm tall. Stems 4-angled, sulcate, retrorsely pubescent. Petiole (0-)0.5-1.5 cm, sulcate, pubescent; leaf blade elliptic, oblong-elliptic, ovate, or lanceolate, 1-7(-10.5) × 0.5-2(-3.5) cm, sparsely pubescent when young, soon glabrescent or abaxially pilose along midvein, cystoliths adaxially numerous, secondary veins 3-6 on each side of midvein, base cuneate to attenuate, margin entire, apex acute to obtuse. Spikes axillary, usually 3-flowered, several clustered; peduncle 2-4 mm, sparsely pubescent; bracts petiolate, subleaflike, circular to obovate-spatulate or sometimes elliptic, 5-11 × 2-6 mm, glabrous or adaxially sparsely pilose, veins 1-3 on each side of midvein, apex rounded to obtuse; bracteoles subulate to triangular, ca. 1 mm, glabrous or sparsely yellow puberulent, apex acute. Calyx 5-lobed almost to base; lobes yellowish white except for green along veins, linear-lanceolate, 6-7 mm, 1- or 2-veined, margin ciliate. Corolla white with 2 purplish red streaks, 7-10 mm, outside puberulent; lower lip ovate, ca. 4 × 3 mm, 3-lobed, middle lobe semicircular and ca. 0.8 × 1.3 mm, lateral lobes ovate and ca. 1.2 × 1 mm; upper lip lanceolate, ca. 3.5 × 1.5 mm, apex emarginate. Stamens exserted; filaments ca. 4 mm, glabrous; anther thecae superposed, lower one spurred at base, upper one muticous. Ovary glabrous; style ca. 6 mm, sparsely pubescent toward base; stigma capitate. Capsule 8-9 mm, glabrous, 4-seeded. Seeds oblong, ca. 2 × 1.5 mm, verrucose. Fl. and fr. Aug-Oct.

- Thickets, forests; 400-2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Yunnan, Zhejiang.

Inflorescences of *Justicia championii* appear to be axillary clusters of flowers but are much-reduced spikes or racemes with a very short rachis.

12. *Justicia xerophila* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 214. 1919.

干地杜根藤 gan di du gen teng

Calophanoides xerophila (W. W. Smith) C. Y. Wu ex C. C. Hu.

Herbs to 10 cm tall. Stems basally semi-woody, slender and flexuous, yellow pilose. Petiole 1-3 mm, pilose; leaf blade lanceolate to oblanceolate, 0.8-1.5 × 0.3-0.5 cm, papery, both surfaces slightly pilose along veins, secondary veins ca. 3 on each side of midvein, base cuneate, margin ciliate and entire or apically 2 or 3 repandly toothed, apex acute to obtuse. Spikes axillary, ca. 1 cm, 1-3-flowered; bracts leaflike, broadly obovate to subcircular, 3-5 mm; bracteoles linear, ca. 2 mm. Calyx green, ca. 5 mm, outside slightly pilose to subglabrous, 5-lobed almost to base; lobes linear, apex acuminate. Corolla white, 7-8

mm, outside sparsely pilose; lower lip 3-lobed; upper lip emarginate. Staminal filaments ca. 4 mm, pilose; anther thecae superposed, lower one spurred at base. Ovary glabrous; style ca. 6 mm, subglabrous. Capsule ca. 5 mm, glabrous. Seeds ovate in outline, ca. 1 × 1 mm, tuberculate.

- Thickets on dry slopes. Yunnan.

13. *Justicia xylopoda* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 214. 1919.

木柄杜根藤 mu bing du gen teng

Calophanoides xylopoda (W. W. Smith) C. Y. Wu ex H. P. Tsui.

Shrubs 10-13 cm tall. Stems very short, much branched; branches basally often cylindrical, erect or decumbent, apically ascending, grayish or whitish pubescent, internodes sulcate. Petiole 1-3 cm, white pubescent; leaf blade ovate to narrowly ovate, 1-2.4 × 0.7-1.2 cm, papery, abaxially minutely and sparsely pilose on veins, adaxially glabrous, secondary veins 3 on each side of midvein, base cuneate and decurrent onto petiole, margin entire, apex ± obtuse. Spikes axillary, ca. 1 cm, usually 3-flowered; bracts ovate, ca. 1 cm, pubescent like leaves; bracteoles sublinear, ca. 1.5 mm. Calyx green, ca. 6 mm, 5-lobed to base; lobes linear-lanceolate, membranous, subequal, margin white, apex acuminate. Corolla yellow with purplish spots, ca. 1 cm, outside white pilose; lower lip broad, 3-lobed with center one larger; upper lip triangular, 2-lobed. Stamens inserted at apical part of corolla tube; filaments pilose around insertion; anther thecae superposed, lower one with a white spur at base. Ovary glabrous. Capsule not seen.

- Thickets on mountain slopes; 2300-2400 m. Sichuan, Yunnan.

14. *Justicia albovelata* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 182. 1918.

绵毛杜根藤 mian mao du gen teng

Calophanoides albovelata (W. W. Smith) C. Y. Wu ex H. P. Tsui.

Herbs 20-50 cm tall, perennial, much branched. Stems basally decumbent then erect and zigzag; young branchlets densely white villous. Petiole 3-5 mm, pubescent; leaf blade lanceolate, 3.5-4.5 × 0.8-1.5 cm, membranous, abaxially villous, adaxially densely white villous, secondary veins 4 or 5 on each side of midvein, base cuneate, margin entire, apex obtuse. Spikes axillary, ca. 1 cm, usually 3(or 4)-flowered; bracts spatulate-circular to obovate, 5-10 × 3-7 mm; bracteoles oblanceolate to linear. Pedicels ca. 2 mm. Calyx grayish green, 5-6 mm, 5-lobed almost to base; lobes linear-lanceolate, with dense white trichomes along veins, apex acuminate. Corolla whitish yellow to yellow, ca. 9 mm; tube slightly longer than limb, outside pilose; lower lip 3-lobed; upper lip short, 2-lobed. Staminal filaments basally hirsute; anther thecae superposed, lower one larger and with a white spur at base. Ovary glabrous. Capsule clavate, ca. 8 mm, glabrous, 4-seeded. Seeds ovate in outline, ca. 1.5 × 1.5 mm, verrucose. Fl. Sep.

- Thickets, streamsides; ca. 2700 m. Yunnan.

15. *Justicia yunnanensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 215. 1919.

滇杜根藤 dian du gen teng

Calophanoides yunnanensis (W. W. Smith) C. Y. Wu ex H. P. Tsui.

Shrubs to 45 cm tall. Stems basally unbranched, suberect, apically ascending, whitish sericeous. Petiole 2–5(–7) mm, pilose; leaf blade lanceolate to oblanceolate, ca. 2.5 × 1 cm, papery, both surfaces pilose, base narrowly cuneate and decurrent onto petiole, margin entire, apex ± obtuse. Spikes axillary, ca. 1 cm, usually 3–5-flowered; bracts surrounded by leaves, circular-spatulate to obovate, 5–10 mm; bracteoles linear to oblanceolate. Pedicel short. Calyx light grayish green, ca. 5 mm, 5-lobed to base; lobes linear-lanceolate, midvein pale whitish yellow, apex acuminate. Corolla light whitish yellow, ca. 8 mm, outside minutely pilose; lower lip broad, 3-lobed with center one larger; upper lip triangular, 2-lobed. Stamens inserted at apical part of corolla tube, pilose around insertion; anther thecae superposed, lower one with a white spur at base. Capsule glabrous, 4-seeded. Seeds verrucose. Fl. Sep.

- Limestone slopes; ca. 1600 m. Yunnan.

Based on the known characters, *Justicia yunnanensis* appears remarkably similar to *J. albovelata*, if it is indeed distinct. We have refrained from making taxonomic alterations because no specimens of *J. yunnanensis* were studied.

16. *Justicia hainanensis* (C. Y. Wu & H. S. Lo) N. H. Xia & Y. F. Deng, J. Trop. Subtrop. Bot. 13: 533. 2005.

海南爵床 hai nan jue chuang

Calophanoides hainanensis C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 597. 1974.

Herbs to 1 m tall. Stems 4-angled, sulcate, pubescent. Petiole 2–5 mm; leaf blade ovate to lanceolate-ovate, (0.5–)1.5–3 × (0.3–)0.5–1.8 cm, thickly papery, both surfaces hispid, secondary veins 3–5 on each side of midvein, base broadly cuneate to subrounded, margin entire, apex acute. Spikes axillary, ca. 1 cm, (1–)3–5-flowered; bracts shortly petiolate, circular to subcircular, 2–5 mm in diam.; bracteoles small or absent. Calyx ca. 4.5 mm, hispid, 5-lobed almost to base; lobes linear-lanceolate. Corolla white, ca. 6 mm, outside densely pubescent; tube slightly enlarged; lower lip spreading, apex 3-lobed; upper lip erect, triangular and concave, apex emarginate. Staminal filaments ca. 2.5 mm; anther thecae superposed, lower one spurred at base. Ovary glabrous; style ca. 3 mm, glabrous. Capsule obovoid, ca. 6 mm, glabrous, 4-seeded. Seeds broadly ovate in outline, ca. 0.6 × 0.6 mm, compressed, verrucose. Fl. Jul–Nov, fr. Oct–Jan.

- Forests; 200–1100 m. Guangdong, Hainan.

17. *Justicia quadrifaria* (Nees) T. Anderson, J. Linn. Soc., Bot. 9: 514. 1867.

杜根藤 du gen teng

Gendarussa quadrifaria Nees in Wallich, Pl. Asiat. Rar. 3: 105. 1832; *Adhatoda quadrifaria* (Nees) Nees; *A. zollingeriana* Nees; *Calophanoides quadrifaria* (Nees) Ridley.

Herbs. Stems 4-angled, basally decumbent and usually rooting at nodes then erect, sulcate, bifariously pubescent, soon glabrescent. Petiole 0.4–2.5 cm, sparsely pubescent; leaf blade oblong, lanceolate, to rarely orbicular, (2–)6–8 × (1–)2–3.5 cm, both surfaces glabrous or only pubescent along veins, secondary veins 5–7 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin entire or slightly serrate, apex acute. Spikes axillary, ca. 1 cm, usually 3-flowered, solitary or several in a cluster; bracts with a 3–4 mm petiole, ovate to obovate, 3–8 × 3–5 mm, sparsely pubescent, pinnately veined, apex obtuse; bracteoles linear, ca. 1 mm, glabrous. Calyx 5–6 mm, outside puberulent, 5-lobed almost to base; lobes linear-lanceolate. Corolla white with purple spots on lower lip, ca. 8 mm, outside pubescent; lower lip ca. 4 × 3 mm, patent, apex 3-lobed; upper lip oblong, erect, apex 2-lobed. Anthers with thecae superposed, lower ones spurred at base. Ovary glabrous; style ca. 6 mm, sparsely hirsute. Capsule ca. 8 mm, glabrous. Seeds ovate in outline, ca. 1.5 × 1 mm, verruculose, glabrous.

On rock in forested valleys; 800–1600 m. Chongqing, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Yunnan [India, Indonesia, Laos, Myanmar, Thailand, Vietnam].

18. *Justicia kouytcheensis* (H. Léveillé) E. Hossain, Notes Roy. Bot. Gard. Edinburgh 32: 407. 1973.

贵州杜根藤 gui zhou du gen teng

Ruellia repens Linnaeus var. *kouytcheensis* H. Léveillé, Repert. Spec. Nov. Regni Veg. 13: 175. 1914; *Calophanoides kouytcheensis* (H. Léveillé) H. S. Lo.

Herbs to 40 cm tall. Stems basally decumbent and rooting at nodes. Petiole 1–2.5 cm; leaf blade oblong to rhombic, 5.5–11.5 × 3.5–5.5 cm, membranous, both surfaces pubescent especially along veins, secondary veins 6 or 7 on each side of midvein, base cuneate and decurrent onto petiole, margin entire or sometimes apically undulate-serrate, apex acuminate to subcaudate. Spikes axillary, ca. 1 cm, 1–3(–5)-flowered; bracts with a 1–2 mm petiole, obovate to circular, 7–8 × 4–5 mm, veins ca. 3 on each side of midvein, base broadly cuneate, apex retuse or rounded; bracteoles subulate, 1–2 mm. Calyx ca. 1 cm, 5-lobed almost to base; lobes lanceolate, subequal, outside white laterally, green along midvein, and pubescent. Corolla white, ca. 1.4 cm; lower lip patently 3-lobed; upper lip erect, 2-lobed. Staminal filaments ca. 5 mm, glabrous; anther thecae oblong, superposed, lower one smaller and with a white spur at base. Ovary glabrous; style ca. 9 mm, glabrous; stigma capitate, slightly enlarged. Capsule and seeds not seen. Fl. Aug–Oct.

- Limestone hills, thickets; 800–1300 m. Guizhou, Yunnan.

Justicia kouytcheensis is very similar to *J. quadrifaria*, and the putative distinctions between them require additional studies.

19. *Justicia xerobatica* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 213. 1919.

滇东杜根藤 dian dong du gen teng

Calophanoides xerobatica (W. W. Smith) H. P. Tsui.

Subshrubs to 30 cm tall, prostrate. Stems basally woody, slender, flexuous, and often rooting at nodes, apically as-

ending, minutely white sericeous. Petiole 2–3 cm, pilose; leaf blade subcircular, broadly obovate, or rarely narrowly lanceolate, 1–2 × 0.5–0.8 cm, softly membranous, both surfaces pilose on veins, base cuneate, margin entire, apex rounded to obtuse. Spikes axillary, ca. 1 cm, 1–3-flowered; bracts surrounded by leaves, leaflike, broadly obovate to subcircular, 3–4 mm; bracteoles ovate to nearly subulate-lanceolate, small. Calyx green, ca. 5 mm, 5-lobed almost to base; lobes linear-lanceolate, midrib pilose, margins scarios, apex acuminate. Corolla white (reportedly), ca. 9 mm, outside sparsely pilose. Mature capsule not seen. Fl. Sep.

- Limestone areas; 1200–1400 m. Sichuan, Yunnan.

Justicia xerobatica is very similar to *J. xerophila*. Further studies of both will be necessary to determine whether they should be treated as distinct from one another.

20. *Justicia siccanea* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 43. 1917.

旱杜根藤 han du gen teng

Calophanoides siccanea (W. W. Smith) C. Y. Wu ex C. C. Hu.

Shrubs to 60 cm tall, prostrate. Stems woody, flexuous, grayish tomentose, soon glabrescent. Petiole 3–8 cm, villous; leaf blade ovate to lanceolate, 1.5–4 × 1–2 cm, both surfaces sparsely pilose, secondary veins ca. 4 on each side of midvein, base cuneate, margin entire, apex rounded to acute. Spikes axillary, ca. 1 cm, 1–3-flowered; peduncle ca. 3 mm, grayish pubescent; bracts linear, 2–3 mm, abaxially grayish pubescent; bracteoles similar to bracts. Calyx ca. 7 mm, outside pubescent, 5-lobed to base; lobes linear. Corolla white tinged with red, ca. 1.3 cm, outside pubescent; lower lip very short, 3-lobed, lobes circular; upper lip shorter, apex emarginate. Staminal filaments ca. 4 mm, basal portion whitish villous; anther thecae superposed, lower one spurred at base. Ovary glabrous; style ca. 8 mm, white villous. Capsule ca. 7 mm, glabrous. Seeds ovate in outline, ca. 1 × 1 mm. Fl. Sep.

- On rocks by trailsides, open slopes; 2000–2200 m. Sichuan, Yunnan.

21. *Justicia xantholeuca* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 11: 212. 1919.

黄白杜根藤 huang bai du gen teng

Calophanoides xantholeuca (W. W. Smith) C. Y. Wu ex C. C. Hu.

Shrubs to 30 cm tall. Stems 4-angled, much branched, sulcate, pilose then glabrescent. Petiole 2–5 mm, pilose; leaf blade lanceolate, 2–3 × 0.7–1 cm, papery, both surfaces pilose along veins, secondary veins ca. 3 on each side of midvein, base cuneate, margin entire, apex acute. Spikes axillary, 3–5-flowered; bracts lanceolate or ovate, 5–6 mm; bracteoles subulate, narrowly lanceolate, or ovate, smaller than bracts. Calyx grayish white, ca. 5 mm, white pilose along midvein, 5-lobed almost to base; lobes linear-lanceolate. Corolla white, ca. 8 mm, outside sparsely pilose; lower lip 3-lobed; upper lip emarginate. Staminal filaments ca. 5 mm, sparsely hirsute; anther thecae superposed, lower one spurred at base. Ovary glabrous; style ca. 6

mm, subglabrous. Capsule ca. 5 mm, glabrous. Seeds ovate in outline, ca. 1 × 1 mm, tuberculate-verrucose. Fl. Nov–Jan.

- Thickets on dry slopes; 400–800 m. Yunnan.

22. *Justicia grossa* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 535. 1885.

大爵床 da jue chuang

Shrubs 50–100 cm tall. Stems subterete, puberulent when young then glabrescent. Petiole 1.3–4 cm, glabrous or puberulent; leaf blade elliptic to lanceolate, 16–30 × 5–9.5 cm, abaxially glabrous or puberulent along veins, adaxially glabrous, secondary veins 5–8 on each side of midvein, base broadly rounded to cuneate, margin crenulate, apex acuminate to attenuate and with an obtuse tip. Inflorescences terminal, thyrsoid of 3-flowered cymes, usually 3 or more branched, 5–15 × 2–3 cm; peduncle 1–3.5 cm; rachis hirsute; bracts ovate, elliptic, or lanceolate, 2–8 × 1–5 mm, abaxially puberulent; bracteoles lanceolate to rarely triangular, 1.5–3 × 0.5–1 mm, abaxially puberulent. Pedicel 1–5 mm, hirsute. Calyx ca. 6 mm, both surfaces gland-tipped pubescent, 5-lobed to base; lobes linear. Corolla greenish white with pale purple dots on lower lip, 1.2–1.5 cm, outside pubescent; tube 6–7 mm; limb 6–7 mm; lower lip 3-lobed, lobes ovate and ca. 2 × 1.5–2 mm; upper lip emarginate. Staminal filaments 4–6 mm, basal portion densely pubescent; anther thecae 1.5–2 mm, both spurred at base. Ovary pubescent; style pubescent. Capsule ca. 1.6 cm, densely pubescent. Seeds elliptic to circular in outline, ca. 3.5 × 3.5 mm, wrinkly verrucose.

Forests; 400–800 m. Hainan [Laos, Malaysia, Myanmar, Thailand, Vietnam].

23. *Justicia adhatoda* Linnaeus, Sp. Pl. 1: 15. 1753.

鸭嘴花 ya zui hua

Adhatoda vasica Nees.

Shrubs to 4 m tall. Branches thickened, ± 4-angled, lenticellate, pubescent when young but soon glabrescent. Petiole 0.8–3 cm, puberulent; leaf blade ovate to elliptic-ovate, 7–18 × 2–7 cm, abaxially puberulent, adaxially densely tomentose when young but glabrescent except tomentose along veins, secondary veins 9–12 on each side of midvein and meeting near margin, base broadly cuneate, margin entire, apex acuminate and sometimes slightly falcate. Spikes terminal or axillary, ovoid to broadly ovoid, 3–7 cm; peduncle 3–7 cm; bracts imbricate, ovate-oblong, 1–2 × 0.5–1.5 cm, puberulent, 3–7-veined, margin ciliate, apex acute; bracteoles linear-lanceolate, 1–1.4 × ca. 0.4 cm, puberulent, 3–5-veined, margin ciliate, apex acute. Calyx 5-lobed; lobes linear-oblong, ca. 10 × 3 mm, margin narrowly scarios and ciliate. Corolla white or pink with purplish or pinkish stripes outside, broadly tubular, 2.5–3 cm, outside pilose; tube basally cylindrical and ca. 5 mm wide for ca. 5 mm and then slightly inflated and bent upward; upper lip ovate-oblong, ca. 1.8 cm, erect, shallowly 2-lobed; lower lip oblong-circular, spreading, 3-lobed, middle lobe subcircular and ca. 9 × 5 mm, lateral lobes ovate and ca. 8 × 4.5 mm. Stamens exerted; filaments ca. 1.5 cm, declinate, glabrous except basally sericeous; anther thecae ellipsoid, ca. 3.5 mm, equal,

superposed, lower one spurred at base. Ovary pubescent especially at tip; style ca. 2.5 cm, recurved, basal part pubescent; stigma simple. Capsule obovoid, 2.5–4 × ca. 0.5 cm. Seeds circular in outline. Fl. Jan–Mar, fr. Jun–Jul. $2n = 34$.

Roadsides, thickets. Naturalized or cultivated in Guangdong, Guangxi, Hainan, and Yunnan [probably native to India, Indonesia, Malaysia, Nepal, Pakistan, and Sri Lanka, but widely cultivated and naturalized in tropics, obscuring native distribution].

Justicia adhatoda is widely cultivated beyond its native range.

This species is used medicinally.

24. *Justicia vagabunda* Benoist, Notul. Syst. (Paris) 5: 114. 1936.

针子草 zhen zi cao

Rhaphidospora vagabunda (Benoist) C. Y. Wu ex C. C. Hu.

Shrubs to 1.3 m tall. Stems terete, zigzag, glabrous. Petiole 7–12 mm; leaf blade oblong-lanceolate, 6–14 × 2–5 cm, glabrous or sometimes pilose along midvein, base obliquely cuneate, margin entire or slightly undulate, apex acute to falcate. Cymes axillary, ca. 2 cm; peduncle 4–6 mm, pubescent; bracts subulate, 1–2 mm, pilose; bracteoles 2–5 mm, pilose. Calyx ca. 3.5 mm, outside pubescent; lobes 5, oblong-lanceolate. Corolla white with blue lines, 1–1.1 cm, outside pubescent; tube as long as limb; lower lip 3-lobed; upper lip triangular, apex emarginate. Staminal filaments ca. 4 mm, glabrous; anther thecae superposed, lower one spurred at base. Ovary pubescent at tip; style basal portion hirsute. Capsule not seen.

Forests, thickets, streamsides; 500–800 m. Yunnan [Cambodia, Vietnam].

25. *Justicia ventricosa* Wallich ex Hooker, Bot. Mag. 54: t. 2766. 1827.

黑叶小驳骨 hei ye xiao bo gu

Adhatoda ventricosa (Wallich ex Hooker) Nees; *Gendarussa ventricosa* (Wallich ex Hooker) Nees.

Subshrubs or perennial herbs, to 1 m tall. Stems subterete, glabrous. Winter buds ovoid, ca. 2 mm, pubescent. Petiole 0.5–1.5 cm, sulcate, glabrous; leaf blade elliptic to obovate, 6–17 × 2–6 cm, glabrous, midvein abaxially prominent and adaxially impressed, secondary veins 6–8 on each side of midvein, prominent on both surfaces, and meeting near margin, base attenuate, margin entire or slightly undulate, apex shortly acuminate to acute. Spikes terminal, 5–10 cm, densely flowered, usually with 1–3 flowers on each inflorescence node; peduncle ca. 1 cm; bracts leaflike, green to maroon, imbricate, broadly ovate to subcircular, 1–1.5 × 0.8–1 cm, abaxially pilose to subglabrous, pinnately veined, margin ciliate, apex acute; bracteoles linear, 3–5 × 1–2 mm, margin ciliate. Calyx 5-lobed; lobes linear-lanceolate, ca. 3 mm, margin ciliate. Corolla creamy white with purplish pink stripes on lips, 1.5–1.8 cm, outside pilose, inside pubescent; tube basally cylindrical and ca. 1.7 mm wide for ca. 1 cm; lower lip 3-lobed, lobes ovate, ca. 2 × 1 mm, and apex rounded; upper lip oblong-ovate, 2-lobed. Stamens exserted; filaments ca. 6 mm, glabrous; anther thecae ovoid, subequal, superposed, lower one with a white appendage at base. Ovary comose; style ca. 1.6 cm, base pilose. Cap-

sule ca. 8 mm, pubescent, 4-seeded. Fl. Nov–Jan, fr. Apr–May. $2n = 30$.

Sparse forests, thickets. Naturalized or cultivated in Guangdong, Guangxi, Hainan, and Yunnan [native to Cambodia, Laos, Myanmar, N Thailand, and Vietnam].

This species is used medicinally.

26. *Justicia gendarussa* N. L. Burman, Fl. Indica, 10. 1768.

小驳骨 xiao bo gu

Gendarussa vulgaris Nees.

Subshrubs 0.7–1.5 m tall, much branched. Stems subterete, swollen at nodes, glabrous. Petiole 3–10 mm; leaf blade narrowly lanceolate, 6–10 × 1–1.5 cm, glabrous, secondary veins 5–8 on each side of midvein, base cuneate to attenuate, margin subsinuate, apex acute to shortly acuminate. Spikes terminal or axillary, 3–12 cm, interrupted, usually in a leafy panicle; peduncle 0.5–1.5 cm; bracts triangular, 2–6 × 1–2.5 mm, basal ones longer than calyx then gradually smaller with apicalmost ones shorter than calyx, margin ciliate, apex acute; bracteoles elliptic to linear-lanceolate, ca. 3 × 1 mm, margin ciliate, apex acute. Calyx ca. 5 mm, 5-lobed; lobes linear-lanceolate, 3–4 × ca. 0.5 mm, subequal, apex acuminate. Corolla creamy white, 1.2–1.5 cm; tube basally cylindrical and ca. 2 mm wide for 8–9 mm; lower lip violet dotted basally, cuneate-obovate, 6–10 mm broad, 3-lobed, lobes oblanceolate and 3–5 × ca. 3.5 mm; upper lip violet blotched, triangular, ca. 7 × 3.5 mm, 2-cleft. Stamens exserted; filaments 3–6 mm, glabrous; anther thecae oblong, ca. 1.2 mm, superposed, lower one spurred at base, upper one mucicous. Ovary glabrous; style ca. 1 cm, glabrous; stigma capitate, shortly 2-lobed. Capsule clavate, ca. 1.2 cm. Fl. Jan–Apr. $2n = 28, 30$.

Roadsides, thickets. Naturalized or cultivated in Guangdong, Guangxi, Hainan, Taiwan, and Yunnan [native to or naturalized in Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Sri Lanka, Thailand, and Vietnam; widely cultivated].

Justicia gendarussa is native to S and SE Asia but is widely cultivated and naturalized. Its actual native distribution is not certain because it is often not clear whether particular collections are native.

27. *Justicia pseudospicata* H. S. Lo & D. Fang, Guihaia 17: 52. 1997.

黄花爵床 huang hua jue chuang

Mananthes pseudospicata (H. S. Lo & D. Fang) C. Y. Wu & C. C. Hu.

Herbs to 30 cm tall, perennial. Stems 4-angled, basally usually rooting at nodes, sulcate, bifariously pubescent. Petiole 3–13 mm, pubescent; leaf blade ovate, (0.8–)1.5–6.5 × (0.4–)1–4 cm, thickly papery, abaxially glabrous, adaxially glabrous or pilose on veins, secondary veins 4 or 5 on each side of midvein, base cuspidate to rounded, margin subundulate, apex acute. Spikes often terminal or rarely axillary in apicalmost leaf axil, 1.5–3 cm, interrupted; peduncle 1–2.5 cm; rachis bifariously pubescent; bracts broadly obovate to sometimes circular or ovate, 3–5 × 2–4 mm, abaxially sparsely gland-tipped puberulent, apex cuspidate; bracteoles narrowly triangular, ca. 2 × 1 mm, abaxially pubescent, margin ciliate, apex acute. Calyx 2–3

mm, 5-lobed almost to base; lobes linear. Corolla yellow with purplish spots, 1.2–1.4 cm, outside pubescent; lower lip palate 3-lobed, lobes triangular and 1–2 mm; upper lip 4–5.5 mm, apex emarginate. Staminal filaments 2.5–3 mm, glabrous; anther thecae ca. 1.5 mm, lower one spurred at base. Ovary glabrous; style 5–8 mm, subglabrous. Capsule not seen. Fl. Sep–Dec.

- On rocks in forests; 1300–1700 m. Guangxi.

28. *Justicia latiflora* Hemsley, J. Linn. Soc., Bot. 26: 245. 1890.

紫苞爵床 *zi bao jue chuang*

Mananthes latiflora (Hemsley) C. Y. Wu & C. C. Hu.

Herbs or shrubs 50–100 cm tall, erect. Stems 4-angled, sulcate, sparsely pubescent. Petiole 1–3.5 cm, pubescent; leaf blade lanceolate, ovate, or subcircular, 6–10 × 2–3.5 cm, both surfaces hispid along veins, secondary veins 8–10 on each side of midvein, base cuneate to sometimes attenuate, margin entire, apex acuminate. Spikes terminal, 3.5–5.5 cm, densely flowered; bracts basally pale green and purplish red above middle, ovate to elliptic, 7–10 × 3–4 mm, abaxially puberulent, apex acuminate; bracteoles linear, 5–7 × ca. 1.5 mm, abaxially puberulent. Calyx 5–8 mm, outside puberulent, 5-lobed almost to base; lobes linear, apex acute. Corolla pale white with purplish red dots or stripes on lobes, ca. 1.5 cm, outside pubescent; tube ca. 1 cm; lower lip patent, broadly 3-lobed, lobes circular and ca. 1 mm in diam.; upper lip ca. 0.5 mm, broadly rounded and concave, apex emarginate. Staminal filaments glabrous; anther thecae superposed, lower one minutely spurred at base. Ovary glabrous; style glabrous. Capsule obovoid-clavate, 1–1.2 cm, glabrous. Seeds ovate in outline, ca. 4 × 3.5 mm, rugose. Fl. Feb–Apr, fr. May–Jun.

- Forests, streamsides; 600–1800 m. Chongqing, Guizhou, Hubei, Hunan.

29. *Justicia austrosinensis* H. S. Lo, Guihaia 17: 52. 1997.

华南爵床 *hua nan jue chuang*

Mananthes austrosinensis (H. S. Lo) C. Y. Wu & C. C. Hu.

Herbs 40–70 cm tall. Stems 4-angled, sulcate, glabrous. Petiole 0.5–3 cm, bifariously pubescent or glabrescent; leaf blade broadly ovate to ovate-elliptic, 7–15 × 2.5–7 cm, glabrous, abaxially pale green, adaxially green and with numerous cystoliths especially on veins, secondary veins 5–8 on each side of midvein, base cuneate and decurrent onto petiole, margin crenate or entire, apex shortly acuminate to acute. Spikes mostly terminal or rarely axillary, 5–7 cm; peduncle 1–3 cm, with numerous cystoliths, glabrous; bracts green, usually subtending 1 or 2 flowers, flabellate or broadly obovate, 5–8 × 7–9 mm, margin ciliate, apex acuminate to obtuse and mucronate, with 1–3 teeth; bracteoles subulate, ca. 3 mm, margin ciliate, apex acuminate. Calyx 5-lobed almost to base; lobes lanceolate, ca. 4 mm, margin ciliate, apex acuminate. Corolla yellowish green with purplish red dots on lobes, ca. 1.3 cm, outside pilose, inside glabrous except for trichomes retaining style; lip ca. 1/2

as long as corolla; lower lip 3-lobed, lobes ovate, ca. 2 × 2 mm, and apex rounded; upper lip ovate-triangular, ca. 6 × 3 mm, erect, apex emarginate. Stamens exerted; filaments ca. 4 mm, glabrous; anther thecae ca. 2 mm, unequal, superposed, lower one spurred at base, upper one mucous. Ovary glabrous; style ca. 1 mm, pilose. Capsule clavate, ca. 1.2 cm, pubescent, 4-seeded. Seeds ovate in outline, ca. 2 mm, rugose. Fl. Jul–Oct.

- Thickets in ravines. Guangdong, Guangxi, Guizhou, Jiangxi, Yunnan.

30. *Justicia ferruginea* H. S. Lo & D. Fang, Guihaia 17: 58. 1997.

锈背爵床 *xiu bei jue chuang*

Mananthes ferruginea (H. S. Lo & D. Fang) C. Y. Wu & C. C. Hu.

Herbs 20–60 cm tall, anisophyllous. Stems 4-angled, sulcate, glabrous. Leaves sessile; leaf blade oblanceolate to rarely lanceolate, 8–17 × 2.5–6.5 cm, papery, glabrous, abaxially rust-colored when dry, secondary veins 10–13 on each side of midvein, base auriculate and somewhat amplexicaul, margin entire, apex obtuse. Spikes terminal or axillary, 1.5–5 cm, interrupted, with 2–5 flowers per node; peduncle 1.5–3.5 cm, glabrous; rachis puberulent; bracts triangular, ca. 1 mm, subglabrous; bracteoles similar to bracts. Calyx ca. 2 mm, subglabrous, 5-lobed almost to base; lobes narrowly triangular. Corolla white, 6.5–7 mm, outside puberulent; lower lip 3-lobed, lobes ca. 1 mm and apex rounded; upper lip ovate-triangular, ca. 3 mm, erect, apex emarginate. Staminal filaments ca. 2 mm, glabrous; anther thecae ca. 1 mm, unequal, superposed, lower one spurred at base. Ovary glabrous; style subglabrous. Capsule not seen. Fl. May–Aug.

- Forests on limestone hills. Guangxi.

31. *Justicia panduriformis* Benoist, Notul. Syst. (Paris) 5: 116. 1936.

琴叶爵床 *qin ye jue chuang*

Mananthes panduriformis (Benoist) C. Y. Wu & C. C. Hu.

Shrubs to 2 m tall. Stems 4-angled, sulcate, glabrous. Leaves sessile; leaf blade obovate, 15–26 × 7.5–15 cm, glabrous, base attenuate to rounded, margin entire or slightly undulate, apex shortly acuminate. Spikes terminal, elongated; rachis densely pubescent, with 2 or 3 flowers clustered per node; bracts lanceolate-linear, 2–3 mm, apex acute; bracteoles similar to bracts. Calyx ca. 3 mm, outside puberulent, 5-lobed almost to base; lobes linear, apex acute. Corolla white, ca. 8 mm; tube as long as limb; lower lip 3-lobed; upper lip emarginate. Staminal filaments ca. 4 mm, glabrous; anther thecae unequal, superposed, lower one spurred at base. Ovary pubescent; style ca. 6 mm, basal portion slightly pubescent. Capsule not seen. Fl. May–Sep.

- Forests on limestone hills. Guangxi, Yunnan [Vietnam].

32. *Justicia lianshanica* (H. S. Lo) H. S. Lo, Guihaia 17: 50. 1997.

广东爵床 *guang dong jue chuang*

Mananthes lianshanica H. S. Lo, Bull. Bot. Res., Harbin 1(4): 105. 1981.

Herbs to 30 cm tall. Stems 4-angled, basally prostrate and rooting at nodes then erect, sulcate, bifariously pubescent to glabrescent. Petiole 1.5–3.5 cm, pubescent; leaf blade ovate, 3.5–14 × 2–6 cm, thinly papery, abaxially glabrous or sparsely puberulent along veins, adaxially glabrous, secondary veins 6–8 on each side of midvein and meeting near margin, base shallowly cordate to subtruncate, margin slightly undulate or subentire, apex obtuse. Spikes terminal; rachis densely pubescent, usually 1-flowered per node; bracts ovate-lanceolate, 2–3 mm, abaxially pubescent; bracteoles similar to bracts. Calyx ca. 4 mm, outside gland-tipped pubescent, 5-lobed almost to base; lobes lanceolate, ca. 3.5 × 0.7 mm. Corolla yellow with purplish spots on lower lip, ca. 8 mm, outside gland-tipped pubescent; tube slightly widened apically; lower lip ca. 3.5 mm, broader than upper lip, patent, 3-lobed, lobes ovate and apex rounded; upper lip triangular, ca. 2.2 mm, erect, apex emarginate. Staminal filaments ca. 3 mm, glabrous; anther thecae ovoid, superposed, lower one spurred at base. Ovary hirsute; style ca. 9 mm, subglabrous. Capsule (immature) clavate, hirsute. Fl. May–Jul.

- Forests on rocks; 300–800 m. Guangdong, Guangxi.

33. *Justicia cardiophylla* D. Fang & H. S. Lo, Guihaia 17: 57. 1997.

心叶爵床 xin ye jue chuang

Mananthes cardiophylla (D. Fang & H. S. Lo) C. Y. Wu & C. C. Hu.

Herbs 20–50 cm tall. Stems terete, glabrous. Petiole 3.5–11 mm, glabrous or somewhat gland-tipped puberulent; leaf blade cordate to rarely broadly ovate, 3.5–12 × 2–9 cm, papery, glabrous, secondary veins 5–7 on each side of midvein, base cordate to ± truncate, margin subentire, apex acute to rarely shortly acuminate. Spikes terminal, 3.5–11 cm, unbranched or sometimes 1-branched; peduncle 7.5–20.5 cm, somewhat bifariously pubescent; rachis densely pubescent, (1 or) 2–5-flowered per node; bracts triangular, 1.5–2 × ca. 1 mm, abaxially puberulent, margin ciliate; bracteoles subtriangular, ca. 1.5 mm, abaxially puberulent. Calyx ca. 2 mm, outside puberulent, 5-lobed almost to base; lobes linear-triangular, ca. 1.5 × 0.6 mm. Corolla greenish yellow, ca. 7 mm, outside pubescent; lower lip patent, 3-lobed, lobes ca. 1 mm and apex rounded; upper lip triangular, ca. 3.5 mm, erect, apex emarginate. Staminal filaments ca. 2 mm, glabrous; anther thecae linear, ca. 1 mm, unequal, superposed, lower one spurred at base. Ovary pubescent; style ca. 3.5 mm, basal portion sparsely puberulent. Capsule clavate, ca. 1.5 cm, pubescent, 4-seeded. Seeds ovate in outline, ca. 1.3 × 1.3 mm, verrucose. Fl. Mar–Jun.

- Rocky limestone hills; 400–600 m. Guangxi [Vietnam].

34. *Justicia austroguangxiensis* H. S. Lo & D. Fang, Guihaia 17: 54. 1997.

桂南爵床 gui nan jue chuang

Justicia austroguangxiensis f. *albinervia* D. Fang & H. S. Lo; *Mananthes austroguangxiensis* (H. S. Lo & D. Fang) C. Y.

Wu & C. C. Hu; *M. austroguangxiensis* f. *albinervia* (D. Fang & H. S. Lo) C. Y. Wu & C. C. Hu.

Herbs 15–30 cm tall. Stems 0.5–5 cm, sometimes woody. Leaves in a basal rosette; petiole 1–3 cm, glabrous; leaf blade obovate, obovate-elliptic, or rarely elliptic, (6–)10–15 × (2.5–)4–7(–9) cm, papery, glabrous, secondary veins 7 or 8 on each side of midvein, base attenuate to narrowly cuneate and decurrent onto petiole, margin entire, apex acute to rarely obtuse. Spikes terminal or axillary in apical leaf axils, 5–35 cm, interrupted, usually branched; rachis puberulent, usually (1 or) 2–9-flowered per node; bracts triangular to rarely narrowly triangular, 1–2 mm, abaxially puberulent; bracteoles similar to bracts. Calyx 1.5–2 mm, outside puberulent, 5-lobed almost to base; lobes subulate. Corolla light yellowish green, 8–9 mm, outside puberulent; lower lip 3-lobed, lobes 4–4.5 mm; upper lip triangular, 3.5–4 mm, erect, apex emarginate. Staminal filaments ca. 3 mm, glabrous; anther thecae superposed, lower one spurred at base. Ovary puberulent; style 4.5–5 mm, basal portion puberulent. Capsule clavate, 1.3–1.5 cm. Seeds ovate in outline, ca. 0.8 × 0.8 mm, tuberculate. Fl. Mar–Jul, fr. Aug.

- Dense forests on rocks; 300–500 m. Guangxi.

35. *Justicia leptostachya* Hemsley, J. Linn. Soc., Bot. 26: 245. 1890.

南岭爵床 nan ling jue chuang

Mananthes leptostachya (Hemsley) H. S. Lo.

Herbs 40–60 cm tall. Stems 4-angled, sulcate, bifariously pubescent. Petiole 1–2 cm; leaf blade ovate-lanceolate, 10.5–12.5(–18) × 5–6.5(–8) cm, papery, abaxially strigose along veins, adaxially sparsely strigose, secondary veins 5–9 on each side of midvein, base broadly cuneate, margin entire or slightly undulate, apex acuminate. Spikes terminal, 3–6 cm, branched or rarely unbranched; rachis hispid, with several flowers per node; bracts linear, ca. 2 × 0.8 mm, abaxially puberulent; bracteoles similar to bracts. Calyx ca. 3 mm, outside puberulent, 5-lobed almost to base; lobes narrowly lanceolate to linear, apex acute. Corolla ca. 6 mm, outside pubescent; lower lip patent, 3-lobed, lobes ovate and apex rounded; upper lip oblong, apex emarginate. Staminal filaments ca. 3 mm, glabrous; anther thecae superposed, lower one spurred at base. Ovary glabrous; style filiform, glabrous. Capsule clavate, ca. 1.2 cm, puberulent, 4-seeded. Seeds dark brown, ovate in outline, ca. 1 × 1 mm, slightly muricate. Fl. Mar–Jun, fr. Jul–Aug.

- On rocks. Guangdong, Guangxi, Hunan.

Specimens misidentified as *Mananthes vasculosa* (Nees) Bremekamp by C. C. Hu (FRPS 70: 298. 2002) belong here.

36. *Justicia microdonta* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 183. 1918.

小齿爵床 xiao chi jue chuang

Mananthes microdonta (W. W. Smith) C. Y. Wu & C. C. Hu.

Shrubs to 2 m tall, much branched. Young braches reddish when dry, 4-angled, sparsely pilose. Petiole 1–2 cm; leaf blade

ovate, (2-)3-5.5 × 1.5-2.5 cm, variable in size, papery, abaxially light green and pilose along midvein, adaxially green and pilose especially along veins, base broadly cuneate and decurrent onto petiole, margin entire, apex shortly acuminate to acute. Spikes terminal, 5-7(-10) cm, unbranched, nodes distant, with 2-4 flowers per node; peduncle short; rachis densely pilose; bracts linear-lanceolate, 3-5 cm; bracteoles similar to bracts. Calyx ca. 7 mm, 5-lobed almost to base; lobes linear-lanceolate, 5-6 mm, pilose along midvein. Corolla white, 1-1.3 cm, outside somewhat pubescent to glabrescent; tube short; limb longer than tube; lower lip 4-5 mm, 3-lobed, lobes pilose inside and ciliate on margin; upper lip 2-lobed. Staminal filaments pilose; anther thecae parallel, superposed, lower one with a white spur at base. Ovary glabrous; style densely pilose. Capsule ca. 2 cm, 4-seeded. Seeds reddish brown, circular in outline, 3-4 mm in diam., rugose-verruculose. Fl. Jun-Aug.

- Thickets; 800-1200 m. Sichuan, Yunnan.

37. *Justicia damingensis* (H. S. Lo) H. S. Lo, *Guihaia* 17: 51. 1997.

大明爵床 *da ming jue chuang*

Mananthes damingensis H. S. Lo, *Bull. Bot. Res.*, Harbin 1(4): 106. 1981.

Herbs 15-30 cm tall. Stems subterete, basally prostrate and rooting at nodes then erect, sulcate, bifariously pubescent. Petiole 0.5-1.5 cm, pubescent; leaf blade ovate, 4-9 × 2.5-4.5 cm, thinly papery, abaxially pubescent along veins, adaxially glabrous, secondary veins ca. 5 on each side of midvein, base narrowly cuneate, margin shallowly undulate, apex acute. Racemes terminal, spiciform, 17-18 cm, branchless or trifurcate branched, with 3 flowers per node; peduncle 5.5-10 cm, pubescent; bracts subulate, 1.5-2 mm, abaxially pubescent; bracteoles similar to bracts. Pedicel ca. 1 mm, pubescent. Calyx ca. 6 mm, 5-lobed almost to base; lobes narrowly triangular, ca. 5 × 0.6 mm, margin ciliate, apex acuminate. Corolla yellow, ca. 1 cm, outside puberulent; lower lip ca. 3.2 mm, patent, 3-lobed, lobes ovate and apex rounded; upper lip subdeltoid, ca. 2.5 mm. Staminal filaments ca. 3 mm, glabrous; anther thecae ellipsoid, superposed, lower one spurred at base. Ovary glabrous; style ca. 6 mm, glabrous. Capsule not seen. Fl. May-Jun.

- Thickets; 300-600 m. Guangxi.

38. *Justicia amblyosepala* D. Fang & H. S. Lo, *Guihaia* 17: 55. 1997.

钝萼爵床 *dun e jue chuang*

Mananthes amblyosepala (D. Fang & H. S. Lo) C. Y. Wu & C. C. Hu.

Shrubs 30-50 cm tall. Stems terete, glabrous. Petiole 0.8-3 cm, glabrous; leaf blade ovate to elliptic, 9-17 × 4.5-8 cm, papery, glabrous, secondary veins 5-7 on each side of midvein, base attenuate to rounded, margin subentire, apex acute. Spikes terminal or axillary, 2-23 cm, interrupted, simple or branched; peduncle 1.5-5 cm; rachis 4-angled, sulcate, bifariously puberulent, with 1 flower per node; bracts triangular to rarely narrowly triangular, 1.5-3 mm, subglabrous; bracteoles narrowly triangular, ca. 2 mm, margin ciliolate. Calyx ca. 5 mm, 5-lobed;

lobes elliptic-lanceolate, both surfaces usually puberulent to subglabrous, apex obtuse to rounded. Corolla light yellow, ca. 1.3 cm, outside retrorsely puberulent; lower lip 3-lobed, lobes ca. 1.5 mm and apex rounded; upper lip ovate-triangular, ca. 5 mm, erect, apex emarginate. Staminal filaments ca. 3 mm, glabrous; anther thecae ellipsoid, ca. 1.5 mm, unequal, superposed, lower one spurred at base. Ovary pubescent at tip; style 8-11 mm, sparsely puberulent. Capsule clavate, ca. 1.5 cm, pubescent. Seeds ovate in outline, ca. 1 × 1 mm, verrucose. Fl. Mar-May, fr. Aug.

- Forests on limestone slopes. Guangxi.

39. *Justicia acutangula* H. S. Lo & D. Fang, *Guihaia* 17: 56. 1997.

棱茎爵床 *leng jing jue chuang*

Mananthes acutangula (H. S. Lo & D. Fang) C. Y. Wu & C. C. Hu.

Herbs 50-100 cm tall. Stems sharply 4-angled and slightly winged, sulcate, glabrous. Petiole ca. 1.3 mm, pubescent; leaf blade elliptic to rarely broadly elliptic, 8.5-28 × 5-12.5 cm, glabrous, secondary veins 13-15 on each side of midvein, base rounded to attenuate and decurrent onto petiole, margin subentire, apex acute. Spikes terminal or axillary in upper leaf axils, 3.5-14 cm, interrupted, unbranched or branched, with 1 flower per node; bracts triangular, 2-3 mm, glabrous, margin ciliate; bracteoles ca. 2.5 mm, glabrous, margin ciliate. Calyx ca. 5 mm, outside densely puberulent, 5-lobed almost to base; lobes lanceolate, apex acute. Corolla light greenish yellow with purplish dots on lower lip, 2-2.2 cm, outside pubescent; limb as long as tube; lower lip as long as upper lip, 3-lobed, lobes ovate, ca. 2 mm, and apex rounded; upper lip ca. 9 mm, apex emarginate. Staminal filaments ca. 7.5 mm, glabrous; anther thecae ca. 2.5 mm, superposed, lower one minutely spurred at base. Ovary glabrous; style ca. 2 cm, basal portion pubescent. Capsule clavate, ca. 2 cm. Seeds ovate in outline, ca. 1.2 × 1.3 mm. Fl. Nov-Jan, fr. Apr-May.

- Forests on limestone hills; 500-700 m. Guangxi, Guizhou.

40. *Justicia patentiflora* Hemsley, *Hooker's Icon. Pl.* 28: t. 2792. 1905.

野靛棵 *ye dian ke*

Mananthes patentiflora (Hemsley) Bremekamp.

Herbs to 2 m tall, perennial. Stems subterete, glabrous. Petiole 2-6 cm; leaf blade ovate to oblong-lanceolate, 16-26 × 7.5-9.5 cm, membranous, glabrous, secondary veins 8 or 9 each side, blade basally attenuate to a narrowly cuneate base, apex acuminate. Spikes terminal or axillary in upper leaf axils, 5-12 cm, unbranched or bifurcately branched; rachis 4-angled, bifariously yellowish pubescent, with 1 flower per node; bracts scale-like, triangular-lanceolate, ca. 3 mm, abaxially puberulent; bracteoles similar to bracts. Calyx ca. 1.2 cm, puberulent, 5-lobed almost to base; lobes linear, apex acute. Corolla purplish red with purplish spots, 1.5-2 cm; tube 1-1.5 cm, abruptly recurved above base, outside puberulent; lower lip 3-lobed, lobes circular; upper lip subcircular, shorter than lower lip, apex emarginate. Staminal filaments ca. 5 mm, glabrous; anther

thecae superposed, lower one spurred at base. Ovary glabrous; style ca. 7 mm, basal portion sparsely puberulent. Capsule narrowly obovoid, ca. 1.5 cm. Seeds light yellow, circular in outline, ca. 1.2 × 1.2 mm, verrucose. Fl. Nov–Jan, fr. Apr–May.

Forests, streamsides, limestone hills; 500–1800(–2400) m. Yunnan [Vietnam].

“*Mananthes tubiflora*” (Y. M. Shui & W. H. Chen, Seed Pl. Karst Reg. China 1: 182. 2006) belongs here but was not validly published.

41. *Justicia poilanei* Benoist, Notul. Syst. (Paris) 5: 125. 1936.

毛萼爵床 mao e jue chuang

Shrubs to 2 m tall. Stems ± 4-angled, sulcate, glabrous. Petiole 1–6 cm, flat, sulcate, margin ciliate; leaf blade ovate to ovate-lanceolate, 10–20 × 4–8 cm, glabrous, secondary veins 6–10 on each side of midvein, base attenuate and decurrent onto petiole, margin entire or undulate, apex acute. Spikes terminal or rarely axillary, 7–15 cm, usually trifurcately branched or rarely unbranched; peduncle 1–3 cm; rachis 4-angled, glabrous, with 1 flower per node; bracts triangular, 2–2.5 × ca. 2 mm, both surfaces glabrous, margin ciliate; bracteoles similar to bracts. Calyx 3–4 mm, both surfaces puberulent especially distally on inner surface, 5-lobed almost to base; lobes lanceolate, margin ciliate, apex acute. Corolla ca. 1 cm, outside pubescent; tube as long as limb; lower lip 3-lobed, lobes subequal, ovate, and apex rounded; upper lip subtriangular, erect, apex emarginate. Staminal filaments ca. 4 mm, glabrous; anther thecae unequal, superposed, lower one spurred at base. Ovary glabrous; style ca. 8 mm, glabrous. Capsule not seen. Fl. Dec–Feb.

Limestone hills; 1000–2400 m. Yunnan [Vietnam].

42. *Justicia kampfiana* Benoist, Notul. Syst. (Paris) 5: 118. 1936.

那坡爵床 na po jue chuang

Mananthes kampfiana (Benoist) C. Y. Wu & C. C. Hu.

Shrubs to 1 m tall. Stems ± 4-angled, sulcate, glabrous. Petiole 3–6 mm, glabrous; leaf blade lanceolate, 9–16 × 4.3–

cm, glabrous, secondary veins ca. 8 on each side of midvein, base cuneate, margin entire, apex shortly acuminate. Spikes axillary or terminal; rachis 4-angled, unbranched or 2-furcately branched, subglabrous, 1-flowered per node; bracts narrowly triangular, ca. 1.5 mm, abaxially pubescent; bracteoles similar to bracts. Calyx ca. 3 mm, outside pubescent, inside glabrous, 5-lobed almost to base; lobes linear, subequal, apex acute. Corolla ca. 1 cm, outside pubescent; tube slightly longer than limb; lower lip 3-lobed, lobes subequal, ovate, and apex rounded; upper lip subtriangular, erect, apex emarginate. Staminal filaments ca. 4 mm, glabrous; anther thecae unequal, superposed, lower one spurred at base. Ovary and style glabrous. Capsule glabrous. Fl. Apr–May.

On rocks in forests; 500–600 m. Guangxi [Cambodia].

43. *Justicia caudatifolia* (H. S. Lo & D. Fang) Z. P. Hao, Y. F. Deng & T. F. Daniel, J. Trop. Subtrop. Bot. 18: 486. 2010.

尾叶爵床 wei ye jue chuang

Leptostachya caudatifolia H. S. Lo & D. Fang, Guihaia 17: 45. 1997.

Herbs to 1 m tall. Stems 4-angled, basally prostrate and rooting at nodes, sulcate, glabrous. Petiole 2–15 mm, glabrous; leaf blade elliptic to obovate-elliptic, 3–10 × 1.2–4.2 cm, apical half broadest, papery, glabrous, secondary veins 5 or 6 on each side of midvein, base cuneate, margin subentire, apex caudate. Spikes axillary, 1–3 cm, interrupted; peduncle 0.5–1.5 cm; rachis sulcate, puberulent, 1-flowered per node; bracts linear-triangular, 3–4 mm, abaxially puberulent, margin ciliate; bracteoles ovate, 2.5–3 mm, margin ciliate. Calyx ca. 4 mm, 5-lobed almost to base; lobes narrowly triangular, outside glabrous, inside glabrous. Corolla white, ca. 1.1 cm, outside slightly retrorsely pubescent; tube as long as limb; lower lip 3-lobed, lobes ca. 2.5 mm and apex rounded; upper lip ca. 5 mm, apex emarginate. Staminal filaments ca. 3 mm, glabrous; anther thecae superposed, lower one minutely spurred at base. Ovary glabrous; style ca. 5 mm, glabrous. Capsule not seen. Fl. Oct.

● On rocks in forests on limestone hills. Guangxi.

25. RHINACANTHUS Nees in Wallich, Pl. Asiat. Rar. 3: 76, 108. 1832.

灵枝草属 ling zhi cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs, subshrubs, or herbs, with cystoliths. Leaves opposite, petiolate or subsessile; leaf blade margin entire or slightly undulate. Inflorescences axillary or terminal, spikes or racemes, sometimes branched into panicles; bracts and bracteoles shorter than calyx. Calyx deeply 5-lobed; lobes subequal. Corolla white or greenish [or purple]; tube cylindrical, elongate, narrow; limb 2-lipped; lower lip 3-lobed, lobes ascending cochlear in bud; upper lip entire or 2-cleft, inside rugulose. Stamens 2, exerted from mouth of corolla; anthers 2-theous; thecae unequally inserted to superposed, lower theca with or without a basal appendage; staminodes absent. Capsule with a solid stalk, clavate, 4-seeded; retinacula present. Seeds discoid, variously ornamented, lacking trichomes.

About 25 species: tropical and subtropical regions of Africa and Asia; two species (one endemic) in China.

Rhinacanthus calcaratus (Wallich) Nees was reported from Yunnan by C. C. Hu (FRPS 70: 268. 2002) based on a misidentification of *Pseuderanthemum polyanthum*.

- 1a. Leaf blade narrowly obovate to oblanceolate, 20–24 × 6–8 cm, abaxially glabrous, secondary veins 8–10 on each side of midvein; corolla tube ca. 4 cm, lobes of lower lip 2–2.5 cm 1. *R. beesianus*
 1b. Leaf blade elliptic, ovate-elliptic, or rarely lanceolate, 2–7(–11) × 0.8–3 cm, abaxially pubescent, secondary veins 5 or 6 on each side of midvein; corolla tube 1.5–1.8 cm, lobes of lower lip 2–4 mm 2. *R. nasutus*

1. *Rhinacanthus beesianus* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 164. 1912.

滇灵枝草 dian ling zhi cao

Shrubs to 1.5 m tall. Stems 4-angled, subglabrous. Petiole 0–4 mm; leaf blade narrowly obovate to oblanceolate, 20–24 × 6–8 cm, abaxially glabrous, adaxially slightly pubescent, secondary veins 8–10 on each side of midvein, base attenuate and decurrent onto petiole, margin slightly undulate to subentire, apex acute. Panicles terminal, 12–15 × 8–9 cm; bracts leaflike, lanceolate, 0.8–1.2 × 0.3–0.4 cm. Flowers pedicellate. Calyx lobes linear, ca. 10 × 1.5 mm, pubescent, 1-veined, apex acute. Corolla white, fragrant, outside gland-tipped pubescent; tube ca. 4 cm; lower lip lobes elliptic, 2–2.5 cm; upper lip ca. 2 cm, apex 2-cleft. Stamens ca. 1 cm. Fl. Aug–Sep.

• Open dry situations on mountain slopes; 2100–2400 m. Yunnan.

2. *Rhinacanthus nasutus* (Linnaeus) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 39: 79. 1870.

灵枝草 ling zhi cao

Justicia nasuta Linnaeus, Sp. Pl. 1: 16. 1753; *Rhinacanthus communis* Nees.

Subshrubs or perennial herbs, to 1.5 m tall. Stems stout, ± 4-angled, faintly striate, densely pubescent when young then glabrescent. Petiole 0.5–1.5 cm; leaf blade elliptic, ovate-elliptic, or rarely lanceolate, 2–7(–11) × 0.8–3 cm, abaxially densely pubescent, adaxially sparsely pubescent to subglabrous, secondary veins 5 or 6 on each side of midvein, base cuneate, margin entire or slightly undulate, apex shortly acuminate to acute. Panicles terminal or axillary, to 50 cm; rachis densely pubescent; bracts lanceolate, to 2 × 0.5 mm; bracteoles ca. 1 mm. Flowers sessile to subsessile. Calyx ca. 5 mm, both surfaces pubescent; lobes lanceolate, ca. 4 × 0.7 mm. Corolla greenish white, 2.1–2.7 cm, outside pubescent with gland-tipped and non-glandular trichomes; tube 1.5–1.8 cm; lower lip 0.75–1.2 cm, lobes 2–4 mm and subequal; upper lip linear-lanceolate, 6–7.5 mm, erect. Staminal filaments glabrous. Style sparsely pubescent. Capsule ca. 2 × 0.3 cm, pubescent with gland-tipped trichomes. Seeds ca. 2.5 × 2.2 mm, papillose. Fl. Oct–Dec. $2n = 30$.

Thickets, forests, cultivated around villages; below 700 m. Guangdong, Hainan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; Madagascar].

26. DICLIPTERA Jussieu, Ann. Mus. Natl. Hist. Nat. 9: 267. 1807, nom. cons.

狗肝菜属 gou gan cai shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Diapedium K. D. Koenig.

Herbs, diffuse, annual, biennial, or perennial [or sometimes shrubs], with cystoliths; young stems ± 6-angled in cross-section. Leaves petiolate; leaf blade margin entire or subsinuate. Inflorescences of cymes in leaf axils or in terminal spikelike thyrses or panicles of thyrses. Flowers subtended by an involucre of several pairs of bracteoles (= cymule); outermost pair equal or unequal in size, usually concealing inner pair(s), calyx, and base of corolla. Calyx deeply 5-lobed; lobes narrow, equal, apex acute. Corolla pink, resupinate 180° by torsion of tube; tube slender, widened apically, limb 2-lipped; lower lip (in upper position) 3-lobed, lobes ascending cochlear in bud; upper lip (in lower position) entire or emarginate. Stamens 2, exerted from mouth of corolla; anthers 2-theous; thecae unequally inserted to superposed, base mucous; staminodes absent. Stigma 2-cleft. Capsule substipitate or stipitate, 2–4-seeded; retinacula present; placenta with retinacula separating elastically and rising from inner capsule wall at dehiscence. Seeds lenticular, papillate, lacking trichomes.

About 100 species: tropical and temperate regions worldwide; four species (two endemic) in China.

- 1a. Outer bracteoles oblong-lanceolate to oblanceolate, greater than 2 × as long as wide.
 2a. Outer bracteoles oblong-lanceolate, 5–7 mm, sparsely covered with white or grayish trichomes or glabrescent; corolla ca. 0.5 cm 1. *D. bupleuroides*
 2b. Outer bracteoles oblanceolate, 10–14 mm, densely covered with yellow trichomes; corolla ca. 1.5 cm 2. *D. induta*
 1b. Outer bracteoles elliptic, subcircular, or obovate, less than 2 × as long as wide.
 3a. Corolla pale purple, 1–1.2 cm; outer bracteoles 0.5–1.3 × 0.3–0.8 cm 3. *D. chinensis*
 3b. Corolla pinkish red, ca. 1.8 cm; outer bracteoles 1.5–2 × 1–1.5 cm 4. *D. elegans*

1. *Dicliptera bupleuroides* Nees in Wallich, Pl. Asiat. Rar. 3: 111. 1832.

印度狗肝菜 yin du gou gan cai

Dicliptera roxburghiana Nees var. *bupleuroides* (Nees) C. B. Clarke.

Herbs to 50 cm tall. Stems sulcate, pubescent. Petiole 5–10 mm; leaf blade ovate, 3.5–7 × 1.8–2.8 cm, glabrous or with 2-celled trichomes, secondary veins 4 or 5 on each side of midvein, base cuneate, margin subentire, apex acuminate. Inflores-

cences axillary and subsessile or sometimes terminal and shortly pedunculate, cymes, many flowered; peduncle 3–5 mm; bracts lanceolate, 2–3 mm; outer bracteoles green, oblong-lanceolate, 5–7 × ca. 2 mm, abaxially pubescent, base cuneate, margin entire and ciliate, apex mucronate; inner bracteoles green with yellowish margin, lanceolate, ca. 4 × 1.5 mm. Calyx ca. 3 mm; lobes subulate, pubescent. Corolla ca. 5 mm, outside pubescent; lip in lower position orbicular, ca. 1.5 × 1.5 mm; lip in upper position oblong, ca. 2 × 1 mm, 3-lobed, lobes ovate and ca. 0.3 × 0.3 mm. Staminal filaments ca. 2 mm; anther thecae spheri-

cal. Ovary pilose at tip; style ca. 3 mm. Capsule ca. 3 mm, pilose at tip. Seeds ovate in outline, ca. 1 mm, papillate. Fl. Nov–May, fr. Dec–Jun. $2n = 26$.

Roadsides, forests, shady places; 800–1900 m. Guizhou, Sichuan, Yunnan [Cambodia, India, Laos, Myanmar, Thailand, Vietnam].

2. *Dicliptera induta* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 175. 1918.

毛狗肝菜 mao gou gan cai

Herbs to 60 cm tall. Stems sulcate, densely yellow hirsute especially along sulcae. Petiole 5–12 mm, yellow tomentose; leaf blade ovate, 3–4 × 1.5–2.5 cm, both surfaces yellow tomentose especially along veins, secondary veins 3–5 on each side of midvein, base broadly cuneate to subrounded, margin entire, apex acute. Inflorescences axillary, each of 1 or 2 cymes; peduncle 2–3 mm, yellow hirsute; bracts linear-subulate, ca. 5 mm, tomentose; outer bracteoles dark green, oblanceolate, 10–14 × 2–4 mm, unequal, rigid, both surfaces tomentose especially toward base, base cuneate, apex acute and shortly mucronate; inner bracteoles linear-lanceolate, 8–10 mm, pilose, apex acuminate. Pedicel ca. 1 mm. Calyx ca. 5 mm; lobes linear, pilose, apex acute. Corolla pink, ca. 1.5 cm, pilose; tube basally slender, white pilose; lip in lower position ca. 4 mm, 2-lobed; lip in upper position ca. 3 mm, 3-lobed, lobes ovate. Staminal filaments ca. 6 mm, glabrous; anther thecae spherical, ca. 1 mm. Ovary minutely pilose; style ca. 1.2 cm, minutely pilose. Capsule ca. 4 mm, pilose. Seeds ovate in outline, ca. 2 mm, papillate. Fl. Aug–Sep, fr. Oct–Nov.

• Wastelands; 400–700 m. Yunnan.

3. *Dicliptera chinensis* (Linnaeus) Jussieu, Ann. Mus. Natl. Hist. Nat. 9: 268. 1807.

狗肝菜 gou gan cai

Justicia chinensis Linnaeus, Sp. Pl. 1: 16. 1753; *Diapedium chinense* (Linnaeus) K. D. Koenig & Sims; *Dicliptera burmanni* Nees; *D. roxburghiana* Nees.

Herbs 30–80 cm tall, annual or biennial. Stems ridged, basally diffuse, apically erect, glabrous except for pubescence on young branches and nodes. Petiole to 0.5–3 cm, puberulent; leaf blade ovate-elliptic, 2–8 × 1.5–4 cm, abaxially sparsely puberulent along veins, adaxially glabrous, secondary veins 4 or 5 on each side of midvein and abaxially slightly prominent, base cuneate to attenuate and decurrent onto petiole, margin entire or slightly sinuate, apex shortly acuminate to acute. Inflorescences each of (1–)3 or 4 pedunculate cymes from upper leaf axils, 1–4 cm; inflorescence bracts subulate to linear to oblanceolate to obovate, 3–7.5 × 0.3–1 mm; peduncle 2–5 mm; cymules usually 3 or 4 per cyme; outer bracteoles elliptic to obovate, 5–13 × 3–8 mm, unequal, abaxially puberulent, 3-veined, margin cili-

ate, apex acute and mucronate; inner bracteoles linear, ca. 5 mm, abaxially hirsute, apex acuminate. Pedicel 0.5–3 mm, puberulent. Calyx ca. 5 mm; lobes linear, equal, margin hirsute, apex acuminate. Corolla pale purple, 1–1.2 cm, outside puberulent; tube slender, ca. 6 mm, ca. 1.5 mm wide; limb 2-lipped; lip in lower position ovate, ca. 5 × 3 mm, apex entire; lip in upper position oblong, ca. 4 × 1.5 mm, shallowly 3-lobed. Stamens inserted near apex of corolla tube; filaments ca. 4 mm, glabrous; thecae spherical, ca. 1.2 mm in diam., parallel. Ovary pilose at tip; style ca. 1.4 cm. Capsule broadly ellipsoid, ca. 6 mm, puberulent, 4-seeded, apex apiculate. Seeds circular in outline, ca. 2 mm in diam., covered with apically barbed papillae. Fl. Sep–Jan, fr. Nov–Feb. $2n = 26$.

Streamsides, trailsides; below 1800 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan [Bangladesh, India, Vietnam].

This species is used medicinally.

4. *Dicliptera elegans* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 174. 1918.

优雅狗肝菜 you ya gou gan cai

Dicliptera mairei Benoist.

Herbs 60–120 cm tall. Stems erect, branched, slender, sulcate, sparsely pubescent. Petiole 0.5–1.5 cm, sulcate, pubescent; leaf blade ovate to ovate-lanceolate, 4–8 × 2–5 cm, abaxially pale gray and sparsely pubescent, adaxially green, densely covered with cystoliths, and densely brownish pilose on midveins but otherwise sparsely pubescent with few large-celled white trichomes, secondary veins 4–6 on each side of midvein, base broadly cuneate and decurrent onto petiole, margin entire or sinuate, apex acuminate. Inflorescences axillary, each of 2 or 3 cymes; peduncle to 7 cm, white tomentose; inflorescence bracts linear, 7–10 × 1–2 mm, puberulent; cymules 3–6 per cyme; outer bracteoles subcircular to obovate, 1.5–2 × 1–1.5 cm, unequal, abaxially with cystoliths and pilose, palmately 3- or 5-veined, base rounded, apex mucronate; inner bracteoles linear-lanceolate, 5–7 × ca. 1 mm, abaxially puberulent, apex acuminate. Pedicel 0.5–2 mm. Calyx 6–7 mm; lobes linear-lanceolate, outside puberulent, apex acuminate. Corolla pinkish red, ca. 1.8 cm, outside pubescent; tube slender; limb 2-lipped. Staminal filaments ca. 5 mm, glabrous; anther thecae spherical, ca. 1 mm, inserted at slightly different levels. Ovary slightly pilose. Capsule ca. 6 mm, light yellow pilose. Seeds light brown, circular in outline, ca. 1.5 × 1.5 mm, compressed, yellowish papillate. Fl. Aug–Oct, fr. Oct–Dec.

• Forest margins, thickets, roadsides; 600–2000 m. Sichuan, Yunnan.

Dicliptera mairei was incorrectly reduced to *D. induta* by C. C. Hu (FRPS 70: 238. 2002).

27. PERISTROPHE Nees in Wallich, Pl. Asiat. Rar. 3: 77, 112. 1832.

观音草属 guan yin cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs or shrubs, with cystoliths. Leaf blade margin entire or slightly toothed. Inflorescences in axillary or terminal cymes, these

sometimes aggregated into a leafy panicle-like complex; cymes consisting of (1 or)2–4(or more) involucre; involucre of usually 1–3 flowers enclosed by 2(or more) pairs of bracteoles that conceal calyx and corolla tube. Outer pair of bracteoles equal to unequal in size and larger than inner pair(s). Calyx small, 5-lobed; lobes equal. Corolla white to pink or purple, usually large, resupinate 180°; tube slender, twisted, apically ± widened into throat; limb 2-lipped; upper lip (in lower position) entire to 2-cleft; lower lip (in upper position) 3-lobed; lobes ascending cochlear in bud. Stamens 2, inserted at corolla throat, exerted from corolla tube; anthers 2-theous; thecae unequally inserted or superposed (contiguous or separated by gap), base mucicous; staminodes absent. Ovary with 2 ovules per locule; stigma slightly enlarged or 2-cleft. Capsule with a solid stalk, 4-seeded; retinacula present; placenta not rising elastically from base of valves. Seeds discoid, smooth to tuberculate, lacking trichomes.

About 40 species: tropical and subtropical Africa, Asia, and Madagascar, with one species possibly extending to Australia (see R. M. Barker, J. Adelaide Bot. Gard. 9: 192. 1986); ten species (three endemic) in China.

- 1a. Outer involucre bracteoles abaxially pubescent with gland-tipped trichomes.
 2a. Corolla ca. 4.5 cm, pubescent with gland-tipped and non-glandular trichomes 1. *P. lanceolaria*
 2b. Corolla ca. 1 cm, outside pubescent with non-glandular trichomes 2. *P. paniculata*
- 1b. Outer involucre bracteoles abaxially glabrous or pubescent with non-glandular trichomes.
 3a. Anther thecae superposed (i.e., one entirely above other and with a gap between them).
 4a. Corolla ca. 1 cm; outer involucre bracteoles subulate to lanceolate to linear, less than 3 mm wide; capsule pubescent with non-glandular trichomes 2. *P. paniculata*
 4b. Corolla 3–3.4 cm; outer involucre bracteoles ovate to elliptic, more than 5 mm wide; capsule pubescent with gland-tipped and non-glandular trichomes 10. *P. japonica*
- 3b. Anther thecae inserted at same level or at different levels but overlapping.
 5a. Anther thecae inserted at same level 3. *P. yunnanensis*
 5b. Anther thecae inserted at different levels.
 6a. Outer involucre bracteoles less than 2 × as long as calyx.
 7a. Leaf blade subglabrous 4. *P. tianmuensis*
 7b. Leaf blade densely pubescent 5. *P. strigosa*
 6b. Outer involucre bracteoles more than 2 × as long as calyx.
 8a. Corolla and capsule glabrous 6. *P. montana*
 8b. Corolla and capsule pubescent.
 9a. Leaf blade adaxially puberulent (especially along midvein) or becoming subglabrescent; corolla 3–5.7 cm 7. *P. bivalvis*
 9b. Leaf blade adaxially sparsely pubescent; corolla 2–4 cm.
 10a. Outer involucre bracteoles narrowly ovate to lanceolate, more than 4 × as long as wide 8. *P. floribunda*
 10b. Outer involucre bracteoles ovate to oblong to elliptic, less than 3 × as long as wide.
 11a. Outer involucre bracteoles ovate to oblong, abaxially slightly villous, base subcordate 9. *P. fera*
 11b. Outer involucre bracteoles ovate to elliptic, abaxially subglabrous to puberulent, base cuneate to truncate 10. *P. japonica*

1. *Peristrophe lanceolaria* (Roxburgh) Nees in Wallich, Pl. Asiat. Rar. 3: 114. 1832.

五指山藍 wu zhi shan lan

Justicia lanceolaria Roxburgh, Fl. Ind. 1: 122. 1820.

Herbs to 1 m tall, erect. Branches stout, densely covered with white retrorse trichomes or sometimes glabrescent. Petiole (0.5–)1.5–3.5 cm; leaf blade lanceolate to ovate-lanceolate, (6–)10–17 × (1–)3–6 cm, abaxially sparsely pubescent or glabrescent, adaxially glabrescent except for a few trichomes along midvein toward base, secondary veins 5–7 on each side of midvein, base narrowly cuneate and slightly oblique, margin entire, apex acuminate. Inflorescences of axillary pedunculate cymes of (1–)3 involucre with cymes sometimes in axils of distal bracts and collectively forming a terminal panicle-like complex 5–7 cm; outer involucre bracteoles linear-lanceolate, 10–18 × 1.5–3 mm, gland-tipped pubescent; inner involucre bracteoles similar to outer ones except smaller. Calyx ca. 9 mm; lobes linear, ca. 1 mm broad. Corolla pink, ca. 4.5 cm, outside pubes-

cent with gland-tipped and non-glandular trichomes; tube base ca. 1.5 mm wide for ca. 2.5 cm; lip in lower position obovate, ca. 2 × 0.8 cm, slightly 2-lobed; lip in upper position oblong, ca. 2 × 0.6 cm, 3-lobed, lobes ovate and ca. 1 × 1 mm. Staminal filaments ca. 1.8 cm, glabrous; anther thecae oblong, ca. 3 × 0.6 mm, superposed. Capsule 1.4–1.8 cm, pubescent with gland-tipped trichomes. Seeds ca. 3 × 2 mm, smooth. Fl. Dec–Mar, fr. Mar–Jun.

Wet places; 500–700 m. Hainan, Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

2. *Peristrophe paniculata* (Forsskål) Brummitt, Kew Bull. 38: 451. 1983.

双萼观音草 shuang e guan yin cao

Dianthera paniculata Forsskål, Fl. Aegypt.-Arab. 7. 1775; *D. bicalyculata* Retzius; *Dicliptera paniculata* (Forsskål) I. Darbyshire; *Justicia bicalyculata* (Retzius) Vahl; *Peristrophe bicalyculata* (Retzius) Nees.

Herbs to 1.2 m tall, erect, perennial. Stems hirsute, usually 4- or 6-angled. Petiole 3–12 mm; leaf blade ovate to lanceolate, (1–)3–4.5 × (0.5–)1.5–2 cm, abaxially scabrid, adaxially slightly scabrid, base attenuate to broadly cuneate, margin remotely serrulate and slightly ciliate, apex acuminate, acute, or sometimes rounded. Inflorescences of axillary pedunculate cymes with (1–)4(or more) involucre (cymes sometimes branching internally) in axils of leaves or bracts and collectively often forming a terminal leafy panicle-like complex; rachis and inflorescence branches pubescent; outer involucre bracteoles unequal, abaxially pubescent with gland-tipped (sometimes absent) and non-glandular trichomes, larger outer involucre bracteole ± linear, ca. 10 × 2 mm, 1-veined, and apex acute and mucronate, shorter outer involucre bracteole subulate to lanceolate, ca. 6 × 0.1 mm; inner involucre bracteoles narrowly linear to subulate, unequal in length. Calyx lobes lanceolate, ca. 3 mm, outside sparsely pubescent with non-glandular trichomes, inside sparsely pubescent with sessile gland-tipped trichomes, margin membranous at base, apex long acuminate. Corolla light to dark purple, ca. 1 cm, outside pubescent with non-glandular trichomes; tube basally cylindrical for ca. 5 mm; lip in lower position narrowly elliptic, 5–7 × 1–2 mm, apex emarginate; lip in upper position elliptic, 3–7 × 2–3 mm, 3-lobed. Staminal filaments ca. 5 mm, white hairy; anther thecae ovoid, superposed, not touching. Ovary ovoid, pubescent and glandular; style glabrous; stigma 2-lobed. Capsule 0.9–1.3 cm, pubescent with non-glandular trichomes. Seeds 2.2–2.5 mm, rough and tuberculate. Fl. Aug–Dec, fr. Oct–Feb.

Weedy areas, roadsides; 600–2200 m. Guangxi, Sichuan, Yunnan [Cambodia, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam; tropical Africa, Australia].

3. *Peristrophe yunnanensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 187. 1918.

滇观音草 dian guan yin cao

Herbs 1–2 m tall. Stems sulcate, densely grayish pubescent when young, later glabrescent. Petiole 1–10 mm; leaf blade lanceolate to ovate, 2.5–3 × ca. 1 cm, abaxially pubescent, adaxially sparsely puberulent especially on veins or glabrescent, base cuneate, margin entire, apex acuminate. Outer involucre bracteoles linear, ca. 3 mm; inner involucre bracteoles 2.5–6 mm. Calyx 5–7 mm; lobes linear, glabrous or subglabrous, apex acute. Corolla pink to violet, ca. 1.8 cm, outside slightly pubescent. Staminal filaments basally pubescent; anther thecae oblong, ca. 2 mm, parallel, inserted at same level, touching each other. Capsule not seen. Fl. Apr, Aug.

• Thickets; 1900–2200 m. Sichuan, Yunnan.

4. *Peristrophe tianmuensis* H. S. Lo, Bull. Bot. Res., Harbin 8(1): 4. 1988.

天目山蓝 tian mu shan lan

Herbs 30–35 cm tall. Stems 6-angled, pubescent. Petiole 3–10 mm; leaf blade broadly ovate, 1.5–6 × 1–4 cm, both surfaces subglabrous, secondary veins 3–6 on each side of midvein, base broadly cuneate to subrounded, margin entire, apex cuspidate to acute. Cymes terminal or pseudo-axillary; outer involucre bracteoles narrowly lanceolate, 3.5–6 mm, pubes-

cent; inner involucre bracteoles similar to outer involucre bracteoles. Calyx ca. 3 mm; lobes linear, pubescent. Corolla light purple, ca. 2 cm; tube slender; lip in lower position oblong-elliptic, ca. 1 cm, apex emarginate; lip in upper position oblong-spatulate, minutely 3-lobed. Staminal filaments 7.5–8 cm, pubescent; anther thecae linear, parallel, inserted at different levels, touching each other for 2/3 of length. Ovary pubescent; style ca. 2 cm, glabrous. Capsule 8–9 mm, pubescent. Seeds ca. 1.2 × 1.2 mm. Fl. Aug, fr. Oct.

• Thickets. Zhejiang (Tianmu Shan).

5. *Peristrophe strigosa* C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 596. 1974.

糙叶山蓝 cao ye shan lan

Herbs 40–100 cm tall, annual. Stems 6-angled, pubescent. Petiole 1.5–2.5 cm; leaf blade ovate to lanceolate-ovate, 7–13 × 3–5.5 cm, both surfaces densely pubescent, secondary veins 6–8 on each side of midvein, base broadly cuneate, margin entire, apex acuminate to shortly caudate. Cymes terminal or axillary, 3(or 5)-branched, with 3–5 involucre; peduncle ca. 4 mm; outer involucre bracteoles ovate, ca. 5 × 2 mm, concave, apex aristate; inner involucre bracteoles subulate, ca. 2.5 mm. Calyx ca. 5 mm; lobes linear-lanceolate, apex acuminate. Corolla purple, ca. 4.2 cm, outside pubescent; tube basally cylindrical for ca. 2.4 cm; lip in lower position elliptic-obovate, ca. 1.6 × 0.6 cm, apex obtuse to retuse; lip in upper position oblong, ca. 1.6 × 0.5 cm, slightly narrowed at tip, 3-lobed, lobes suboblong and ca. 1 × 1 mm. Staminal filaments ca. 1 cm, pubescent; anther thecae linear, parallel, inserted at different levels. Ovary oblong, ca. 2 mm, pubescent; style ca. 3.5 cm, glabrous. Capsule clavate, ca. 1.7 cm, densely strigose-pubescent. Seeds ca. 2.5 × 2 mm, tuberculate-punctate. Fl. Nov–Jan, fr. Jan–Mar.

• Dense forests. Hainan.

6. *Peristrophe montana* Nees in Wallich, Pl. Asiat. Rar. 3: 113. 1832.

岩观音草 yan guan yin cao

Herbs to 1 m tall, erect, glabrous. Petiole 1.5–4.5 cm; leaf blade narrowly oblong, lanceolate, or rarely ovate, 4–9(–20) × 3–5 cm, both surfaces glabrous, secondary veins 6–8 on each side of midvein, base rounded, margin entire, apex acute. Cymes terminal or axillary; peduncle 1.5–1.7 cm; outer involucre bracteoles various, broadly ovate to linear-lanceolate, 1–1.8 × 0.2–1 cm, pinnately veined, base rounded to truncate, margin entire, apex obtuse; inner cymule bracteoles linear, 3–4 mm. Calyx ca. 5 mm; lobes linear. Corolla pink, 4.5–6 cm, outside glabrous; lip in lower position elliptic, apex emarginate; lip in upper position oblong, 3-lobed. Filaments pubescent; anther thecae linear. Ovary glabrous; style glabrous. Capsule ca. 2 cm, shiny, glabrous. Seeds ca. 3 × 2.6 mm. Fl. Oct–Dec, fr. Dec–Feb.

Wet shady cliffs. Hainan [India, Sri Lanka].

7. *Peristrophe bivalvis* (Linnaeus) Merrill, Interpr. Herb. Amboin. 476. 1917.

观音草 guan yin cao

Justicia bivalvis Linnaeus, Syst. Nat., ed. 10, 2: 850. 1759; *Hypoestes bodinieri* H. Léveillé; *J. baphica* Sprengel; *J. roxburghiana* Roemer & Schultes; *J. tinctoria* Roxburgh; *Peristrophe baphica* (Sprengel) Bremekamp; *P. roxburghiana* (Roemer & Schultes) Bremekamp; *P. tinctoria* (Roxburgh) Nees.

Herbs to 1 m tall, perennial. Stems 5- or 6-angled, much branched, sulcate, pubescent. Petiole to 3.5 cm; leaf blade ovate to lanceolate-ovate, 3–14.5 × 1.5–5.3 cm, both surfaces puberulent (especially along midvein) or becoming subglabrescent, secondary veins 5 or 6 on each side of midvein, base broadly cuneate to subrounded, margin entire to sinuate, apex acuminate to acute. Cymes axillary or terminal, pedunculate, often consisting of 1–3 (or more) pedunculate involucre terminating branches; peduncle 0.3–2.3 cm; outer involucre bracteoles broadly ovate, ovate, or elliptic, unequal in size, puberulent to subglabrous, base rounded to cuneate, apex acute; larger outer involucre bracteole (1.8–)2.3–3.3 × 0.8–1.5 cm; smaller outer involucre bracteole 0.71–0.85 × as long as larger one; inner cymule bracteoles triangular-subulate, 1–2 mm. Calyx 4.5–5 mm, pubescent; lobes lanceolate. Corolla pink, 3.5–5.7 cm, outside pubescent with non-glandular trichomes; tube ca. 1.5 mm in diam.; lip in lower position broadly ovate-elliptic, 2.2–2.6 × ca. 1.8 cm, apex emarginate; lip in upper position oblong, 2–2.5 × ca. 0.9 cm, 3-lobed. Staminal filaments ca. 1.3 cm, puberulent; anther thecae linear, subequally to unequally inserted (overlapping for most of their length), 3.2–4 mm. Ovary pubescent; style glabrous; stigma 2-cleft. Capsule ca. 1.5 cm, pubescent. Seeds ca. 1.5 × 1.5 mm. Fl. Aug–Mar.

Forests; 500–1000 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Thailand, Vietnam].

8. *Peristrophe floribunda* (Hemsley) C. Y. Wu & H. S. Lo, Fl. Hainan. 3: 561. 1974.

海南山藍 hai nan shan lan

Dicliptera crinita (Thunberg) Nees var. *floribunda* Hemsley, J. Linn. Soc., Bot. 26: 248. 1890.

Herbs, erect, perennial. Stems stout, 4-angled, sulcate, pubescent. Petiole 0.5–2 cm; leaf blade ovate to lanceolate, 2–9 × 1.5–3.5 cm, both surfaces pubescent along veins, secondary veins 4–6 on each side of midvein, base broadly cuneate to subrounded, margin entire, apex acuminate to acute-acuminate. Cymes terminal or axillary; outer involucre bracteoles narrowly ovate to lanceolate, unequal in size, both surfaces pubescent, base cuneate, rounded, or sometimes cordate, margin entire and ciliate, apex acuminate; larger outer involucre bracteoles 1.5–2 × 0.3–0.5 cm; smaller outer involucre bracteoles 4/5–5/6 size of larger ones; inner involucre bracteoles shorter than calyx. Calyx ca. 4.5 mm, pubescent; lobes ca. 3.5 mm. Corolla light purple to pink, outside pubescent; tube slender, ca. 1 mm in diam.; lip in lower position ovate-elliptic, apex slightly emarginate; lip in upper position oblong, 3-lobed. Staminal filaments ca. 1 cm, pubescent; anther thecae linear, parallel, slightly unequally inserted. Ovary hirsute; style basally hirsute. Capsule 1.2–1.3 mm, densely pubescent. Seeds ca. 2.5 mm in diam. Fl. Jun–Sep.

Valleys, forests. Fujian, Guangdong, Guizhou, Hainan, Hunan, Sichuan, Yunnan [India].

9. *Peristrophe fera* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 556. 1885.

野山藍 ye shan lan

Peristrophe fera var. *intermedia* C. B. Clarke; *P. jalapifolia* Nees.

Herbs to 1 m tall, erect. Stems 4-angled, sulcate, pubescent. Petiole 5–10(–20) mm; leaf blade ovate to ovate-lanceolate, 5–10 × 2–4.3 cm, both surfaces pubescent, secondary veins 3–5 on each side of midvein, base broadly cuneate, margin subentire or apically obscurely dentate, apex acuminate. Cymes terminal or axillary in apical leaf axils, densely pubescent; outer involucre bracteoles ovate to oblong, unequal in size, slightly villous, base subcordate, margin ciliate, apex acuminate; larger outer involucre bracteoles ca. 1.5 × 0.8–1 cm; smaller outer involucre bracteoles 4/5–5/6 size of larger ones; inner involucre bracteoles 2.2–2.5 mm. Calyx 4–5 mm, pubescent; lobes linear, apex acuminate. Corolla 3–4 cm, outside pubescent; tube ca. 1.5 mm in diam.; lip in lower position broadly elliptic, apex emarginate; lip in upper position narrowly oblong, apex 3-lobed. Staminal filaments ca. 1.5 cm, villous; anther thecae linear, parallel, slightly unequally inserted. Ovary pubescent; style basally hirsute. Capsule ca. 1.4 cm, pubescent. Seeds ca. 1.5 × 1.5 mm. Fl. Jul–Aug.

Dense forests. Guizhou, Hainan, Yunnan [India].

10. *Peristrophe japonica* (Thunberg) Bremekamp, Boissiera 7: 194. 1943.

九头狮子草 jiu tou shi zi cao

Dianthera japonica Thunberg in Murray, Syst. Veg., ed. 14, 64. 1784; *Dicliptera buergeriana* Miquel; *D. crinita* (Thunberg) Nees; *D. japonica* (Thunberg) Makino; *D. uraiensis* Hayata; *Justicia crinita* Thunberg; *Peristrophe chinensis* Nees; *P. guangxiensis* H. S. Lo & D. Fang.

Herbs 20–80 cm, perennial. Stems 4-angled, basally prostrate and rooting at nodes, bifariously pubescent. Petiole 0.5–1.5 cm; leaf blade lanceolate to ovate-oblong, (3–)5–13 × (1–)2.5–4.5 cm, both surfaces sparsely pubescent (especially along midvein), secondary veins 3–5 on each side of midvein, base obtuse to cuneate, margin entire or slightly sinuate, apex acuminate to caudate. Inflorescences terminal or axillary pedunculate cymes from axils of distal leaves, cymes consisting of 1–4 (or more) pedunculate involucre; involucre bearing 1–3 flowers; peduncle 0.7–5.5 cm; outer involucre bracteoles ovate to elliptic, subequal to unequal in size, abaxially subglabrous to puberulent, base cuneate to truncate, margin entire, apex acute to obtuse; larger outer involucre bracteoles 1.1–2.5 × 0.5–1.8 cm; smaller outer involucre bracteoles 8–17 × 3–9 mm; inner involucre bracteoles linear, 2–3 mm, abaxially puberulent, apex acuminate. Calyx ca. 4 mm; lobes subulate, pubescent. Corolla white to pale pink to light purple and with pink specks or dark lines on limb, 2–3.4 cm, outside pubescent with non-glandular trichomes; tube basally ca. 1 mm wide for ca. 1.5 cm; lip in lower position elliptic to subcircular, 8–15 × 3–11 mm, entire or slightly emarginate; lip in upper position oblong, 9–15 × 4–7

mm, 3-lobed. Staminal filaments ca. 7 mm, pubescent; anther thecae linear, ca. 1.2 mm, parallel, unequally inserted to superposed. Ovary pilose; style ca. 2 cm; stigma 2-cleft. Capsule 0.8–1.2 cm, pubescent with gland-tipped and non-glandular trichomes. Seeds ca. 2 mm in diam., tuberculate. Fl. Jul–Feb, fr. Jul–Oct. $2n = 48$.

Roadsides, grasslands, streamsides, montane slopes, trailsides, evergreen broad-leaved forests, *Machilus-Castanopsis* forests; below 1500 m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan].

This species is used medicinally.

28. HYPOESTES Solander ex R. Brown, Prodr. 474. 1810.

枪刀药属 qiang dao yao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs or perennial herbs, decumbent to erect, with cystoliths. Leaves opposite, petiolate; leaf blade margin entire or dentate. Inflorescences of axillary or terminal bracteate spikes to panicles of spikes or of variously disposed cymes (these sometimes clustered in leaf axils); bracteoles usually 4, in 2 to rarely more pairs, distinct or connate, inner pair sometimes partially adnate to outer pair, forming an involucre enclosing 1 or sometimes more flowers. Calyx small, usually obscured by bracteoles, scarious or membranous, 5-lobed; lobes equal or subequal in length. Corolla rose-pink, purplish, or whitish, resupinate 180° by torsion of tube; tube subcylindric to expanded distally into a narrow throat; limb 2-lipped; lower lip (in upper position) shallowly 3-lobed; upper lip (in lower position) subentire or shallowly 2-lobed; lobes ascending cochlear in bud. Stamens 2, inserted near apex of corolla tube, exerted from mouth of corolla; anthers 1-theous; theca mucicous. Ovary with 2 ovules per locule; style exerted from mouth of corolla; stigma 2-lobed, lobes equal or unequal. Capsule stalked, 2–4-seeded; retinacula present. Seeds smooth or ornamented.

About 150 species: Old World; three species in China.

- 1a. Outer bracteoles connate for more than half their length, forming a conspicuous tube; capsule glabrous 1. *H. purpurea*
 1b. Outer bracteoles inconspicuously connate only at base if at all, not forming a conspicuous tube; capsule pubescent.
 2a. Outer bracteoles 2.5–4 mm, lanceolate-subulate to linear 2. *H. cumingiana*
 2b. Outer bracteoles 7–17 mm, elliptic to obovate to oblanceolate 3. *H. triflora*

1. *Hypoestes purpurea* (Linnaeus) R. Brown, Prodr. 474. 1810.

红丝线 hong si xian

Justicia purpurea Linnaeus, Sp. Pl. 1: 16. 1753; *Hypoestes sinica* Miquel; *Peristrophe purpurea* (Linnaeus) Hochreutiner.

Shrubs or perennial herbs, to 1.5 m tall, spreading to erect. Stems ± 4-angled when young, sulcate, slightly puberulent. Petiole 1–3.5 cm, sparsely pubescent; leaf blade ovate to ovate-elliptic, 5–13 × 1.5–7 cm, abaxially pale green and glabrous, adaxially green and sparsely pubescent or glabrous except for pubescent along veins and on margin, secondary veins 5–8 on each side of midvein, base narrowed and cuneate, margin entire, subundulate, or sinuate-crenate, apex acuminate to acute. Inflorescences of terminal or axillary spikes, 1–3 cm, often arranged in large panicles forming a many-flowered thyse to 7 cm or of dense cymose clusters in axils of leaves or subleaflike bracts; outer bracteoles connate for more than half their length, forming a 5–8 mm obconic involucre, abaxially glabrous or pubescent; inner bracteoles smaller than and partially adnate to outer pair. Calyx ca. 5 mm, 5-lobed ± halfway to base; lobes equal, margin ciliate. Corolla reddish purple to purple, 2–2.7 cm, outside puberulent; lip in lower position lanceolate, subentire; lip in upper position triangularly obovate. Staminal filaments to 1.2 cm, glabrous. Style glabrous; stigma equally 2-lobed. Capsule oblong-ovoid, 0.7–1 cm, glabrous. Seeds elliptic-ovate in outline, tuberculate. Fl. Sep–Oct, fr. Oct.

Thickets, along trails and roads, evergreen broad-leaved forests, rocky shores; near sea level to 1200 m. Guangdong, Guangxi, Hainan, Taiwan [Laos, Philippines].

Hypoestes purpurea is a medicinal and ornamental plant.

2. *Hypoestes cumingiana* (Nees) Benth & J. D. Hooker, Gen. Pl. 2: 1122. 1876.

枪刀菜 qiang dao cai

Peristrophe cumingiana Nees in A. Candolle, Prodr. 11: 498. 1847.

Herbs to 1 m tall, suffrutescent. Stems subterete, ascending to decumbent, distally minutely pubescent. Petiole to 2 cm; leaf blade ovate-oblong to linear-lanceolate, 4–14 × 1–4 cm, both surfaces glabrous, secondary veins 3–6 on each side of midvein, base truncate to cuneate, margin slightly undulate, apex acuminate to acute. Panicles terminal or axillary, to 40 cm, lax; branches of panicle usually subtended by subleaflike inflorescence bracts; floral bracts lanceolate, ca. 4.5 × 1 mm; bracteoles lanceolate-subulate to linear, outer pair 2.5–4 mm, puberulent, inner pair smaller. Flowers single or paired, crowded at tips of branches. Calyx 5-lobed nearly to base, lobes subulate, outside puberulent with non-glandular and gland-tipped trichomes. Corolla white to light purple with darker purple markings, 1.6–2 cm, outside puberulent; tube basally cylindrical and ca. 1 mm wide for 5–8 mm; lip in lower position elliptic, 8–1.2 × 7–8 mm, apex rounded; lip in upper position ca. 10 × 4 mm. Staminal filaments ca. 8 mm. Style 1.4–2 cm, sparsely strigose; stigma 2-lobed. Capsule oblong-ovoid, ca. 1.3 cm, densely puberulent. Seeds blackish brown, ovate in outline, ca. 3 × 3 mm, verrucose. Fl. Nov–Mar, fr. Mar–Jun.

Trailsides slopes, along streams; 100–500 m. Taiwan [Philippines].

3. *Hypoestes triflora* (Forsskål) Roemer & Schultes, Syst. Veg. 1: 141. 1817.

三花枪刀药 san hua qiang dao yao

Justicia triflora Forsskål, Fl. Aegypt.-Arab. 4. 1775; *Diptera riparia* Nees var. *yunnanensis* Handel-Mazzetti.

Herbs to 1 m tall, decumbent, much branched. Stems 4-angled, sulcate, strigose. Petiole 1–3 cm, pubescent; leaf blade ovate, ovate-elliptic, or oblong, (1.3–)3–10 × (1–)2–4 cm, both surfaces sparsely pubescent, secondary veins 4–7 on each side of midvein, base cuneate and decurrent onto petiole, margin minutely crenate to denticulate, apex acuminate. Cymes pedunculate in leaf axils and/or in axils of subleaflike bracts distally or in a terminal cluster, (1–)3(–5)-flowered; outer pair of bracte-

oles elliptic to obovate to oblanceolate, 0.7–1.7 × 0.4–0.6 cm, green toward apex, abaxially pilose, base cuneate, apex rounded to acute; inner pair of bracteoles linear-lanceolate to oblanceolate, smaller, basally connate, apex acute. Calyx ca. 6 mm, 5-lobed almost to base; lobes linear-lanceolate, ca. 5 mm. Corolla white to pink with maroon markings, ca. 1.5 cm, outside pubescent; tube basally cylindrical and ca. 1 mm wide for ca. 1 cm; lip in lower position lanceolate, ca. 5 × 1.5 mm, apex slightly 2-lobed; lip in upper position oblong, ca. 5 × 3 mm. Ovary pubescent; style ca. 1.4 cm, glabrous; stigma unequally 2-lobed. Capsule ca. 9 mm, pubescent (at least distally). Seeds black, ovate in outline, ca. 2 × 2 mm, verrucose. Fl. Jul–Sep, fr. Sep–Jan. $2n = 30$.

Trailsides, forests; 300–2400 m. Yunnan [Bhutan, India, Myanmar, Nepal; Africa].

29. *BARLERIA* Linnaeus, Sp. Pl. 2: 636. 1753.

假杜鹃属 jia du juan shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs, subshrubs, or perennial herbs, with cystoliths, usually spiny. Leaves opposite, petiolate. Inflorescences axillary cymes (sometimes secund or reduced to dense clusters), terminal spikes, or flowers solitary; bracts present or absent; bracteoles 2, sometimes becoming spinose. Calyx deeply 4-lobed; outer 2 lobes larger [anterior lobe sometimes 2-cleft]; inner 2 lobes smaller. Corolla funnel-shaped, usually large; limb 5-lobed (usually with upper lip appearing 4-lobed); lobes subequal, quincuncial in bud. Stamens [2 or]4 and didynamous, one pair usually greatly reduced and/or sterile; anthers 2-theous; thecae ± equal in size, equally inserted, lacking basal appendages; staminodes 1 or 3, sometimes bearing very small anthers. Ovary with 2 ovules per locule; stigma 2-cleft or entire. Capsule substipitate or lacking a distinct basal stalk, subellipsoid to ovoid, 2–4-seeded; retinacula present. Seeds discoid, pubescent with appressed hygroscopic trichomes.

About 80–120 species: tropical regions of Africa and Asia, one species in tropical America; four species (one endemic) in China.

Barleria procumbens Loureiro (Fl. Cochinch. 2: 377. 1790) is not treated here because no material was available for study. *Barleria lupulina* Lindley is cultivated only in China and not treated here.

1a. Margin of calyx lobes (at least outer lobes) serrate or spiny.

2a. Flowers in dense, shortly pedunculate cymes from leaf axils; bracteoles linear to linear-lanceolate,

2.4–6.5 cm 1. *B. cristata*

2b. Flowers in axillary and terminal dense spikes; bracteoles elliptic, ca. 1.2 cm 3. *B. strigosa*

1b. Margin of calyx lobes entire (apex spine-tipped in *B. prionitis*).

3a. Plants with spines in at least some leaf axils; calyx lobes apically spinose; corolla yellowish to orange 2. *B. prionitis*

3b. Plants without spines; calyx lobes not apically spinose; corolla not yellowish to orange.

4a. Flowers in dense spikes; calyx purple; narrow basal portion of corolla tube ca. 3 × as long as throat;

bracteoles ca. 1/2 as long as calyx; seeds 4 per capsule 3. *B. strigosa*

4b. Flowers solitary in leaf axils; calyx green; narrow basal portion of corolla tube shorter than throat;

bracteoles equaling or longer than calyx; seeds 2 per capsule 4. *B. integrisepala*

1. *Barleria cristata* Linnaeus, Sp. Pl. 2: 636. 1753.

假杜鹃 jia du juan

Barleria cavaleriei H. Léveillé; *B. ciliata* Roxburgh; *B. cristata* var. *mairei* H. Léveillé; *B. dichotoma* Roxburgh; *B. laciniata* Nees; *B. napalensis* Nees.

Subshrubs to 2 m tall. Stems terete, branched, covered with soft trichomes. Petiole (0–)0.3–1 cm; leaf blade elliptic to oblong to ovate, 2–10 × 1–4 cm, both surfaces villous especially along veins, secondary veins 4–7 on each side of midvein, base cuneate and decurrent onto petiole, apex acute to sometimes acuminate. Inflorescences axillary short and dense cymes, shortly pedunculate; bracts absent; bracteoles variable,

linear to linear-lanceolate, 2.4–6.5 × 0.5–1.5 cm, 3–7-veined, base cuneate, margin usually spiny but sometimes bristly pilose and becoming spinescent with age, apex acuminate. Outer calyx lobes ovate to narrowly elliptic to lanceolate, 1.2–2.5 × 0.5–1.3 cm, pilose, reticulately veined, margin spiny, apex mucronate; inner calyx lobes linear to lanceolate, 6–12 mm, 1-veined, margin scarious. Corolla purplish blue, 4.5–6.5 cm, outside pilose; tube basally narrowly cylindrical then gradually widened; lobes oblong-elliptic, ca. 1.5 cm, equal. Stamens 4, didynamous; filaments pilose especially toward base; staminode 1, filament sparsely pilose. Ovary oblong-ellipsoid, glabrous; style linear, ca. 2.5 cm, glabrous; stigma slightly inflated. Capsule 1.2–1.8 cm, glabrous, 4-seeded. Seeds subglobose to ovoid, 4–5 × ca. 4 mm. Fl. May, Aug–Dec, fr. May, Oct. $2n = 40$.

Roadsides, slopes, along streams, in xeric vegetation; below 100–2600 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, ?Xizang, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam].

Barleria cristata is a medicinal and ornamental plant.

2. *Barleria prionitis* Linnaeus, Sp. Pl. 2: 636. 1753.

黄花假杜鹃 huang hua jia du juan

Shrubs to 1.8 m tall with spines in lower leaf axils, branched. Stems and branches terete, smooth, lenticellate, glabrous. Petiole 1–2.5 cm; leaf blade elliptic to ovate, 4–10.5 × 1.8–5.5 cm, both surfaces pubescent when young but soon glabrescent, sparsely strigose along midvein, base attenuate and decurrent onto petiole, margin entire, apex acute. Flowers clustered in axils of upper leaves and/or bracts; bracts linear-oblong, 1.2–2.2 × 0.2–0.8 cm, margin ciliate, apex abruptly acuminate; bracteoles linear-lanceolate, to 1.4 × 0.2 cm, spine-tipped. Outer calyx lobes ovate-oblong, ca. 1.5 × 0.4 cm, apex mucronate; inner calyx lobes linear-lanceolate, ca. 1.3 × 0.2 cm, apex mucronate. Corolla yellow to orange, 2.4–4 cm, outside pilose; tube with narrow basal portion slightly shorter than throat; lobes ovate-oblong to orbicular, 8–10 × 6–7 mm, recurved. Stamens 4, longer pair ca. 1.1 cm with anthers ca. 3.2 mm, shorter pair ca. 1.5 mm with anthers ca. 1 mm. Ovary ovoid; stigma slightly enlarged, 2-cleft, exserted. Capsule ovoid, ca. 1.8 cm, contracted gradually at tip forming a beak, 2-seeded. Seeds ovate in outline, ca. 7 × 5 mm. Fl. Oct–Dec, fr. Dec–Feb. $2n = 40$.

Roadsides, thickets, dry places in evergreen broad-leaved forests; ca. 600 m. Yunnan [India, Laos, Myanmar, Sri Lanka, Thailand, Vietnam; Africa, Madagascar].

This species is used medicinally.

The distribution of *Barleria prionitis* is commonly given as throughout tropical Africa and Asia, where it is often introduced; its native distribution is not known with certainty.

3. *Barleria strigosa* Willdenow, Sp. Pl. 3: 379. 1800.

紫萼假杜鹃 zi e jia du juan

Barleria purpureosepala H. P. Tsui.

Subshrubs to 80 cm tall, branched. Stems subterete, coarsely fulvous strigose. Petiole 0.7–2.5 cm, brownish yel-

lowish strigose; leaf blade elliptic to ovate, 5.5–15 × 2.2–5.5 cm, both surfaces fulvous strigose especially along veins, secondary veins ca. 7 on each side of midvein, base cuneate and decurrent onto petiole, apex acute. Flowers in axillary and terminal dense spikes to 5 cm; bracts oblong to elliptic-oblong, abaxially shortly strigose along veins, apex sharply acute; bracteoles elliptic, ca. 1.2 cm, 1-veined, margin ciliate, apex acute. Outer calyx lobes purple, ovate, ca. 3.2 × 1.8 cm, base rounded, margin subentire to dentate, apex acute; inner calyx lobes yellowish brown, lanceolate, ca. 1.5 × 0.2 cm, both surfaces strigose, apex acute. Corolla purplish red, 5–6 cm; tube basally cylindrical for ca. 3.7 cm, throat ca. 1.2 cm; lobes obovate-oblong, ca. 2 × 1–1.5 cm, subequal. Stamens 4; filaments basally pilose, longer pair ca. 1.3 cm with anthers ca. 5 mm, shorter pair ca. 3 mm with anthers ca. 1.5 mm; staminode 1. Ovary ovoid, ca. 3 mm; style ca. 2.5 cm. Capsule ellipsoid, 1.4–1.8 × ca. 0.5 cm, glabrous, shining, 4-seeded. Fl. Nov, fr. Feb. $2n = 40$.

Dense forests; ca. 900 m. Yunnan [Bhutan, Cambodia, India, Indonesia, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

4. *Barleria integrisejala* H. P. Tsui, Acta Bot. Yunnan. 12: 269. 1990.

全缘萼假杜鹃 quan yuan e jia du juan

Shrubs to 1 m tall, evergreen. Stems sparsely lenticellate, strigose, soon glabrescent. Leaves clustered at shoot apices; petiole 3–5 cm, strigose; leaf blade ovate, narrowly ovate, or lanceolate, 3–4.5 × 0.7–1.8 cm, both surfaces pilose and strigose along veins, secondary veins 4–6 on each side of midvein, base cuneate and decurrent onto petiole, apex acute. Flowers axillary, solitary; bracteoles linear, ca. 14 × 1 mm, sparsely pilose. Pedicel short. Outer calyx lobes elliptic, ca. 1.3 × 0.7 cm, outside sparsely strigose, inside pilose, base cuneate, margin ciliate, apex acute; inner calyx lobes lanceolate, ca. 5 × 1 mm, margin ciliate, apex acuminate. Corolla bluish purple, funnel-shaped, ca. 3.5 cm; tube basally cylindrical for ca. 7 mm, throat ca. 1.5 cm; lobes suborbicular, ca. 1.4 × 1.4 cm, subequal. Stamens 4; filaments basally pilose, longer pair ca. 1.7 cm with anthers ca. 4 mm, shorter pair ca. 4 mm with anthers ca. 1.5 mm; staminode 1, filament ca. 4 mm. Ovary subellipsoid, ca. 4 mm, glabrous; stigma enlarged. Capsule ellipsoid, ca. 1.7 cm, contracted at tip forming a beak, 4-seeded. Seeds ovate in outline, ca. 5 × 5 mm. Fl. Aug–Sep, fr. Nov–Dec.

• Thickets along streams; 1900–2000 m. Sichuan (Muli).

30. LEPIDAGATHIS Willdenow, Sp. Pl. 3: 400. 1800.

鳞花草属 lin hua cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs [or shrubs], perennial, with cystoliths, often anisophyllous. Leaves opposite; leaf blade margin entire or crenate-serrate. Inflorescences dense spikes or cymes condensed into globose heads, sometimes clustered; bracts and bracteoles present. Calyx 5-lobed; lobes heteromorphic; posterior lobe usually largest; lateral 2 lobes smallest; anterior 2 lobes usually connate to a greater degree than other lobes. Corolla small; tube usually expanded into a distinct throat near middle; limb 2-lipped; lower lip 3-lobed, patent, usually spotted, lobes subequal or middle one slightly larger; upper lip erect or slightly patent, entire to 2-lobed; lobes quincuncial in bud. Stamens 4, didynamous [or with one pair reduced or absent], usually included in corolla tube; filaments short; anthers 2-theous [or with one pair of anthers sometimes 1-theous]; thecae oblong, parallel or one lower and somewhat divergent,

base mucous or spurred. Ovary with 2 ovules per locule; stigma subcapitate, entire or slightly 2-cleft. Capsule subellipsoid to oblong to linear-conical, lacking a stalk, to 4-seeded; retinacula present. Seeds discoid, pubescent with hygroscopic trichomes.

About 100 species: tropical to subtropical regions worldwide (mostly paleotropical); seven species (three endemic) in China.

- 1a. Inflorescences globose or ovoid heads to 1 cm; leaves sessile to subsessile; leaf blade usually less than 2 cm, base truncate to subcordate 6. *L. secunda*
- 1b. Inflorescences ± elongate and secund spikes to 5.5 cm; leaves usually petiolate; leaf blade to 14.5 cm, base cuneate to attenuate and usually decurrent onto petiole (in *L. inaequalis* abruptly truncate to rounded and decurrent onto petiole).
- 2a. Leaf blade linear to linear-lanceolate, (4.6–)6.5–16 × as long as wide 7. *L. stenophylla*
- 2b. Leaf blade ovate to elliptic to subcircular to obovate, 1.6–4.5(–5.6) × as long as wide (in *L. fasciculata*, sometimes only distalmost 1 or 2 nodes with leaf blade linear to linear-lanceolate and 6–9.5 × as long as wide and others ovate to elliptic and 1.7–3 × as long as wide).
- 3a. Anterior calyx lobes connate at base for 10%–25% of their length; bracts (1 or 3)(or 5)-veined.
- 4a. Corolla pinkish; bracts broadly ovate to ovate-oblong, 2.5–4.4 mm wide; posterior calyx lobe 3-veined; distinct segments of anterior calyx lobe oblanceolate to linear, 6–6.5 mm; capsule 4.5–5 mm, pubescent distally 1. *L. fasciculata*
- 4b. Corolla white; bracts narrowly lanceolate, 1–1.5 mm wide; posterior calyx lobe 5-veined; distinct segments of anterior calyx lobe narrowly lanceolate, 9–10 mm; capsule 6–6.5 mm, pubescent throughout 3. *L. hainanensis*
- 3b. Anterior calyx lobes connate at base for 30%–60% of their length; bracts 1(or 3)-veined.
- 5a. Leaf blade 1–4(–6) cm, 1.6–2 × as long as wide, base abruptly rounded to truncate and decurrent onto petiole; plants decumbent, not conspicuously woody at base 4. *L. inaequalis*
- 5b. Leaf blade to 14.5 cm, usually more than 2 × as long as wide, base cuneate to long attenuate and decurrent onto petiole; plants not decumbent, conspicuously woody at base.
- 6a. Calyx 5–6 mm 2. *L. formosensis*
- 6b. Calyx 8–10 mm 5. *L. incurva*

1. *Lepidagathis fasciculata* (Retzius) Nees in Wallich, Pl. Asiat. Rar. 3: 95. 1832.

齿叶鳞花草 chi ye lin hua cao

Ruellia fasciculata Retzius, Observ. Bot. 4: 28. 1786.

Herbs to 40 cm tall, erect to spreading, isophyllous to anisophyllous. Stems 4-angled to 4-angled and sulcate, pubescent or glabrate. Petiole 1.5–3.5 cm; leaf blade ovate to elliptic (distalmost 1 or 2 nodes with leaves sometimes linear to linear-lanceolate), 1.3–12.5 × 0.7–5(–7) cm, 1.7–3 (6–9.5 in distalmost linear leaves when present) × as long as wide, both surfaces pubescent but trichomes sometimes sparse or restricted to midvein, secondary veins 4 or 8 or more on each side of midvein, base attenuate and decurrent onto petiole, margin entire to crenate-serrate, apex acuminate. Spikes elongate, 2–4 cm; bracts broadly ovate to ovate-oblong, 7–10 × 2.5–4.4 mm, abaxially pubescent, 1- or 3-veined, veins prominent, margin ciliate with gland-tipped and non-glandular trichomes, apex aristate; bracteoles ovate-elliptic, abaxially pubescent, margin ciliate with glandular and non-glandular trichomes. Calyx ca. 8 mm, pubescent with gland-tipped and non-glandular trichomes; posterior lobe narrowly elliptic to oblong-lanceolate, ca. 8 × 1.5–1.7 mm, 3-veined; lateral lobes lanceolate, ca. 6.5 mm; anterior lobes connate at base for 17%–25% of their length, distinct segments oblanceolate to linear and 6–6.5 mm. Corolla pinkish, 0.8–1.5 cm, outside pubescent; lower lip 2.5–4 mm, lobes ca. 1 × 0.7–1 mm. Capsule 4.5–5 mm, distally pubescent. Seeds subcircular in outline, 0.8–1.2 mm in diam. Fl. Nov–Mar, fr. Jan–May, 2n = 20.

Thickets, roadsides, streamsides. Hainan, Yunnan [Bangladesh, Laos, Malaysia, Myanmar, N Thailand].

2. *Lepidagathis formosensis* C. B. Clarke ex Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 213. 1911.

台湾鳞花草 tai wan lin hua cao

Herbs to 45(–90) cm tall, suffruticose, erect, isophyllous to conspicuously anisophyllous. Stems 4-angled to 4-angled and sulcate, glabrous or slightly pubescent. Petiole 0.5–2 cm; leaf blade ovate to narrowly elliptic to broadly elliptic to obovate, 2.5–14.5 × (0.8–)1–6 cm, 2–3.8(–5.6) × as long as wide, abaxially sparsely pubescent along veins, adaxially glabrous, secondary veins 4–7 on each side of midvein, base long attenuate and decurrent onto petiole, margin entire to sinuate, apex acuminate. Spikes elongate, 1–5.5 cm, secund; bracts ovate to lanceolate, 3.5–5 × 1–2 mm, 1(or 3)-veined, abaxially and marginally pubescent with non-glandular and sometimes gland-tipped trichomes, apex aristate; bracteoles similar to bracts or narrower. Calyx 5–6 mm, pubescent with non-glandular and sometimes gland-tipped trichomes; posterior lobe ovate to oblong-lanceolate, 5–5.9 × 1.2–1.8 mm, 3-veined; lateral lobes lanceolate to oblong-lanceolate, 4.5–5.8 × 0.7–0.9 mm; anterior lobes connate at base for 50%–60% of their length, distinct segments lanceolate-subulate and 2.5–3 mm. Corolla white with purple markings on limb, 6.5–9 mm, outside pubescent; lower lip 2.3–3.1 mm, lobes 1–2 × 1–2 mm. Capsule 5–7 mm, distally pubescent. Seeds subcircular to broadly ovate in outline, 1.3–1.8 mm in diam. Fl. Sep–May, fr. Jan–Apr.

• Secondary evergreen broad-leaved forests, along streams, ditches, slopes; 100–2300 m. Guangdong, Taiwan.

Lepidagathis formosensis is similar to *L. incurva*, if it is indeed distinct. On most plants from Taiwan the bracts and calyx are pubescent with only non-glandular trichomes. On some, however (e.g., *B. Bar-*

tholomew & D. E. Boufford 6193 at CAS), conspicuous gland-tipped trichomes are present on these structures. In other respects, such plants agree with non-glandular specimens of *L. formosensis*.

3. *Lepidagathis hainanensis* H. S. Lo, Fl. Hainan. 3: 598. 1974.

海南鳞花草 hai nan lin hua cao

Herbs to 30 cm tall, erect, anisophyllous. Stems 4-angled, subglabrous to slightly pubescent. Petiole (0–)0.5–1.5 cm; leaf blade ovate to elliptic, 1–12 × 0.5–3.5 cm, 1.8–3.5 × as long as wide, abaxial surface sparsely and inconspicuously puberulent especially along midvein, adaxial surface glabrous, secondary veins 4–6 on each side of midvein, base narrowly cuneate and decurrent onto petiole, margin entire to irregularly subsinuate, apex obtuse to rounded to acute. Spikes elongate, 2–6 cm, secund; bracts narrowly lanceolate, 8–10 × 1–1.5 mm, abaxially and marginally pubescent with gland-tipped and non-glandular trichomes, 3(or 5)-veined, apex aristate; bracteoles similar to bracts. Calyx 0.9–1.2 cm, pubescent with gland-tipped and non-glandular trichomes; posterior lobe lanceolate, 8.5–11 × 1.5–2 mm, 5-veined; lateral lobes lanceolate-subulate, ca. 7 × 1 mm; anterior lobes connate at base for ca. 10% of their length, distinct segments narrowly lanceolate and 9–10 mm. Corolla white, 9–10 mm, outside pubescent; lower lip not seen. Capsule 6–6.5 mm, pubescent throughout. Seeds not seen. Fl. Feb–Apr, fr. Feb–Apr.

• Forests. Guangxi, Hainan.

4. *Lepidagathis inaequalis* C. B. Clarke ex Elmer, Leaflet. Philipp. Bot. 5: 1695. 1913.

卵叶鳞花草 luan ye lin hua cao

Herbs 10–20 cm tall, decumbent, not conspicuously woody, isophyllous. Stems 4-angled, sulcate, glabrous or 2-fariously pubescent. Petiole 3–15 mm; leaf blade broadly ovate to subcircular, 1–4(–6) × 0.65–2.5(–3) cm, 1.6–2 × as long as wide, sparsely pubescent especially along midvein, secondary veins 3–5 on each side of midvein, base abruptly rounded to truncate and decurrent onto petiole, margin entire or shallowly sinuate, apex acute to acuminate. Spikes elongate, 1.2–2 cm, secund; bracts lanceolate, 3–5 × 1–1.4 mm, abaxially and marginally pubescent with gland-tipped trichomes (glands sometimes restricted to distal portion of margin), 1(or 3)-veined, apex aristate; bracteoles similar to bracts or smaller. Calyx ca. 6 mm, pubescent with gland-tipped and non-glandular trichomes; posterior lobe oblong-lanceolate, ca. 6.2 × 1.1 mm, 3-veined; lateral lobes lanceolate, ca. 5.8 × 0.7 mm; anterior lobes connate at base for ca. 50% of their length, distinct segments lanceolate and ca. 3.2 mm. Corolla white, ca. 8 mm, outside pubescent; lower lip ca. 3 mm, lobes ca. 2 × 2 mm. Capsule ca. 5 mm, distally pubescent. Seeds not seen. Fl. and fr. Sep.

Evergreen broad-leaved forests, shaded roadsides; below 100 m. Taiwan [Japan, Philippines].

Corollas of *Lepidagathis inaequalis* have been reported as 4–5 mm and glabrous outside (e.g., C. F. Hsieh & T. C. Huang, Fl. Taiwan, ed. 2, 4: 671. 1998). Those of *Kao 704* (CAS) are ca. 8 mm and pubescent outside.

Lepidagathis inaequalis is similar to *L. formosensis*, if they are indeed distinct. Some plants from Taiwan with glandular bracts and calyces (e.g., *Hsieh 787* at CAS) appear somewhat intermediate between them in leaf shape. Plants treated as *L. inaequalis* have glandular bracts and calyces, decumbent stems, and usually smaller leaf blades that are broadly ovate to subcircular and abruptly constricted basally (truncate to rounded). In *L. formosensis*, bracts and calyces are often non-glandular, stems are erect, and leaf blades are usually larger, ovate to elliptic to obovate, and gradually attenuate-tapered at the base. Among the limited specimens studied, those of *L. inaequalis* are isophyllous, whereas most of those of *L. formosensis* are anisophyllous.

5. *Lepidagathis incurva* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 119. 1825.

鳞花草 lin hua cao

Lepidagathis hyalina Nees.

Herbs 30–100 cm tall, base often conspicuously woody, often ± anisophyllous. Stems 4-angled, sulcate, pubescent or soon glabrescent. Petiole 0.5–3.5 cm; leaf blade ovate to elliptic to narrowly elliptic, 2.5–11 × 1–4.5 cm, 1.7–4.5 × as long as wide, both surfaces pubescent but soon glabrescent with few trichomes or sparsely pubescent along veins, secondary veins (4–)7–9 on each side of midvein, base cuneate and conspicuously decurrent onto petiole, margin entire and slightly sinuate, apex acute to shortly acuminate. Spikes elongate, (0.5–)1–3.8 cm, secund; bracts oblong-lanceolate, 6–10 × 1.5–2 mm, abaxially and marginally pubescent with gland-tipped (sometimes absent) and non-glandular trichomes, 1-veined, apex long acuminate; bracteoles similar to bracts except usually smaller. Calyx 8–10 mm, pubescent with gland-tipped (sometimes absent) and non-glandular trichomes or glabrescent; posterior lobe oblong-lanceolate, 8–9 × 1.5–1.7 mm, 3-veined; lateral lobes lanceolate, 6–7.5 × 0.7–0.8 mm; anterior lobes connate at base for 30%–55% of their length, distinct segments lanceolate and 4.8–6 mm. Corolla white streaked with purple, 8–10 mm, outside sparsely pubescent; lower lip 2.5–3 mm, lobes 1.5–3 × 1.3–1.8 mm. Stamens not seen. Ovary not seen; style not seen; stigma not seen. Capsule 5–6 mm, distally pubescent. Seeds subcircular in outline, 1.5–1.8 mm in diam. Fl. and fr. Oct–Mar. *2n* = 20, 44, 84.

Grasslands, thickets, roadsides, hedgerows, streamsides; 100–2200 m. Guangdong, Guangxi, Hainan, Yunnan [Bangladesh, India, Myanmar, Thailand, Vietnam].

This species is used medicinally.

6. *Lepidagathis secunda* Nees in A. Candolle, Prodr. 11: 259. 1847.

小琉球鳞花草 xiao liu qiu lin hua cao

Ruellia secunda Blanco, Fl. Filip. 495. 1837, not Vahl (1794).

Herbs to 30 cm tall, erect or spreading. Stems 4-angled, subglabrous. Leaves sessile to subsessile; leaf blade ovate to ovate-lanceolate, 1.5–2 × 0.7–1 cm, both surfaces pubescent, base truncate to subcordate, margin entire, apex acute to shortly acuminate. Spikes globose to ovoid, to 1 cm; bracts oblong-lanceolate. Corolla to 6 mm, outside pubescent. Stamens included

in corolla tube; thecae ca. 1 mm, pilose at tip. Ovary oblong; style sparingly hirsute. Capsule ca. 4 mm. Seeds subcircular in outline.

Taiwan [Philippines].

No specimens of *Lepidagathis secunda* have been seen, and published descriptions are inadequate to evaluate the status of either this species or its occurrence in Taiwan. Information above is based entirely on that provided by C. F. Hsieh and T. C. Huang (Fl. Taiwan, ed. 2, 4: 673. 1998).

7. *Lepidagathis stenophylla* C. B. Clarke ex Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 214. 1911.

柳叶鳞花草 liu ye lin hua cao

Herbs to 40 cm tall, suffrutescent, often \pm anisophyllous. Stems 4-angled to 4-angled and sulcate, subglabrous or evenly to \pm bifariously pubescent. Petiole (1–)5–12 mm; leaf blade

linear to linear-lanceolate, 3.5–11 \times 0.3–1.9 cm, (4.6–)6.5–16 \times as long as wide, both surfaces subglabrous or pubescent, secondary veins 4 or 5 on each side of midvein, base narrowed and decurrent onto petiole, margin shallowly sinuate, apex acute to acuminate. Spikes elongate, 1.3–3.8 cm, secund; bracts lanceolate to lanceolate-ovate, ca. 5 \times 1–1.5 mm, abaxially and marginally pubescent with non-glandular trichomes, 1-veined, apex aristate; bracteoles similar to bracts except usually smaller and narrower. Calyx 5.5–8.2 mm, pubescent with non-glandular trichomes; posterior lobe ovate to oblong-lanceolate, 5–7.5 \times 1.1–1.3 mm, 3-veined; lateral lobes lanceolate, 4.5–5.7 \times 0.7–0.8 mm; anterior lobes connate at base for 20%–55% of their length, distinct segments narrowly lanceolate and 3–6 mm. Corolla white, ca. 5 mm, outside pubescent; lower lip 2–2.3 mm, lobes 1.5–1.6 \times 0.6–0.8 mm. Capsule 4.5–5.5 mm, pubescent \pm throughout or only distally. Seeds subcircular in outline, 1–1.8 mm in diam. Fl. and fr. Dec.

• Forest trails; 200–400 m. Hong Kong, Taiwan.

31. **CHROESTHES** Benoist, Bull. Mus. Natl. Hist. Nat. 33: 107. 1927.

色萼花属 se e hua shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs, subsisophyllous or anisophyllous. Leaves opposite, petiolate; leaf blade margin entire. Inflorescences terminal thyrses; bracts and bracteoles greenish. Calyx unequally 5-lobed; posterior lobe largest, 2 lateral lobes smaller than 2 anterior lobes. Corolla tube basally cylindrical and expanded distally into a throat; limb 2-lipped, lower lip 3-lobed, upper lip 2-lobed; lobes quincuncial in bud. Stamens 4, not connate, posterior pair shorter than anterior pair, inserted at base of throat; anthers 2-theous; thecae parallel, inserted at different heights, dorsally pubescent, base spurred. Ovary with 2 ovules per locule; style basally sparsely pubescent. Capsule stipe absent or barely present; retinacula present. Seeds compressed, brownish pubescent.

Three species: China, Laos, Malaysia, Myanmar, Thailand, Vietnam; one species in China.

1. *Chroesthes lanceolata* (T. Anderson) B. Hansen, Nordic J. Bot. 3: 209. 1983.

色萼花 se e hua

Asystasia lanceolata T. Anderson, J. Linn. Soc., Bot. 9: 524. 1867; *A. kerrii* Craib; *A. silvicola* W. W. Smith; *Chroesthes pubiflora* Benoist; *C. racemiflora* Bremekamp; *C. racemiflora* var. *glabrior* Bremekamp; *C. silvicola* (W. W. Smith) E. Hossain.

Shrubs 0.5–3 m tall, anisophyllous. Stems terete, slender, rarely branched, glabrous. Petiole 1–2.5 cm; leaf blade elliptic to oblanceolate to lanceolate, 10–16 \times 3–7 cm, both surfaces glabrous, secondary veins 6–9 on each side of midvein, base cuneate, margin entire or subsinuate, apex acuminate. Thyrses 3–7 cm; cymes sessile, 1–3-flowered; bracts elliptic to broadly

lanceolate, 3–9 \times 1–3 mm, gland-tipped pubescent, apex acute; bracteoles narrowly elliptic to broadly lanceolate, 4–9 \times 0.7–1.2 mm. Pedicel 1–5 mm. Calyx 1–1.6 cm, outside gland-tipped pubescent; posterior lobe lanceolate, ovate, or subelliptic; lateral lobes linear-lanceolate; anterior lobes connate to 2/3 their length. Corolla white with pink or purple spots, ca. 2.5 cm, outside pubescent; tube basal portion ca. 9 mm, throat ca. 1.5 cm; lower lip 3-lobed; upper lip 2-lobed. Stamens included in throat; filaments 1–1.2 cm, glabrous; anther thecae 2.1–2.3 mm, pubescent at apex and along sides, basal spur pointed. Ovary apex pubescent; style ca. 2.5 cm. Capsule subellipsoid to obovoid, 1.2–1.6 cm, glabrous or only at apex pubescent, 4-seeded. Seeds subcircular in outline. Fl. Feb–Mar, fr. May–Jul.

Forests; (200–)800–1400 m. Guangxi, S Yunnan [Laos, Myanmar, Thailand, Vietnam].

32. **GYMNOSTACHYUM** Nees in Wallich, Pl. Asiat. Rar. 3: 76, 106. 1832.

裸柱草属 luo zhu cao shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Cryptophragmium Nees; *Sarcanthera* Rafinesque.

Herbs, perennial [or shrubs], with cystoliths. Leaves cauline or subradical, opposite; leaf blade margin usually entire. Inflorescences axillary or terminal, spikes, racemes, or panicles, often secund; bracts and bracteoles shorter than calyx. Calyx 5-lobed nearly to base; lobes subequal. Corolla tube longer than limb, basal portion narrowly cylindrical, \pm expanded distally into a throat; limb 2-lipped, lower lip 3-lobed, upper lip emarginate to 2-lobed; lobes ascending cochlear in bud. Stamens 2, included in or slightly

exserted from corolla tube; anther thecae 2, equal or subequal in size, parallel, one or both mucronate at base; staminodes absent. Ovary with 3 to many ovules per locule; stigma 2-lobed, lobes compressed. Capsule without a stipe, linear, 4-angled, many seeded; retinacula present. Seeds compressed, covered with hygroscopic trichomes.

About 30 species: tropical Asia; three species (two endemic) in China.

- 1a. Stems very short; leaves in a basal rosette 1. *G. subrosulatum*
 1b. Stems elongate; leaves cauline.
 2a. Inflorescences axillary 2. *G. listeri*
 2b. Inflorescences terminal 3. *G. sinense*

1. *Gymnostachyum subrosulatum* H. S. Lo, Acta Phytotax. Sin. 17(4): 86. 1979.

矮裸柱草 ai luo zhu cao

Gymnostachyum kwangsiense H. S. Lo.

Herbs 20–40 cm tall. Stems short, hirsute. Leaves in a basal rosette; petiole 2–9(–14) cm; leaf blade suborbicular to broadly ovate, 5–16 × 3.5–11 cm, papery, abaxially subglabrous but midvein and secondary veins hirsute, adaxially slightly scabrous, secondary veins 7–9 on each side of midvein, base slightly cordate to rounded, margin entire or slightly sinuate, apex rounded to acute. Thyrses 10–35 cm, with 1–4 flowers per cyme; peduncle 8–19 cm; bracts subulate, ca. 2.5 mm, pilose, apex acute; bracteoles similar to bracts. Calyx 2.5–3 mm; lobes subulate, pilose. Corolla ca. 1.5 cm; lower lip patent, 3-lobed, lobes oblong-ovate and ca. 3 × 2 mm; upper lip triangular, ca. 5 mm, erect, 2-dentate. Stamens exserted; filaments 7–8 mm; anther thecae linear, parallel. Ovary 2-locular, with 4 ovules per locule; style 1.3–1.9 cm. Capsule linear, 1.3–1.6 cm, 8-seeded. Seeds ovate in outline, ca. 1 × 0.8 mm. Fl. Apr–May, fr. Jun–Sep.

• Limestone hills; 200–600 m. Guangxi.

2. *Gymnostachyum listeri* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69: 171. 1900.

云南裸柱草 yun nan luo zhu cao

Cryptophragmium tonkinense Benoist; *Parajusticia petelotii* Benoist.

Herbs to 50 cm tall, caulescent, isophyllous. Stems branched, 4-angled, pubescent. Leaves cauline; petiole 5–12 mm, pubescent; leaf blade elliptic to obovate-elliptic, (4.5–)6–13(–17) × 2.1–5.5 cm, abaxially white pubescent, adaxially glabrous except for trichomes along midvein, secondary veins 11–14 on each side of midvein and abaxially prominently curved, tertiary veins inconspicuous, base asymmetric or symmetric and ± decurrent onto petiole, margin entire or obscurely sinuate, apex acute to acuminate. Spikes 2–6 cm, secund; peduncle 0.5–

1.5 cm; rachis pubescent and gland-tipped pilose; bracts linear, ca. 3 × 0.3 mm, pubescent; bracteoles linear-triangular, ca. 1.5 × 0.5 mm, pubescent. Calyx 0.1–1.1 cm; lobes linear, 8–10 × ca. 0.5 mm, outside pubescent, inside glabrous, margin gland-tipped pilose. Corolla purple, 1.6–2 cm, pubescent; tube basally cylindric and ca. 2.5 cm wide for ca. 8 mm, throat abruptly bending and widening to 5 mm; lower lip 4–5 mm, 3-lobed, lobes oblong and ca. 3 × 1.5 mm; upper lip 3–4 mm, 2-lobed, lobes broadly ovate and ca. 2 × 2 mm. Staminal filaments ca. 4 mm, glabrous; anther thecae oblong, ca. 5 × 1 mm, pilose, spurred at base. Ovary ca. 3 × 1 mm, glabrous; style ca. 1.5 cm, villous. Capsule not seen. Fl. Apr–May.

Limestone hills; 200–600 m. Guangxi, Yunnan [Bangladesh, Vietnam].

3. *Gymnostachyum sinense* (H. S. Lo) H. Chu, Bull. Bot. Res., Harbin 11(1): 48. 1991.

华裸柱草 hua luo zhu cao

Andrographis sinensis H. S. Lo, Bull. Bot. Res., Harbin 11(4): 103. 1981.

Herbs to 1 m tall. Stems purplish black, terete, glabrous; young shoots 4-angled, pubescent at nodes. Petiole 2–4 mm; leaf blade ovate to broadly ovate, 1.5–4 × 1–1.8 cm, thickly paper, both surfaces glabrous, secondary veins ca. 6 on each side of midvein, base cuneate, margin entire or subentire, apex acute to sometimes caudate. Spikes terminal, few flowered; peduncle ca. 1 cm, subglabrous; bracts linear to linear-lanceolate, 1.5–2 mm; bracteoles similar to bracts. Calyx ca. 7 mm, glabrous; lobes lanceolate-linear, apex acuminate. Corolla white, ca. 1 cm; lower lip ca. 4 mm, 3-lobed, lobes ovate and ca. 0.5 × 0.5 mm; upper lip subtriangular, ca. 3.5 mm, 2-lobed. Staminal filaments ca. 2.5 mm, glabrous; anther thecae linear, ca. 3 mm, spurred at base. Ovary ellipsoid, ca. 3 mm, glabrous, ovules 5 or 6 per locule; style ca. 7 mm. Capsule narrowly cylindric, 1–1.5 cm, glabrous. Seeds subglobose, ca. 1 × 1 mm, pubescent. Fl. Aug.

• Limestone hills. Guangxi.

33. **ANDROGRAPHIS** Wallich ex Nees in Wallich, Pl. Asiat. Rar. 3: 77, 116. 1832.

穿心莲属 chuan xin lian shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Haplanthoides H. W. Li; *Haplanthus* Nees.

Herbs or subshrubs, with cystoliths. Leaf blade margin entire. Inflorescences terminal or axillary, panicles, racemes, or sometimes spikes or dense clusters; bracts present; bracteoles small [or absent]. Calyx deeply 5-lobed; lobes narrow, equal or subequal. Corolla tubular to funnellform at base; limb 2-lipped; lower lip 3-lobed; upper lip entire or 2-lobed; lobes ascending cochlear in bud.

Stamens 2, exerted from or included in corolla tube; filaments sometimes pubescent; anthers 2-theccous; thecae parallel, equal or subequal, base mucous and conspicuously pubescent. Capsule linear-oblong or ellipsoid, compressed perpendicular to septum, [6–]12–20-seeded; retinacula present. Seeds subglobose, ± blocky, or ± compressed, surfaces smooth or ornamented, lacking trichomes.

About 20 species: tropical and subtropical Asia; two species (one introduced) in China.

- 1a. Leaf blade lanceolate to oblong-lanceolate; corolla deeply and prominently 2-lipped, lips divergent (i.e., upper lip ± perpendicular or oblique to tube and lower lip); stamens exerted from corolla tube 1. *A. paniculata*
 1b. Leaf blade ovate; corolla shallowly and inconspicuously 2-lipped, lips not divergent (i.e., lips ± parallel to one another); stamens included in corolla tube 2. *A. laxiflora*

1. *Andrographis paniculata* (N. L. Burman) Wallich ex Nees in Wallich, Pl. Asiat. Rar. 3: 116. 1832.

穿心莲 chuan xin lian

Justicia paniculata N. L. Burman, Fl. Indica, 9. 1768.

Herbs to 50 cm tall, annual, much branched. Stems 4-angled, glabrous. Petiole 0.3–1 cm; leaf blade ovate-lanceolate, lanceolate, or narrowly elliptic, 1.5–7 × 1–2.5 cm, both surfaces glabrous, abaxially pale green, adaxially green, secondary veins 3–5 on each side of midvein, base attenuate and decurrent onto petiole, margin entire, apex acute to shortly acuminate. Inflorescences terminal, leafy panicles of secund racemes; rachis glabrous to sparsely pubescent; bracts triangular to subulate, 1–1.5 mm; bracteoles linear to subulate, 1–1.5 mm. Pedicel 2–9 mm, sparsely pubescent with gland-tipped and non-glandular trichomes (gland-tipped pubescent). Calyx 2.5–3 mm, outside glabrous or gland-tipped pubescent, lobes subulate. Corolla white, 0.9–1.5 cm, outside gland-tipped pubescent; tube basally funnelform for 4–8 mm; lower lip with purple dots, 5–7 mm, erect, lobes ca. 3 mm; upper lip 5–7 mm, reflexed, 2-lobed, lobes ca. 1 mm. Stamens exerted from corolla tube. Style 6–10 mm, sparsely pilose toward base. Capsule ellipsoid-compressed, 1.5–2 × 0.3–0.4 cm, glabrous or sparsely pubescent with gland-tipped trichomes, ca. 12-seeded. Seeds ca. 2 × 1.5 mm, rugose. Fl. and fr. throughout year. $2n = 50$.

Cultivated or naturalized in Anhui, Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Yunnan, and Zhejiang [native to India and Sri Lanka; cultivated or naturalized in Cambodia, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam, and Caribbean].

This species is used medicinally.

2. *Andrographis laxiflora* (Blume) Lindau in Engler & Prantl, Nat. Pflanzenfam. 4(3b): 323. 1895.

疏花穿心莲 shu hua chuan xin lian

Justicia laxiflora Blume, Bijdr. 789. 1826; *Andrographis glomeruliflora* Bremekamp; *A. laxiflora* var. *glomeruliflora* (Bremekamp) H. Zhu; *A. monglunensis* Hung T. Chang & H. Zhu; *A. tenera* (Nees) Kuntze; *A. tenuiflora* T. Anderson, nom. illeg. superfl.; *Haplanthoides yunnanensis* H. W. Li; *Haplanthus tener* Nees.

Herbs to 50 cm tall, isophyllous or anisophyllous. Stems erect or procumbent, 4-angled, glabrous or pubescent. Petiole 3–10 mm; leaf blade ovate, 1.5–9 × 1.5–3(–5.5) cm, both surfaces glabrous, secondary veins 5 or 6 pairs on each side of midvein, base slightly attenuate and decurrent onto petiole, margin entire, apex acuminate to shortly acuminate. Inflorescences axillary or terminal, racemes or panicles of racemes, these sometimes reduced and flowers appearing as clusters in leaf axils or at ends of long peduncles; rachis glabrous or pubescent (trichomes non-gland-tipped or gland-tipped); bracts linear, subulate, or lanceolate, 1–3 mm, glabrous or pubescent; bracteoles subulate, glabrous or pubescent. Pedicel 0.5–2 mm, glabrous or pubescent. Calyx 2–4 mm, outside glabrous or pubescent, lobes subulate. Corolla white with purplish or pinkish coloration on lips, 0.8–1.2 cm, outside pubescent with gland-tipped trichomes; tube 6–9 mm, base curved, dorsally ± gibbous; lower lip 1.5–4 mm, lobes 0.5–2 mm; upper lip 1.5–4 mm, erect (± parallel to lower lip), entire to 2-lobed. Stamens included in corolla tube. Capsule linear-cylindric, 10–20 × ca. 2 mm, glabrous or pubescent with gland-tipped trichomes, 16–20-seeded. Seeds ca. 1 × 0.7 mm, rugose. Fl. Aug–Nov, fr. Nov–Mar.

Thickets, bamboo forests; 200–1500 m. Guangxi, Guizhou, Hainan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

Specimens misidentified as *Gymnostachyum sanguinolentum* (Vahl) T. Anderson (C. Y. Wu, Index Fl. Yunnan. 2: 1676. 1984; C. C. Hu, FRPS 70: 75. 2002) belong here.

Variation is evident in the pubescence of rachises, pedicels, bracts, bracteoles, and calyces among plants of *Andrographis laxiflora*. These structures may be glabrous, have non-glandular trichomes only, have gland-tipped trichomes only, or have a mixture of gland-tipped and non-glandular trichomes. Capsule may be glabrous or pubescent with gland-tipped trichomes only. Plants with gland-tipped trichomes on the calyces and capsules have been treated as *A. laxiflora* var. *glomeruliflora* (C. C. Hu, FRPS 70: 205. 2002). Because varying degrees of pubescence are evident on calyces and capsules among specimens from within and outside of China, and because these same differences are not taxonomically recognized for plants of *A. paniculata* that show the very same variations, var. *glomeruliflora* is not recognized here (in keeping with B. Hansen, Nordic J. Bot. 5: 353–356. 1985, who did not recognize it as distinct).

34. PHLOGACANTHUS Nees in Wallich, Pl. Asiat. Rar. 3: 76, 99. 1832.

火焰花属 huo yan hua shu

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Herbs, shrubs, or small trees, with cystoliths. Leaves opposite; leaf blade large, margin entire or obscurely crenate. Inflores-

cences in terminal thyrses or axillary cymes, pedunculate; bracts small; bracteoles small or absent. Calyx deeply 5-lobed; lobes equal to unequal. Corolla tubular, slightly curved (arched); limb subequally 5-lobed or 2-lipped; lower lip 3-lobed, lobes ascending cochlear in bud; upper lip 2-cleft. Stamens 2, inserted at middle or basal portion of tube, included or sometimes slightly exerted beyond corolla lip; anthers 2-theous; thecae equal, base divaricate and mucous; staminodes 2, small. Ovary usually glabrous; stigma subentire. Capsule linear, 4-angled, basal portion solid but lacking a conspicuous basal stalk; retinacula present, 8–16-seeded. Seeds lenticular, glabrous or pubescent.

About 15 species: mainland Asia; two species in China.

- 1a. Inflorescences terminal thyrses, 14–18 cm; corolla purplish red, 4.5–5 cm; anthers not extending beyond corolla lips; capsule 3.5–5 cm 1. *P. curviflorus*
 1b. Inflorescences axillary cymes, ca. 4 cm; corolla orange, ca. 1.8 cm; anthers extending beyond corolla lips; capsule 2.5–3 cm 2. *P. pubinervius*

1. *Phlogacanthus curviflorus* (Wallich) Nees in Wallich, Pl. Asiat. Rar. 3: 99. 1832.

火焰花 huó yán huā

Justicia curviflora Wallich, Pl. Asiat. Rar. 2: 9. 1831.

Shrubs 3–6 m tall. Petiole 1.5–5 cm; leaf blade elliptic to oblong, 12–35 × 9–18 cm, abaxially puberulent along veins, adaxially glabrous, secondary veins 12–17 on each side of midvein, base broadly cuneate and decurrent onto petiole, margin entire to subrenate, apex acute to acuminate. Thyrses terminal, 14–18 × 6–8 cm; cymes (1–)3–5-flowered. Pedicel 5–12 mm, densely tomentose; bracts subulate to lanceolate, 3–7 mm; bracteoles subulate 2–3 mm. Calyx 6–11 mm; lobes subulate to lanceolate, subequal, outside sparsely pubescent, inside densely brown tomentose. Corolla purplish red, 4.5–5 cm, outside densely brownish pubescent and sometimes including gland-tipped trichomes; tube ca. 4.2 cm; lower lip 3-lobed, lobes oblong and ca. 2 × 1.5 mm; upper lip 2-cleft. Stamens slightly exerted; filaments glabrous; anther thecae ellipsoid, 5–5.5 mm, not extending beyond corolla lips; staminodes 2, small. Ovary and style glabrous. Capsule 3.5–5 cm, 8–10-seeded. Seeds 5.5–6.3 × 4.2–4.5 mm, pubescent. Fl. Oct–Feb, fr. Feb–May.

Thickets, forest margins, ravines; 400–1600 m. Xizang, Yunnan [Bhutan, India, Laos, Myanmar, Thailand, Vietnam].

2. *Phlogacanthus pubinervius* T. Anderson, J. Linn. Soc., Bot. 9: 508. 1867.

毛脉火焰花 mào mài huó yán huā

Aeschynanthus dunnii H. Léveillé; *Lonicera menelii* H. Léveillé.

Shrubs or small trees, to 5 m tall, much branched. Petiole 0.5–2 cm; leaf blade elliptic-oblong to oblong, (5–)8–18 × (1–)3.5–5 cm, abaxially puberulent along veins, adaxially scabrous, secondary veins 5–7 on each side of midvein, base attenuate, margin undulate, apex acuminate to long acuminate. Cymes axillary, 1–4-flowered; peduncle 0.8–1.6 cm, 4-angled, pubescent; bracts small, caducous; bracteoles subulate, ca. 3 × 1 mm, caducous. Pedicel 0.8–1.5 cm. Calyx 7–8 mm; lobes linear-lanceolate, unequal, outside pubescent, inside gray tomentose. Corolla orange, ca. 1.8 cm, outside pubescent; tube ca. 1.3 cm, slightly curved; lower lip deeply 3-lobed, lobes ovate; upper lip 2-cleft. Stamens much exerted; filaments ca. 2.5 cm, glabrous; anther thecae oblong, parallel, extending beyond corolla lips; staminodes 2, small. Ovary glabrous; style ca. 2 cm, glabrous. Capsule 2.5–3 cm, glabrous, 8-seeded.

Forests, thickets; 700–1500 m. Guangxi, Guizhou, Yunnan [Bhutan, India, Myanmar].

35. **CYSTACANTHUS** T. Anderson, J. Linn. Soc., Bot. 9: 457. 1867.

鳧冠花属 biao guān huā shù

Hu Jiaqi (胡嘉琪 Hu Chia-chi), Deng Yunfei (邓云飞); Thomas F. Daniel

Shrubs or perennial herbs, with cystoliths. Leaf blade margin entire or obscurely crenate. Inflorescences thyrses or rarely axillary cymes or racemes; bracteoles 2, small. Calyx deeply 5-lobed; lobes usually covered with gland-tipped trichomes. Corolla orange or pink, funnel-shaped, usually bent ca. 90° and abruptly inflated near middle; limb 2-lipped; lower lip 3-lobed, lobes orbicular or ovate and equal; upper lip 2-lobed; lobes ascending cochlear in bud. Stamens 2, included; anthers 2-theous; thecae parallel, equal, hirsute, mucous at base; staminodes 2. Ovary ovoid, long hirsute; style filiform; stigma 2-cleft. Capsule cylindrical, 8–12-seeded; retinacula present. Seeds ovate in outline, compressed, tomentose.

About 15 species: mainland Asia; eight species (three endemic) in China.

Five of the Chinese species treated here in *Cystacanthus* have also been treated in *Phlogacanthus*. In addition to the macromorphological characteristics (geniculate corolla with an inflated throat in *Cystacanthus*) distinguishing *Cystacanthus* and *Phlogacanthus*, R. W. Scotland (Rev. Palaeobot. Palynol. 72: 229–243. 1992) discussed palynological differences between them in ornamentation of the aperture margins (i.e., aperture margins with spines ± restricted to a single row in *Phlogacanthus* and with the spines throughout the aperture margin in *Cystacanthus*). A thorough reevaluation of taxa treated in these two genera will be necessary to determine whether both genera are worthy of recognition and if so, to which genus each species pertains.

- 1a. Corolla outside pubescent with gland-tipped trichomes.
 2a. Thyrses to 2.5 cm, 3- or 4-flowered 1. *C. affinis*
 2b. Thyrses longer than 5 cm, many flowered.
 3a. Corolla purple; leaf blade oblong to oblong-lanceolate 2. *C. paniculatus*
 3b. Corolla blue, red, white, or purplish blue; leaf blade ovate to ovate-lanceolate.
 4a. Young stems pubescent but not densely whitish or yellowish brown villous 3. *C. yangtsekiangensis*
 4b. Young stems densely whitish to yellowish brown villous 4. *C. yunnanensis*
- 1b. Corolla outside glabrous or non-glandular pubescent.
 5a. Bracts leaflike, much longer than calyx; corolla glabrous outside 5. *C. pyramidalis*
 5b. Bracts small and not leaflike, subequal to calyx; corolla pubescent outside.
 6a. Leaf blade secondary veins ca. 6 on each side of midvein 6. *C. abbreviatus*
 6b. Leaf blade secondary veins 9–17 on each side of midvein.
 7a. Leaf blade secondary veins 9–11 on each side of midvein; inflorescences spikelike thyrses; rachis with 1 flower per node; calyx ca. 6 mm; corolla densely pubescent outside 7. *C. vitellinus*
 7b. Leaf blade secondary veins 12–17 on each side of midvein; inflorescences paniculate thyrses; rachis with several flowers per node; calyx ca. 3 mm; corolla sparsely pubescent outside 8. *C. colaniae*

1. *Cystacanthus affinis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 103. 1916.

丽江鳔冠花 li jiang biao guan hua

Shrubs to 2 m tall. Stems terete. Petiole 5–10 mm; leaf blade oblong to ovate, 2.5–6 × 1.5–3 cm, both surfaces pubescent, secondary veins 5 or 6 on each side of midvein, base cuneate, margin entire, apex acuminate. Thyrses terminal, to 2.5 cm, 3- or 4-flowered; bracts oblong-lanceolate, shorter than calyx, gland-tipped pubescent, caducous; bracteoles similar to bracts. Pedicel ca. 3 mm, gland-tipped pubescent. Calyx 1.5–2 cm, outside pubescent with gland-tipped trichomes; lobes linear, ca. 1 mm wide, apex acute. Corolla yellow outside and light yellow inside with purplish striae, 3.5–4 cm; lobes ovate, to 1.5 cm. Stamens slightly exerted; filaments barbate; anther thecae to 1 mm, connective barbate; staminodes ca. 2 mm. Ovary ca. 5 mm; style ca. 2 cm, glabrous; stigma slightly 2-cleft. Capsule light yellow, ca. 2 cm, glabrous, 6-seeded. Seeds ovate in outline, ca. 3 × 3 mm.

• Thickets, streamsides, trailsides; 1700–2200 m. Sichuan, Xizang, Yunnan.

2. *Cystacanthus paniculatus* T. Anderson, J. Linn. Soc., Bot. 9: 458. 1867.

鳔冠花 biao guan hua

Phlogacanthus paniculatus (T. Anderson) J. B. Imlay.

Shrubs to 2 m tall. Stems 4-angled, glabrous; young branches winged. Petiole 1–1.5 cm; leaf blade oblong to oblong-lanceolate, 10–12 × 2.5–4 cm, abaxially pubescent along veins, adaxially glabrous, base attenuate and decurrent onto petiole, margin undulate to crenulate, apex acuminate. Thyrses terminal, to 18 cm, many flowered; rachis densely villous with gland-tipped trichomes; bracts oblong-lanceolate, shorter than calyx, gland-tipped pubescent, caducous; bracteoles similar to bracts. Pedicel 2–4 mm, gland-tipped pubescent. Calyx 1.2–1.4 cm, gland-tipped pubescent; lobes lanceolate. Corolla light purple, 2–2.4 cm, ventricose, outside gland-tipped pubescent, inside glabrous; lower lip with lobes orbicular, subequal, patent. Stamens included; filaments barbate; anther thecae ca. 1 mm,

connective barbate; staminodes very small. Ovary pubescent, with 4 ovules per locule; style 1.6–2 cm, glabrous; stigma slightly 2-cleft. Capsule grayish brown, clavate, ca. 2.3 cm, pubescent, 8-seeded. Seeds ovate in outline, ca. 3.5 × 3.5 mm.

Forests; 300–2100 m. Yunnan [Myanmar].

3. *Cystacanthus yangtsekiangensis* (H. Léveillé) Rehder, J. Arnold Arbor. 16: 315. 1935.

金江鳔冠花 jin jiang biao guan hua

Strobilanthes yangtsekiangensis H. Léveillé, Cat. Pl. Yunnan, 6. 1915.

Shrubs to 1 m tall. Stems subterete, striate, pubescent. Petiole 3–7 mm, pubescent; leaf blade ovate, ca. 3.5 × 1.5 cm, both surfaces pubescent and glaucous, secondary veins 10–12 on each side of midvein, base cuneate, margin entire, apex acute. Thyrses terminal or axillary, racemose, secund, to 7 cm; bracts linear-lanceolate, 5–8 mm, densely gland-tipped villous; bracteoles similar to bracts. Pedicel 2–4 mm, gland-tipped pubescent. Calyx 7–10 mm; lobes linear, densely yellowish pubescent. Corolla blue or red, campanulate, ca. 2.5 × 1.2–1.3 cm, ventricose and curved; tube basally ca. 5 mm wide and short; lobes broadly triangular, apex obtuse. Stamens included; filaments barbate; anther thecae ovoid, connective barbate with yellowish brown trichomes; staminodes ca. 2 mm. Ovary pubescent; style ca. 2 cm, glabrous; stigma slightly 2-cleft. Capsule and seeds not seen.

• 400–500 m. Yunnan.

4. *Cystacanthus yunnanensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 104. 1916.

滇鳔冠花 dian biao guan hua

Shrubs 1–1.5 m tall, erect. Stems subterete or slightly 4-angled, densely whitish or yellowish brown villous. Petiole 0.5–1.5 cm; leaf blade ovate to ovate-lanceolate, 5–10 × 3–4 cm, abaxially white villous, adaxially densely yellowish villous, secondary veins ca. 6 on each side of midvein, base attenuate, margin entire, apex acuminate to acute. Thyrses paniculate, to 15 cm; bracts linear-lanceolate, 5–10 mm, densely gland-tipped

villous; bracteoles similar to bracts. Pedicel 1–2 mm, gland-tipped villous. Calyx ca. 1.5 cm, outside densely gland-tipped villous, inside slightly villous; lobes linear, ca. 13×2 mm, subequal, apex acute. Corolla white or purplish blue and with a whitish base, 3–3.5 cm, ventricose, incurved, outside gland-tipped pubescent; tube basally ca. 1.5 mm wide and very short then wide at middle; lobes orbicular, ca. 10×7 mm, unequal with anterior one longer. Stamens 2; filaments ca. 1.5 cm, basally pilose; anther thecae oblong, ca. 6 mm, connective barbate; staminodes filiform, ca. 2 mm. Ovary ca. 4 mm, villous, with 6 ovules per locule; style ca. 2 mm, sparsely villous; stigma minutely 2-dentate. Capsule ca. 3.5 cm, ca. 5 mm wide, gland-tipped villous. Seeds disciform, $2-3 \times 2-3$ mm, puberulent.

• Forests; 800–1600 m. Yunnan.

5. *Cystacanthus pyramidalis* Benoist, Bull. Soc. Bot. France 74: 907. 1928.

金塔火焰花 jin ta huo yan hua

Phlogacanthus pyramidalis (Benoist) Benoist.

Herbs to 1 m tall, perennial. Stems 4-angled, glabrous. Petiole ca. 2.5 cm; leaf blade elliptic to elliptic-ovate, $9-23 \times 5.5-10$ cm, abaxially glabrous or pubescent along veins, adaxially glabrous, secondary veins 8–10 on each side of midvein, base cuneate and decurrent onto petiole, margin entire, apex acute to shortly acuminate. Thyrses terminal, to 26 cm; cymes 3-flowered; peduncle 1–3 mm, pubescent; bracts leaflike, ovate to lanceolate, $0.6-3 \times 0.3-1.2$ cm, diminished in size apically on inflorescence, pubescent; bracteoles subulate, ca. 1 mm. Pedicel 3–5 mm. Calyx ca. 3.5 mm, glabrous or sparsely pubescent; lobes equal, linear, apex acuminate to acute. Corolla light purplish red, ca. 1 cm, bent to 90° and abruptly inflated at middle, glabrous; lobes ovate, ca. 2×1.5 mm. Stamens 2; filaments ca. 0.8 cm, glabrous; anther thecae ovoid, ca. 1.5 mm, connective hirsute; staminodes ca. 2 mm. Ovary glabrous; style ca. 1 cm, glabrous; stigma slightly 2-cleft. Capsule clavate, ca. 2.2 cm, 4-angled, 8-seeded. Seeds ca. 2×2 mm, compressed.

Forests. Hainan [Vietnam].

6. *Cystacanthus abbreviatus* Craib, Bull. Misc. Inform. Kew 1911: 438. 1911.

缩序火焰花 suo xu huo yan hua

Phlogacanthus abbreviatus (Craib) Benoist.

Shrubs to 1 m tall. Stems green, terete or 4-angled, slightly pubescent. Petiole 1.5–3.5 cm; leaf blade oblanceolate to obovate-lanceolate, ca. 15×5 cm, abaxially slightly pubescent along veins, adaxially glabrous, secondary veins ca. 6 on each side of midvein, base narrowly attenuate, margin entire, apex shortly acuminate. Thyrses terminal, 8–12 cm; bracts minute, caducous; bracteoles subulate. Pedicel ca. 3 mm. Calyx ca. 8 mm; lobes linear-lanceolate, outside appressed strigose, margin sparsely gland-tipped ciliate, apex obtuse. Corolla purple, ca. 1.5 cm, bent to 90° and abruptly inflated at middle. Stamens included; filaments ca. 1.2 cm, hirsute at base; anther thecae ob-

long, connective gland-tipped hirsute; staminodes 2. Ovary ca. 2 mm, glabrous; style ca. 1 cm, glabrous; stigma slightly 2-cleft. Capsule and seeds not seen.

Yunnan [Vietnam].

7. *Cystacanthus vitellinus* (Roxburgh) Y. F. Deng, **comb. nov.**

糙叶火焰花 cao ye huo yan hua

Basionym: *Justicia vitellina* Roxburgh, Fl. Ind. 1: 117. 1820; *Endopogon vitellinus* (Roxburgh) Nees; *J. asperula* (Nees) G. Loddiges; *Phlogacanthus asperulus* Nees; *P. vitellinus* (Roxburgh) T. Anderson; *Sphinctacanthus siamensis* C. B. Clarke.

Shrubs to 1.5 m tall. Stems terete, glabrous. Petiole 1–5 cm; leaf blade broadly ovate to oblong-lanceolate, $10-30 \times 6-11$ cm, abaxially slightly pubescent or glabrescent, adaxially glabrous or slightly pubescent, secondary veins 9–11 on each side of midvein, base attenuate and decurrent onto petiole, margin slightly undulate, apex acute to acuminate. Thyrses 10–20 cm; bracts minute; bracteoles linear, ca. 1.5×0.5 mm, pubescent. Pedicel 1–3 mm. Calyx ca. 6 mm, pubescent; lobes linear-lanceolate. Corolla purplish red or white, 1.2–1.8 cm, bent to 90° and abruptly inflated at middle, outside pubescent. Stamens ca. 1 cm; filaments hirsute at base; anther thecae oblong, ca. 2 mm, connective glabrous; staminodes very small. Ovary glabrous; style 1–1.5 cm, glabrous; stigma slightly 2-cleft. Capsule clavate, ca. 2 cm, 8-seeded. Seeds ovate in outline, ca. 2.5×2 mm.

Forests; 200–1100 m. Yunnan [Bhutan, India, Myanmar].

8. *Cystacanthus colaniae* (Benoist) Y. F. Deng, **comb. nov.**

广西火焰花 guang xi huo yan hua

Basionym: *Phlogacanthus colaniae* Benoist, Notul. Syst. (Paris) 5: 109. 1936.

Shrubs to 1 m tall. Stems terete, pubescent, soon glabrescent. Petiole 1–5 cm, puberulent; leaf blade ovate to ovate-lanceolate, $(5-12-30 \times (2-5)-12)$ cm, abaxially slightly pubescent, adaxially glabrous or puberulent along veins, secondary veins 8–17 on each side of midvein, base shortly attenuate, margin entire or slightly crenate, apex shortly acuminate. Thyrses 10–20 cm; cymes few flowered; bracts triangular, $1.5-2 \times 0.7-1$ mm, pubescent; bracteoles linear, ca. 1×0.5 mm, pubescent. Pedicel 1–2 mm, pubescent. Calyx ca. 3 mm, pubescent; lobes linear. Corolla ca. 1.2 cm, ventricose, bent to 90° and abruptly inflated at middle, outside slightly grayish white pubescent, inside pubescent on lobes; lobes oblong-ovate, ca. 5×3 mm, unequal, apex acute. Stamens 2; filaments hirsute at base, ca. 6 mm; anther thecae oblong, ca. 2 mm, connective black and glabrous; staminodes filiform, very short, hirsute. Ovary oblong, ca. 2 mm, glabrous; style ca. 8 mm, glabrous; stigma slightly 2-cleft. Capsule 1.8–2 cm, glabrous. Seeds ovate in outline, ca. 2.5×2 mm.

Limestone hills; 200–500 m. Guangxi, Hainan, Yunnan [Vietnam].