

LAMIACEAE

唇形科 chun xing ke

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Herbs, sometimes subshrubs or shrubs, annual or perennial, usually aromatic. Stems and branches usually 4-angled. Leaves opposite, rarely whorled or alternate, simple to pinnately dissected or compound, without stipules. Inflorescences generally compound, sometimes flowers solitary and axillary; verticillasters 2- to many flowered, subtended by leaves or bracts. Flowers bisexual, zygomorphic, rarely subactinomorphic, bracteolate or not. Calyx persistent, 5-toothed, 2-lipped; upper lip 3-toothed or entire (deciduous in *Scutellaria*); lower lip 2- or 4-toothed; tube sometimes hairy annulate inside. Corolla limb usually 2-lipped; upper lip 2-lobed and lower 3-lobed, rarely upper lip entire and lower 4-lobed, also rarely limb (4- or 5-lobed; tube hairy annulate inside. Stamens epipetalous, 4 or 2, free, rarely filaments connate, sometimes one staminodial; anther 1- or 2-celled, usually dehiscent longitudinally; disc persistent. Ovary superior, 2-celled and each cell 2-ovuled and style subterminal, or ovary 4-parted and each lobe 1-ovuled and style gynobasic (from bases of ovary lobes) with 2-cleft apex. Fruit usually 4 dry nutlets. Seeds with or without endosperm.

Approximately 3500 species in 220 genera, distributed worldwide, but mostly in the Mediterranean region and SW Asia. China has 807 species in 96 genera.

Cantino (Taxon 40: 441. 1991) suggests that *Cardioteucris cordifolia* C. Y. Wu, originally placed in the Lamiaceae, is identical with *Caryopteris siccanea* W. Smith (Verbanaceae, q.v.). Although the original author agrees with the identity of *Cardioteucris cordifolia* and *Caryopteris siccanea*, he believes that the generic placement of *Cardioteucris* is in the Lamiaceae because of its 2-lipped calyx and deeply 4-divided ovary. The last feature is aberrant in *Caryopteris* and all other Verbanaceae.

Wu Cheng-yih & Li Hsi-wen, eds. 1977. Labiatae. Fl. Reipubl. Popularis Sin. 65(2): 1–649, 66: 1–647.

- 1a. Style arising above base of ovary; nutlets with a large and obvious areole more than half nutlet axis length; corolla 1-lipped (i.e., all lobes of corolla forming a single lower lip) or \pm so (i.e., upper lip of corolla poorly developed), rarely 2-lipped or flowers subactinomorphic.
 - 2a. Leaves alternate; calyx 19-veined; nutlets flattened dorsi-adaxially, tuberculate; flowers spirally arranged in racemes 8. *Wenchengia*
 - 2b. Leaves opposite; calyx generally 10- or fewer veined; nutlets \pm corrugate; flowers in cymes or verticillasters Key 1
- 1b. Style inserted at base of ovary; nutlets with a small, rarely large areole; corolla 2-lipped.
 - 3a. Nutlets drupelike, with a succulent, thick exocarp and crusty endocarp; calyx equally 5-toothed.
 - 4a. Perennial herbs or shrubs, stellate tomentose; anther cells elongated, parallel, transverse 9. *Gomphostemma*
 - 4b. Herbs without stellate hairs; anthers \pm globose, cells adnate at abaxial side and forming a sac 10. *Bostrychanthera*
 - 3b. Nutlets dry, with a dry, thin exocarp; calyx equally 5-dentate or not.
 - 5a. Fruiting calyx 2-lipped, upper lip generally with a scutellum, deciduous, lower lip generally persistent; ovary stipitate; seeds \pm transverse; embryo with a curved radicle 11. *Scutellaria*
 - 5b. Fruiting calyx other than above; ovary generally not stipitate; seeds erect; embryo with a short, straight radicle.
 - 6a. Lobes of disc opposite ovary lobes; nutlets with a basal-dorsal attachment scar 12. *Lavandula*
 - 6b. Lobes of disc alternate with ovary lobes; nutlets with a small basal attachment scar.
 - 7a. Stamens ascending under upper corolla lip or spreading or projected Key 2
 - 7b. Stamens declinate, lying along or included in lower lip of corolla Key 8

Key 1

- 1a. Style terminal on rounded (unlobed) apex of ovary; leaves deeply 3-lobed to ternately compound.
 - 2a. Rhizomatous perennial herbs; corolla white, 8–10 mm; calyx 2-lipped with 2-lobed lower lip and 3-lobed upper lip 1. *Rubiteucris*
 - 2b. Annual herbs; corolla blue, 2–4 mm; calyx regular or nearly so 2. *Amethystea*
- 1b. Style subterminal; ovary shallowly to deeply lobed; leaves simple, unlobed or rarely shallowly lobed.
 - 3a. Pollen operculate; corolla 1-lipped (lower lip only), or if 2-lipped, then stamens long exserted from corolla; filaments 2–3 \times longer than corolla tube.
 - 4a. Corolla 1-lipped; filaments less than 2 \times as long as corolla tube or curved forward after anthesis (usually both) 3. *Teucrium*
 - 4b. Corolla 2-lipped; stamens long exserted; filaments 2–3 \times longer than corolla tube, erect after anthesis 4. *Kinostemon*
 - 3b. Pollen not operculate; corolla 2-lipped; stamens barely if at all exserted from corolla; filaments less than 2 \times as long as corolla tube.
 - 5a. Lower lip of corolla unlobed; stigma lobes markedly unequal; nectar disc large 5. *Holocheila*
 - 5b. Lower lip of corolla 3-lobed; stigma lobes equal or nearly so; nectar disc poorly developed.
 - 6a. Flowers showy; upper lip of corolla flat, usually 2-lobed; inflorescence dense, terminal, basically thyrsoid but varying to a tight raceme or capitulum; corolla persistent, its expanded base sheathing the fruit 6. *Ajuga*
 - 6b. Flowers inconspicuous; upper lip of corolla slightly concave, unlobed; inflorescence of loose, dichoto-

mous, axillary cymes; corolla falls after anthesis 7. *Cymaria*

Key 2

- 1a. Corolla tube usually exerted from calyx.
 - 2a. Anthers not globose, cells parallel or divergent, oblong or ovoid to linear, not or rarely confluent at apex (except in a few genera such as *Colquhounia*), not flattened after pollination; corolla tube mostly exerted.
 - 3a. Corolla upper lip convex, arcuate, falcate, or galeate.
 - 4a. Stamens 4; anthers ovoid.
 - 5a. Posterior stamens longer than anterior ones Key 3
 - 5b. Posterior stamens shorter than anterior ones Key 4
 - 4b. Stamens 2; anthers linear Key 5
 - 3b. Corolla upper lip flat or convex or corolla nearly radially symmetric, lobes nearly alike or somewhat differentiated Key 6
 - 2b. Anthers globose, cells unilocular or divaricate and confluent at apex, flattened after pollination; corolla tube always included Key 7
- 1b. Corolla tube included within calyx.
- 6a. Calyx 5–10-veined, equally or unequally 5–10-toothed; corolla tube unevenly hairy annulate inside or not, upper lip nearly flat or convex; filaments glabrous or slightly hairy.
 - 7a. Anther cells divergent; calyx 5–10-toothed; verticillasters axillary.
 - 8a. Calyx 5–10-toothed; corolla tube always pilose annulate inside; leaves circular or ovate, crenate 13. *Marrubium*
 - 8b. Calyx 5-toothed; corolla tube not hairy annulate inside; leaves broadly ovate, circular, reniform-orbicular to cordate, palmately lobed or parted 14. *Lagopsis*
 - 7b. Anther cells of posterior stamens divaricate; calyx 5-toothed; verticillasters in terminal spikes 15. *Sideritis*
 - 6b. Calyx 10-veined; equally 5-toothed; corolla tube evenly pilose annulate inside, upper lip slightly convex; filaments villous 48. *Metastachydium*

Key 3

- 1a. Corolla resupinate; calyx tube hairy annulate at middle or on throat inside.
 - 2a. Calyx with 5 subequal teeth; erect herbs; leaves narrowly to broadly ovate differentiated in to stem and floralones 17. *Lophanthus*
 - 2b. Calyx 2-lipped, upper lip 3-toothed, lower lip 2-toothed; stem prostrate, basally leafless, leaves dense and decussate apically 21. *Marmoritis*
- 1b. Corolla not resupinate; calyx tube not hairy annulate at middle inside.
 - 3a. Stamen pairs not parallel to each other, posture various but not all arcuate ascending under upper lip of corolla 16. *Agastache*
 - 3b. Stamen pairs parallel to each other, all arcuate-ascending under upper lip of corolla (except *Nepeta multifida*, *N. tenuifolia*, and *N. annua* where posterior stamens are slightly exerted).
 - 4a. Upper lip of corolla 2-plicate inside, plicae parallel to margin, connected at apex; pedicel flattened 24. *Lallemantia*
 - 4b. Upper lip of corolla smooth, very rarely 1-plicate inside; pedicel terete.
 - 5a. Calyx upper lip 3-lobed, lower 2-lobed; sinuses of teeth without a thickened fold.
 - 6a. Anther cells divaricate at an angle of nearly 180°; plants without stolons; calyx 11–15-veined, with a truncate or oblique mouth; nutlets warty or smooth 18. *Nepeta*
 - 6b. Anther cells divergent or parallel; plants always stoloniferous; calyx 2-lipped, upper lip 3-toothed, lower lip 2-toothed.
 - 7a. Anther cells diverging at right angles; leaves mostly obtuse or rounded at apex; flowers less than 3 cm.
 - 8a. Calyx tubular or campanulate, 15-veined; teeth narrowly triangular to ovate-triangular or ovate, always awned or awned-spinescent at apex; corolla tube not pilose annulate inside; nutlets less than 1.5 mm 19. *Glechoma*
 - 8b. Calyx obconical-campanulate, 5-veined; teeth ovate-deltoid, acute, or acuminate, slightly curved at apex; corolla pilose annulate near base inside; nutlets ca. 2 mm 20. *Suzukia*
 - 7b. Anther cells parallel; leaves acute or short acuminate at apex; plants stoloniferous or not; flowers generally more than 3 cm 22. *Meehania*
 - 5b. Calyx upper lip 3-toothed and lower lip 2-toothed or upper lip entire and lower lip 4-toothed; sinuses of some or all teeth with a thickened fold 23. *Dracocephalum*

Key 4

- 1a. Calyx with very dissimilar teeth, throat closed in fruit by 2 obliquely upwardly directed teeth of lower lip; upper corolla lip galeate 25. *Prunella*
- 1b. Calyx with ± unlike teeth, throat open in fruit.
 - 2a. Calyx with 5, obtuse, triangular equal teeth or with 3 or 4 lobes; corolla broad at base or gradually dilated ascending, with a wider, somewhat convex upper lip 26. *Chelonopsis*
 - 2b. Calyx with acute, subulate, or rarely spinescent lanceolate teeth; corolla upper lip convex, always helmet-shaped, rarely flat.
 - 3a. Upper lip of corolla mostly short, ± flat (except in *Colquhounia*), glabrous or sparsely hairy.
 - 4a. Anther cells confluent at apex; nutlets winged or scaly; shrubs or herbs.

- 5a. Shrubs; nutlets membranous winged at apex; corolla large, scarlet 49. *Colquhounia*
5b. Dwarf herbs; nutlets densely linear scaly at apex and adaxial side 50. *Achyrospermum*
- 4b. Anther cells separate (except in *Microtoena*); nutlets not winged (except in *Chamaesphacos*) or scaly; herbs.
- 6a. Anthers 1-celled, longitudinally dehiscent; corolla tube saccate in front 51. *Eurysolen*
6b. Anthers 2-celled or anterior anthers 2-celled and posterior anthers 1-celled; corolla tube not saccate in front.
- 7a. Anterior anthers transversely 2-celled, cells parallel, posterior anthers 1-celled; calyx 5-dentate, only slightly dilated in fruit; verticillasters arranged in continuous or interrupted, long terminal spikes 52. *Anisomeles*
7b. Anther cells of both pairs equal, divaricate; calyx deformed or dilated in fruit; inflorescences of terminal loose panicles, rarely verticillasters axillary.
- 8a. Upper corolla lip falcate, sometimes very short; nutlets wingless; inflorescences of loose terminal panicles.
- 9a. Upper corolla lip very short; anther cells separate, divaricate; flowers very small; calyx equally 5-toothed 53. *Craniotome*
9b. Upper corolla lip galeate, long; filaments sometimes bearded near base; anther cells divaricate, confluent at apex; flowers large; one posterior tooth of calyx sometimes dilated 54. *Microtoena*
- 8b. Upper corolla lip flat; nutlets narrowly winged at apex and on 2 sides; leaves spiny on margin; verticillasters axillary, 2–6-flowered 55. *Chamaesphacos*
- 3b. Upper lip of corolla convex or galeate, rarely nearly flat, always densely hairy.
- 10a. Calyx teeth 5, spinescent, hooked at apex 27. *Notochaete*
10b. Calyx teeth 5–10, not spinescent and hooked at apex.
- 11a. Style lobes unequal in length (sometimes equal in *Phlomis*), posterior much shorter than anterior.
- 12a. Nutlets prominently hairy at apex; filaments with comblike-fimbriate appendages at base; calyx teeth truncate, apiculate at apex; desert or desert-meadow plants 28. *Eremostachys*
12b. Nutlets slightly hairy or glabrous; other characters not as above.
- 13a. Calyx 10-toothed 29. *Leucas*
13b. Calyx 5-toothed.
- 14a. Upper corolla lip always hairy or fringed-incised; posterior stamens mostly appendiculate at base; mostly erect herbs or subshrubs; leaf venation not fan-shaped; verticillasters axillary, lax or dense 30. *Phlomis*
14b. Upper corolla lip not fringed or incised; posterior stamens not appendiculate at base; stemless herbs; leaf venation fan-shaped; verticillasters in a dense scapose capitulum or short spike 31. *Lamiophlomis*
- 11b. Style lobes subequal or equal in length.
- 15a. Anther cells transversely 2-valved; lower lip of corolla with an apophysis on connective between middle and lateral lobes 32. *Galeopsis*
15b. Anther cells parallel or spreading in vertical or oblique position; lower lip of corolla without apophyses.
- 16a. Nutlets ovoid, rounded at apex.
- 17a. Upper corolla lip galeate, longer than lower lip, bearded; calyx obconic-campanulate, 10-veined, equally 5-toothed 44. *Paraphlomis*
17b. Upper corolla lip shorter than or equal to, rarely longer than lower lip, if equal or longer than calyx 5–8(–10)- or 11-veined.
- 18a. Calyx 2-lipped, 5–8(–10)- or 11-veined.
- 19a. Calyx 5–8(–10)-veined, upper lip 3-toothed, lower 2-toothed; plants without woody underground stem; verticillasters axillary; stamens much exerted 42. *Loxocalyx*
19b. Calyx 11-veined, 2-lipped, upper lip 2-toothed, lower lip 3-toothed; plants with woody underground stem; verticillasters in terminal racemes; stamens slightly exerted 45. *Ombrocharis*
- 18b. Calyx 5-toothed, 5–10-veined; teeth equal in length, rarely calyx 2-lipped.
- 20a. Calyx teeth needlelike; shrubs with many spines arising from base of verticillasters and leaf axils; leaf margin spiny 40. *Lagochilus*
20b. Calyx teeth not needlelike; spineless herbs.
- 21a. Verticillasters many flowered, densely arranged in short cylindrical or subcapitate spikes; anther cells parallel; corolla tube exerted, not villous annulate inside; anther cells parallel 46. *Betonica*
21b. Verticillasters 2- to many flowered, not in dense spikes; anther cells divaricate; corolla tube included or exerted, villous annulate or not at middle inside 47. *Stachys*
- 16b. Nutlets ± acutely 3-angled, not truncate at apex (except in *Loxocalyx* and partly in *Lagochilus*).
- 22a. Calyx 2-lipped, unequally 5-toothed, upper lip 3-toothed and lower 2-toothed, or upper lip entire and lower 4-toothed.

- 23a. Calyx tubular, upper lip 3-toothed, lower 2-toothed; verticillasters axillary 42. *Loxocalyx*
- 23b. Calyx broadly campanulate, upper lip entire, lower lip 4-toothed; verticillasters in dense terminal racemose panicles 43. *Paralamium*
- 22b. Calyx inconspicuously 2-lipped, equally or subequally 5-toothed.
- 24a. Posterior filaments appendiculate or thickened at base; desert or alpine plants.
 - 25a. Calyx tubular-campanulate, teeth subulate or spinescent; nutlets hairy at apex; tall desert plants 28. *Eremostachys*
 - 25b. Calyx broadly campanulate, teeth triangular; nutlets smooth; dwarf herbs of strongly weathered stony alluvial fans 41. *Eriophyton*
- 24b. Posterior filaments not appendiculate at base; plants of various habitats.
 - 26a. Throat of corolla dilated, tube elongated; calyx teeth not spinescent.
 - 27a. Middle lobe of lower corolla lip largest; non-alpine plants; leaves various.
 - 28a. Lateral lobes of lower corolla lip not developed, with a small, acute tooth on margin; anther cells divaricate, hairy 33. *Lamium*
 - 28b. Lateral lobes of lower corolla lip well developed, with acute teeth on margin; anther cells divergent, glabrous 34. *Galeobdolon*
 - 27b. Lateral lobes of lower corolla lip larger, ovate; alpine plants; leaves broadly rhombic or cuneate fan-shaped, tomentose 35. *Alajja*
 - 26b. Throat of corolla barely dilated, tube slightly exerted or included; calyx teeth \pm needlelike or spinescent.
 - 29a. Calyx teeth needlelike; shrubs with spines at base of verticillasters and in leaf axils; leaf margin spiny 40. *Lagochilus*
 - 29b. Calyx teeth spinescent; spineless plants.
 - 30a. Anther cells divaricate; leaves ovate, entire.
 - 31a. Corolla 6–7 mm, slightly longer than calyx; nutlets pubescent at apex 36. *Chaiturus*
 - 31b. Corolla more than 10 mm, much longer than calyx; nutlets glabrous 37. *Stachyopsis*
 - 30b. Anther cells parallel; leaves other than ovate, dissected.
 - 32a. Calyx funnellform, 5-veined; corolla purple-red, reddish, or white, tube puberulent or hairy annulate inside 38. *Leonurus*
 - 32b. Calyx tubular-campanulate, 10-veined; corolla yellowish white, tube not hairy annulate inside 39. *Panzerina*

Key 5

- 1a. Anther connective linear, attached to filaments by dolabriform joints or not 56. *Salvia*
- 1b. Anther connective broad or very small, not attached to filaments by joints.
 - 2a. Plants heathlike shrubs; leaves narrow, revolute; nutlets smooth, with an elaiosome; cultivated 57. *Rosmarinus*
 - 2b. Plants not heathlike shrubs; leaves not revolute at margin; nutlets without an elaiosome.
 - 3a. Subshrubs; upper lip of corolla 4-lobed, lower entire; calyx tubular-campanulate, 10-veined, 2-lipped 58. *Perovskia*
 - 3b. Herbs; upper lip of corolla 2-lobed, lower 3-lobed; calyx narrowly tubular, 15-veined, equally 5-toothed; cultivated 59. *Monarda*

Key 6

- 1a. Posterior stamens much exerted between lobes of upper corolla lip, anterior stamens included before and much exerted after pollination; corolla subactinomorphic; calyx tubular, 2-lipped, posterior tooth largest, ovate-orbicular 60. *Heterolamium*
- 1b. Stamens and corolla other than above; calyx campanulate or tubular, if 2-lipped, then posterior tooth not largest.
 - 2a. Stamens ascending to underneath upper corolla lip.
 - 3a. Two anterior stamens fertile; calyx narrowly cylindric 61. *Ziziphora*
 - 3b. All stamens fertile.
 - 4a. Corolla tube exerted 62. *Melissa*
 - 4b. Corolla included or exerted.
 - 5a. Calyx regular or slightly irregular, 5-toothed, conspicuously 13–15-veined 63. *Micromeria*
 - 5b. Calyx irregular, conspicuously 2-lipped after anthesis, 13–18-veined.
 - 6a. Bracteoles setiform, pilose; calyx throat slightly constricted, sparsely villous or glabrous inside, tube tubular and ventricose in front at base 64. *Clinopodium*
 - 6b. Bracteoles lanceolate-subulate, not pilose; calyx throat not constricted, hirsute annulate inside, tube tubular-campanulate, not ventricose in front at base 65. *Calamintha*
 - 2b. Stamens ascending from base, if spreading then erect.
 - 7a. Calyx 15-veined, with a thickened fold at each tooth sinus 66. *Hyssopus*
 - 7b. Calyx 10–13(–15)-veined, without thickened folds at sinuses.
 - 8a. Stamens 2 or 4 (2 long and 2 short); calyx 10-veined, dilated in fruit; corolla 2-lipped

- or subactinomorphic.
- 9a. Stamens 4; corolla lobes 5, short 71. *Perilla*
- 9b. Stamens 2, anterior stamens reduced to linear staminodes; corolla nearly 2-lipped 72. *Mosla*
- 8b. Stamens 4 (except in *Lycopus*), subequal.
- 10a. Corolla 2-lipped; upper lip 2-lobed; lower lip 3-lobed; leaves mostly entire.
 - 11a. Calyx equally 5-toothed, 13–15-veined; bracts overlapping, ovate or lanceolate, brightly colored 67. *Origanum*
 - 11b. Calyx 2-lipped, upper lip 3-toothed, lower lip prominently 2-toothed, 10–13-veined; bracts minute 68. *Thymus*
- 10b. Corolla subactinomorphic, limb 4-lobed.
 - 12a. Stamens 4, equal; nutlets rounded at apex 69. *Mentha*
 - 12b. Stamens 2; nutlets truncate at apex 70. *Lycopus*

Key 7

- 1a. Calyx broadly campanulate, equally 5-toothed in flower, many veined, much dilated, 2-lipped (upper lip wider) in fruit; corolla tube erect, long and narrow; stamens included; filaments glabrous 81. *Siphocranion*
- 1b. Calyx subequally 5-toothed (or posterior tooth slightly larger), not 2-lipped in fruit; corolla tube short; stamens mostly exerted, filaments sometimes hairy.
 - 2a. Corolla with 4 or 5 equal or subequal lobes, anterior lobe \pm projected; anther cells confluent at apex, flattened after anthesis; filaments mostly hairy.
 - 3a. Calyx 5-parted, teeth linear, plumose in fruit; densely lanate-tomentose, gynodioecious shrubs; leaves opposite or in whorls of 3; flowers minute 80. *Colebrookea*
 - 3b. Calyx with 5 equal teeth.
 - 4a. Leaves opposite, ovate or narrowly ovate, rarely linear or falcate, petiolate or sessile, \pm hairy or tomentose; corolla nearly 2-lipped, upper lip 3-lobed, lower entire; calyx with crystals; stem not hollow 78. *Pogostemon*
 - 4b. Leaves in whorls of 3–10, linear to lanceolate, sessile, subglabrous; corolla 4-lobed; calyx without crystals; stem hollow 79. *Dysophylla*
- 2b. Corolla 2-lipped or nearly so, upper lip slightly convex; anther cells mostly confluent at apex; filaments glabrous, rarely hairy.
 - 5a. Calyx \pm 2-lipped, campanulate, upper lip 3-toothed, lower 2-toothed; racemes of 2-flowered verticillasters; filaments much exerted, rarely included, bearded at base 77. *Keiskea*
 - 5b. Calyx equally or subequally 5-toothed; inflorescences terminal.
 - 6a. Corolla tube short, limb 4-lobed, posterior (or upper) lobe slightly convex, straight; calyx ovoid or campanulate.
 - 7a. Nutlets obtuse at apex; upper corolla lip emarginate, corolla tube hairy annulate or not inside; inflorescences not slender and pendulous 74. *Elsholtzia*
 - 7b. Nutlets beaked at apex; upper corolla lip entire, corolla tube irregularly hairy annulate in throat and at base of stamens; inflorescences slender, pendulous 75. *Rostrinucula*
 - 6b. Corolla 2-lipped, upper lip 2-lobed, lower 3-lobed; calyx tubular or campanulate.
 - 8a. Calyx teeth equal; corolla tube not hairy annulate inside; filaments densely puberulent basally; shrubs or small trees 73. *Leucosceptrum*
 - 8b. Calyx teeth slightly unequal; corolla tube villous annulate inside; filaments glabrous; herbs or subshrubs 76. *Comanthosphace*

Key 8

- 1a. Calyx teeth subequal, posterior one larger, flat 82. *Hanceola*
- 1b. Calyx 2-lipped (upper lip mostly 4-toothed and lower lip entire, rarely upper lip 3-toothed and lower lip 2-toothed), very rarely equally 5-toothed, if so then upper lip of corolla 4-lobed and lower entire.
 - 2a. Lower lobe of corolla short, saccate, abruptly reflexed, narrow at base; calyx equally 5-toothed 83. *Hyptis*
 - 2b. Lower lobe of corolla navicular or plane or slightly concave.
 - 3a. Lower lobe of corolla longer than other lobes, not reflexed, narrow at base; calyx various.
 - 4a. Filaments connate, forming a sheath at base or on basal half; calyx dilated in fruit but not deformed; inflorescences various but always with brightly colored bracts; generally succulent herbs 88. *Coleus*
 - 4b. Filaments separate.
 - 5a. Calyx suberect, 2-lipped, upper lip 3-toothed and lower 2-toothed, or upper lip entire and lower 4-toothed, throat oblique; verticillasters in dense ovoid, oblong, to cylindrical spikes; corolla tube not saccate or spurred at base; herbs or subshrubs with succulent leaves 84. *Anisochilus*
 - 5b. Calyx erect or declined, equally 5-toothed or 2-lipped (upper lip 3-toothed, lower 2-toothed); verticillasters (2–)6- to many flowered, separate or in panicles or racemes; corolla tube saccate or spurred at base.
 - 6a. Corolla tube with a conspicuous elongated spur at base or on basal half; calyx lower lip somewhat truncate; nutlets minutely pitted 87. *Ceratanthus*
 - 6b. Corolla tube saccate or short spurred at base; calyx lower lip \pm 2-toothed; nutlets smooth or dotted.
 - 7a. Upper corolla lip deeply 3-cleft at apex, middle lobe widened, notched; posterior filaments dilated, pilose on outer side at base 85. *Skapanthus*

- 7b. Upper corolla lip equally or subequally 4-lobed at apex; posterior filaments not dilated, glabrous or rarely hairy on outer side at base 86. *Isodon*
- 3b. Lower lobe of corolla flat or slightly concave, not narrowed at base; calyx 2-lipped.
- 8a. Lower lip of fruiting calyx entire, incurved; upper lip entire or with a small tooth on each side or 3-lobed; bracts always brightly colored.
- 9a. Upper lip of calyx 3-toothed, calyx tube 8-veined, with many transverse veins, pitted at base in fruit; inflorescences of loose racemes 90. *Mesona*
- 9b. Upper lip of calyx subentire, calyx tube 10-veined, without transverse veins or foveolae at base in fruit; inflorescences of dense spikes 89. *Nosema*
- 8b. Lower lip of calyx 2-toothed, teeth separate or connate.
- 10a. Upper lip of calyx not decurrent into tube.
- 11a. Fruiting calyx campanulate, ± bent downward, posterior 1 or 3 teeth slightly larger; lateral and anterior teeth nearly equal; flowers very small 93. *Basilicum*
- 11b. Fruiting calyx tubular, elongate.
- 12a. Fruiting calyx obscurely veined, not pitted at base; verticillasters in dense terminal capitula 91. *Acrocephalus*
- 12b. Fruiting calyx prominently veined, pitted at base; verticillasters separate, in terminal or axillary racemes or racemose panicles 92. *Geniosporum*
- 10b. Upper lip of calyx ± decurrent into tube.
- 13a. Style lobes 2, equal, subulate; corolla tube included or exerted; upper lip of calyx obovate or circular 94. *Ocimum*
- 13b. Style globose or clavate, entire or 2-cleft; corolla tube mostly exerted; upper lip of calyx ovate, teeth of lower lip mostly separate.
- 14a. Stamens and style included or slightly exerted; nutlets ovoid or subglobose, minutely tuberculate, glabrous 95. *Orthosiphon*
- 14b. Stamens and style much exerted, their exerted parts ca. 2 × as long as corolla tube; nutlets ovoid or oblong, corrugate 96. *Clerodendranthus*

1. RUBITEUCRIS Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 297. 1929.

掌叶石蚕属 zhang ye shi can shu

Herbs rhizomatous. Leaves 3-palmatisect to palmately 3-foliolate. Inflorescences in terminal thyrses; bracts subulate-lanceolate; bracteoles minute, linear, early deciduous. Calyx campanulate, with 5 main and 3 accessory veins, 2-lipped, upper lip 3-toothed, lower lip 2-toothed. Corolla tube slightly exerted, slightly swollen in front at base; limb 2-lipped, upper lip erect, 2-lobed; lower lip nearly at right angles to tube, 3-lobed. Stamens 4, anterior 2 longer; anther cells divaricate. Ovary glabrous. Style slightly longer than stamens, equally 2-cleft at apex, lobes filiform. Nutlets obovoid, slightly 3-ribbed on back, areole ca. 3/4 as long as nutlet.

A monotypic genus: China, India (Sikkim).

1. *Rubiteucris palmata* (Bentham ex J. D. Hooker) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 297. 1929.

掌叶石蚕 zhang ye shi can

Teucrium palmatum Bentham ex J. D. Hooker, Fl. Brit. India 4: 702. 1885; *Caryopteris mairei* H. Léveillé.

Stems erect, 20–60 cm tall, glabrous or subglabrous. Petiole 2–4 cm, basal petioles longest; leaf blade ovate-triangular to cordate, 5–10 × 2–4 cm, undivided to 3-palmatisect or nearly palmately 3-foliolate, membranous, adaxially pubescent or subglabrous, abaxially sparsely pilose, base cuneate to subcordate, margin mucronate-serrate, apex acute to acuminate; middle lobe rhombic-ovate; lateral lobes smaller, obliquely cuneate at base, and crenate. Thyrses 4–6

cm, cymes 1–3-flowered; bracts slightly shorter than pedicel; bracteoles ca. 1.5 mm. Pedicel 3–4 mm, pubescent. Calyx campanulate, ca. 5 × 5 mm, pubescent outside, tube ca. 2 mm; teeth of upper lip ovate-triangular, subequal; teeth of lower lip lanceolate, apically acuminate. Corolla white, 8–10 mm, sparsely pubescent outside, tube ca. 2 × as long as calyx; lobes of upper lip erect, ovate-triangular; middle lobe of lower lip obovate-spatulate, ca. 3 × as long as lateral lobes, entire or sometimes 3-undulate at apex, lateral lobes ovate. Nutlets brownish, 2–2.3 × 1.5–1.7 mm. Fl. Jul–Aug.

Moist fertile soil in subalpine coniferous forests; 2000–3000 m. Gansu, Guizhou, Hubei, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan [India (Sikkim)].

2. AMETHYSTEA Linnaeus, Sp. Pl. 1: 21. 1753.

水棘针属 shui ji zhen shu

Herbs annual. Stems erect. Leaves petiolate; leaf blade palmatipartite, margin rarely entire. Panicles terminal; floral leaves similar to stem leaves, reduced; bracteoles linear. Calyx campanulate, 10-veined, veins conspicuous; teeth 5, subregular, enlarged in fruit. Corolla tube included or slightly exerted, not hairy annulate inside, 2-lipped; upper lip 2-lobed, lobes similar to lateral lobes of lower lip; lower lip slightly larger, 3-lobed, middle lobe subcircular. Stamens 4, anterior 2 fertile, involute in bud, elongate after anthesis, exerted from sinus of upper lip, posterior 2 reduced to staminodes, minute, or almost absent; anthers 2-

celled, cells divaricate, longitudinally dehiscent, apically confluent. Style unequally 2-cleft, posterior lobe short or inconspicuous. Nutlets obovoid triquetrous.

A monotypic genus: Asia.

1. Amethystea caerulea Linnaeus, Sp. Pl. 1: 21. 1753.

水棘针 shui ji zhen

Stems 30–100 cm tall, base sometimes woody, pyramidally branched, purplish, pilose or puberulent especially on nodes. Petiole 0.7–2 cm, purple or purplish green, grooved, narrowly winged, sparsely hirsute; leaf blade triangular to subovate, sometimes purplish, usually 3–5-partite, lobes lanceolate, adaxially puberulent to subglabrous, abaxially glabrous, margin coarsely serrate to double serrate; middle lobe 2.5–4.7 × 0.8–1.5 cm; lateral lobes 2–3.5 × 0.7–1.2 cm, asymmetrical, decurrent. Panicles composed of lax, long pedunculate cymes; peduncle sparsely glandular; bracteoles ca. 1 mm, ciliate. Pedicel 1–2.5 mm, sparsely

glandular. Calyx ca. 2 mm, papillate outside, glandular, the 5 accessory veins inconspicuous; teeth triangular, ca. 1 mm, apically acuminate, ciliate. Corolla blue or purplish blue, tube glabrous; limb glandular, lobes of upper lip oblong-ovate to ovate, lower lip slightly larger. Nutlets abaxially netted-wrinkled, adaxially ribbed, smooth, areole ca. 1/2 as long as nutlet. Fl. Aug-Sep, fr. Sep-Oct.

Fields, sandy soil along rivers, open roadsides, streamsides; 200–3400 m. Anhui, Gansu, Hebei, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia; SW Asia].

Used medicinally for perspiration.

3. TEUCRIUM Linnaeus, Sp. Pl. 2: 562. 1753.

香科科属 xiang ke ke shu

Herbs or subshrubs, with rhizomes or stolons. Stems erect or ascending, simple or branched from base. Leaves simple, petiolate or subsessile, cordate to lanceolate, pinniveined. Verticillasters 2–6-flowered, in false spikes, terminal racemes, or panicles of racemes; bracts rhombic-ovate to linear-lanceolate, margin entire or dentate. Calyx 10-veined, throat glabrous to pilose annulate; tube tubular to campanulate, swollen in front at base; limb equally 5-toothed to 2-lipped, upper lip 3-toothed, lower lip 2-toothed. Corolla 1-lipped; tube included or exerted, not hairy annulate inside; limb 5-lobed, with middle lobe circular or spatulate, occasionally 2-lobulate; lateral lobes 4, small. Stamens 4, anterior 2 slightly longer, all exerted from posterior sinus of corolla; anther cells divaricate. Ovary globose. Style equal to or slightly longer than stamens, equally or subequally 2-cleft at apex. Nutlets obovoid, glabrous, smooth to netted, areole ca. 1/2 as long as nutlet.

Approximately 260 species: worldwide, but abundant in the Mediterranean region; 18 species in China.

- 1a. Verticillasters 2–6-flowered, without bracts, inserted on all parts of stem and branches; calyx with 5 subequal teeth, not 2-lipped; posterior sinus of corolla narrow so that the corolla appears inconspicuously 1-lipped.
- 2a. Plants lanate-villous, hairs 1–1.5 mm; basal leaves subsessile, rounded to broadly cuneate at base, 3–6-crenate to coarsely 3–6-serrate on each margin 1. *T. scordium*
- 2b. Plants densely lanate-villous, hairs to 2 mm; basal leaves sessile, auriculate-amplexicaul to rounded at base, 5–12-crenate on each margin 2. *T. scordioides*
- 1b. Verticillasters 2-flowered, bracteate, in terminal false spikes; calyx ± 2-lipped; posterior sinus of corolla broad so that the corolla appears conspicuously 1-lipped.
- 3a. Calyx 2-lipped; stamens much exerted, ca. 2 × as long as corolla tube.
- 4a. Leaves ovate-lanceolate, caudate-acuminate at apex, entire 18. *T. integrifolium*
- 4b. Leaves ovate, ovate-lanceolate, to lanceolate, coarsely serrate.
- 5a. Lower lip of calyx 2-toothed to base; posterior-lateral lobes of corolla limb obliquely triangular-ovate; plants densely, retrorsely white puberulent 16. *T. pernyi*
- 5b. Lower lip of calyx 2-toothed less than 1/3 its length; posterior-lateral lobes of corolla limb subcircular; plants subglabrous 17. *T. bidentatum*
- 3b. Calyx inconspicuously to conspicuously 2-lipped; stamens slightly exerted to much exerted, ca. 2 × as long as corolla tube.
- 6a. Verticillasters in cylindrical false spikes; calyx inconspicuously 2-lipped, throat glabrous inside; corolla tube slightly exerted; nutlets not netted.
- 7a. Corolla 1 cm or less when open, tube ca. 1/2 as long as limb, middle lobe of limb small, subcircular or circular; petiole ca. 1/4 as long as blade.
- 8a. Leaves circular to ovate-triangular; bracts 3-lobed; false spikes composed of widely spaced verticillasters 3. *T. veronicoides*
- 8b. Leaves ovate to ovate-oblong; bracts entire; false spikes composed of closely spaced verticillasters 4. *T. viscidum*
- 7b. Corolla 1.1–1.5 cm when open, tube 1/3 to 1/2 as long as limb, middle lobe of limb largest, rhombic-obovate, subcircular, or obovate-orbicular; petiole ca. 1/5 as long as blade.
- 9a. Calyx nearly 2-lipped, teeth with conspicuously netted veins; false spikes composed of 2–4-flowered verticillasters; leaves thick, adaxially ± corrugate; petiole and stems densely white lanate 8. *T. ussuriense*
- 9b. Calyx with 5 equal or subequal teeth, when subequal the lower 2 teeth as long as but narrower than upper 3, all inconspicuously veined; false spikes composed of 2-flowered verticillasters; leaves papery; petiole and stems variously hairy (white lanate only in *T. japonicum* var. *tsungmingense*).

- 10a. Stems spreading white or yellowish villous, hairs 1.5–3 mm.
 11a. Calyx densely villous outside 7. *T. pilosum*
 11b. Calyx glabrous or pilose only on veins, when pilose calyx purplish 6. *T. tsinlingense*
 10b. Stems subglabrous or covered with small hooked hairs or white lanate but without spreading villous hairs 5. *T. japonicum*
- 6b. Verticillasters in dorsiventrally flattened false spikes; calyx conspicuously 2-lipped, throat pilose annulate inside; corolla tube exerted more than 2 × longer than calyx tube; nutlets netted.
 12a. False spikes terminal on apical 2/3 of stems and branches, in panicles; corolla limb projected at an obtuse angle to tube; stems covered with golden yellow, rusty brown, or purple villous or strigose hairs, hairs to 2.5 mm 9. *T. quadrifarium*
 12b. False spikes terminal on stems and branches, composed of widely spaced verticillasters, not in panicles; corolla limb projected at a right angle to tube; stems covered with hairs not as above.
 13a. Corolla 1.8–1.9 cm, limb as long as tube, tube ca. 2 × as long as calyx tube; leaves ovate-lanceolate, oblong-lanceolate, to ovate-oblong.
 14a. Bracts ovate; stems covered with small, purple, hooked hairs; corolla tube ca. 8 × 1.2 mm, limb to 1.2 cm 15. *T. labiosum*
 14b. Bracts ovate-lanceolate, lanceolate, to linear-lanceolate.
 15a. Stems spreading villous; corolla tube ca. 9 mm, ca. 1.5 mm wide at middle; teeth of lower calyx lip subulate to caudate-acuminate at apex 14. *T. simplex*
 15b. Stems subglabrous; corolla tube ca. 7 × 2 mm; teeth of lower calyx lip lanceolate, short acuminate at apex 13. *T. omeiense*
 13b. Corolla 1.2–1.6 cm, limb 1.5–2 × as long as tube, tube less than 2 × as long as calyx tube; leaves ovate to obovate, sometimes oblong or elliptic.
 16a. Bracts oblong-lanceolate to obovate-lanceolate; stems scabrid-villous; plants less than 25 cm 10. *T. nanum*
 16b. Bracts oblong to subcircular; stems subglabrous or with small hooked hairs or villous; plants more than 35 cm.
 17a. Stems slender and twisted; bracts oblong to subcircular; corolla limb nearly 2 × as long as tube; leaves ovate to obovate, 1.2–3.8 × 0.8–2.2 cm, apex rounded to obtuse; petiole 3–9 cm 11. *T. anlunense*
 17b. Stems erect; bracts ovate; corolla limb slightly longer than tube; leaves ovate to oblong, 3–6(–11) × 1.5–4.5 cm, apex acute; petiole 1–2.5 cm 12. *T. manghuaense*

1. *Teucrium scordium* Linnaeus, Sp. Pl. 2: 565. 1753.

蒜味香科科 suan wei xiang ke ke

Herbs perennial. Stems ascending, 25–35 cm tall, lanate-villous, with hairs 1–1.5 mm, branched from base. Leaves subsessile basally, sessile apically; leaf blade obovate to oblong, 1.2–3 × 0.4–1.2 cm, adaxially appressed villous, abaxially spreading villous mainly along veins and glandular, base rounded to broadly cuneate, margin remotely 3–6-crenate to coarsely 3–6-serrate, apex obtuse. Verticillasters 2–6-flowered, inserted on all but basal nodes. Pedicel 4–5 mm. Calyx tubular-campanulate, ca. 2.8 mm, very swollen in front at base, villous and glandular villous outside; teeth triangular, ca. 1/2 as long as calyx, with anterior 2 slightly narrower. Corolla purple, ca. 6 mm, pubescent outside; limb with a tuft of hairs inside, middle lobe oblong, undulate, lateral lobes obliquely ovate-triangular. Ovary white barbate. Nutlets ovoid, ca. 1 mm, slightly netted. Fl. Jul–Aug, fr. Sep.

Moist areas; 1000 m. Gansu, Xinjiang [Russia; Europe].

Used to treat wounds and as an antihydropic.

2. *Teucrium scordioides* Schreber, Pl. Verticill. Unilaa. Gen. Sp. 37. 1774.

沼泽香科科 zhao ze xiang ke ke

Herbs perennial, rhizomatous, stoloniferous. Stems erect, to 60 cm tall, densely lanate-villous, with hairs to 2 mm, striate, much branched apically. Leaves sessile; leaf blade obovate to oblong, 1–3.2 × 0.4–1.2 cm, unevenly villous except adaxially densely lanate-villous on midrib, margin 5–12-crenate. Verticillasters 2–6-flowered, inserted on all but

basal nodes. Pedicel 4–5 mm. Calyx tubular-campanulate, less than 3 mm, very swollen in front at base, villous and glandular villous outside; teeth triangular, subequal, ca. 1/2 as long as tube. Corolla purple, ca. 2 × as long as calyx, pubescent outside; limb with a tuft of hairs inside, middle lobe circular, lateral lobes narrowly, obliquely ovate-triangular. Ovary white, bullate, hairy. Nutlets unknown. Fl. Jul.

Marsh margins, moist grasslands. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan; SW Asia, Europe].

Used medicinally and as a spice.

3. *Teucrium veronicoides* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, sér. 3, 23: 388. 1877.

裂苞香科科 lie bao xiang ke ke

Herbs perennial, stoloniferous. Stems erect, 20–40 cm tall, spreading villous, much branched. Petiole 1–2 cm, spreading villous; leaf blade of mid stem leaves circular to ovate-triangular, 2–4 × 1.8–3 cm, basal leaf blade sometimes subreniform, 0.7–1.3 × 0.5–1.5 cm, adaxially appressed villous, abaxially puberulent except for villous veins, base truncate to subcordate, margin double crenate, apex obtuse to acute. Verticillasters 2-flowered, in spikes 5–10 cm; rachis villous; bracts ovate, 3-lobed. Pedicel 2.5–3.5 mm, villous. Calyx campanulate, 3–4 × 2–2.5 mm; teeth triangular, subequal, obtuse, subglabrous except for ciliate margin. Corolla purplish red, 7–8 mm, subglabrous outside; limb obliquely spreading, middle lobe subcircular, lateral lobes obliquely ovate-triangular and subequal. Nutlets chestnut brown, oblong-obovoid, ca. 1.2 mm, smooth. Fl. Jul.

Forests; 1800–2500 m. Hunan, Liaoning, Sichuan, Yunnan [Japan, Korea].

4. *Teucrium viscidum* Blume, Bijdr. 827. 1826.

血见愁 xue jian chou

Herbs perennial, stoloniferous. Stems erect, 30–70 cm tall, basally glabrous or subglabrous, apically glandular pubescent or glabrous. Petiole 1–3 cm, subglabrous; blade ovate to ovate-oblong, 3–10 cm, subglabrous or very sparsely puberulent, base rounded, broadly cuneate to cuneate, margin double crenate-serrate, apex acute to short acuminate. Spikes on apical parts of stem and branches, 3–7 cm, densely glandular pubescent; verticillasters close together, 2-flowered; bracts lanceolate. Pedicel 1–2 mm, densely glandular villous. Calyx campanulate, 2.8–4 × 2.2 mm; teeth straight, subequal, less than 1/2 as long as calyx tube, upper 3 ovate-triangular, lower 2 triangular. Corolla white, reddish, or purplish, 6.5–7.5 mm, tube ca. 3 mm; middle lobe circular, lateral lobes ovate-triangular, obtuse. Ovary apically bullate, hairy. Style as long as stamens. Nutlets yellow-brown, obovate, ca. 1.3 mm. Fl. Jun–Nov (Jun–Sep in the Chang Jiang basin; Jun–Nov in Guangdong and S Yunnan).

Moist forests, ravines, thickets on slopes; 100–2500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Myanmar, Philippines].

- 1a. Calyx glabrous 4c. var. *leiocalyx*
1b. Calyx densely glandular villous, gray
puberulent, or gray pubescent.
2a. Calyx densely glandular villous 4a. var. *viscidum*
2b. Calyx densely gray puberulent or gray pubescent.
3a. Calyx densely gray puberulent
..... 4b. var. *nepetoides*
3b. Calyx densely gray pubescent.
4a. Bracts to 10 mm; plants
glabrous 4d. var. *longibracteatum*
4b. Bracts less than 8 mm; plants
sparsely pubescent 4e. var. *macrostephanum*

4a. *Teucrium viscidum* var. *viscidum*

血见愁 xue jian chou

Teucrium philippinense Merrill; *T. stoloniferum* Roxburgh.

Calyx densely glandular villous outside.

Moist forests; 100–1500 m. Fujian, Guangdong, Guangxi, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Myanmar, Philippines].

Used medicinally.

4b. *Teucrium viscidum* var. *nepetoides* (H. Léveillé) C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 331. 1965.

微毛变种 wei mao bian zhong

Teucrium nepetoides H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 450. 1910.

Calyx densely gray puberulent, ca. 4 × 2.5 mm. Corolla 8–10 mm, tube 4–5 mm.

• Moist forests; 700–2000 m. Anhui, Guizhou, Hubei, Jiangxi, Shaanxi, Sichuan, Zhejiang.

4c. *Teucrium viscidum* var. *leiocalyx* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 332. 1965.

光萼变种 guang e bian zhong

Stems pilose or subglabrous. Calyx glabrous, shiny in fruit. Corolla white.

• Forests, ravines; 1700 m. Gansu, Hubei, Shaanxi, Sichuan.

4d. *Teucrium viscidum* var. *longibracteatum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 332. 1965.

长苞变种 chang bao bian zhong

Leaf base rounded to truncate. Spikes gray pubescent; bracts to 10 mm.

• Forests. Hunan.

4e. *Teucrium viscidum* var. *macrostephanum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 333. 1965.

大唇变种 da chun bian zhong

Stems sparsely pubescent. Petiole and abaxial surface of leaves pubescent, leaf base truncate. Bracts less than 8 mm. Calyx gray pubescent. Corolla ca. 1 cm.

• Thickets on slopes. Guangxi, Guizhou, Yunnan.

5. *Teucrium japonicum* Willdenow, Sp. Pl. 3: 23. 1800.

穗花香科科 sui hua xiang ke ke

Herbs perennial, stoloniferous. Stems 50–80 cm tall, glabrous or occasionally sparsely villous near nodes. Petiole 0.8–1.5 cm; leaf blade ovate-oblong to ovate-lanceolate, 5–10 × 1.5–4.5 cm, base cordate to truncate, margin double serrate/crenate, apex acute to short acuminate. Spikes 3–4.5 cm, glabrous; verticillasters close together and 2-flowered; bracts linear-lanceolate. Pedicel ca. 1.5 mm. Calyx campanulate, 4–4.5 × 3–3.5 mm, slightly swollen in front near base, 10-veined; teeth triangular, lower 2 narrower. Corolla white or reddish, 1.2–1.4 cm, tube 1/4 as long as corolla; middle lobe rhombic-obovate, nearly 1/2 as long as limb; lateral lobes ovate-oblong, acute. Style as long as stamens. Nutlets chestnut brown, obovate, ca. 1.2 mm, smooth, sparsely white bullate, hairy. Fl. Jul–Sep.

Hilly fields, waste areas, grasslands near roads; 500–1200 m. Gansu, Guangdong, Guizhou, Hebei, Henan, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang [Japan, Korea].

- 1a. Calyx glabrous except for ciliate margin.
2a. Inflorescences glabrous; petiole and abaxial
leaf surface sparsely pubescent; plants sparsely
pilose or pubescent to subglabrous
..... 5a. var. *japonicum*
2b. Inflorescences pubescent; petiole and
abaxial leaf surface lanate; plants
white lanate through-out 5b. var. *tsungmingense*
1b. Calyx sparsely pubescent 5c. var. *microphyllum*

5a. *Teucrium japonicum* var. *japonicum*

穗花香科科 sui hua xiang ke ke

Calyx glabrous, ciliate on margin.

Hilly fields; 500–1100 m. Guangdong, Guizhou, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang [Japan, Korea].

Used medicinally.

5b. *Teucrium japonicum* var. *tsungmingense* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 334. 1965.

崇明变种 chong ming bian zhong

Plants white lanate.

- Grasslands near roads. Jiangsu, Zhejiang.

5c. *Teucrium japonicum* var. *microphyllum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 334. 1965.

小叶变种 xiao ye bian zhong

Calyx sparsely pubescent.

- Waste areas; 500–1200 m. Gansu, Hebei, Henan.

6. *Teucrium tsinlingense* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 334. 1965.

秦岭香科科 qin ling xiang ke ke

Herbs stoloniferous. Stems erect, simple or branched, 40–80 cm tall, basally glabrous, with spreading villous hairs above middle, hairs to 2.5 mm. Petiole 0.6–1.5 cm, villous; leaf blade ovate-lanceolate, 3.5–7 × 1–2.5 cm, adaxially sparsely puberulent, abaxially subglabrous, pubescent on veins, glandular, base truncate to subcordate, margin serrate, apex acute to acuminate. Spikes 1.5–4.5 cm, verticillasters close together and 2-flowered; bracts linear-lanceolate, pilose. Pedicel ca. 2 mm, glabrous. Calyx campanulate, glabrous, shiny glandular; teeth ciliate, 3.5–4 mm, triangular, subequal. Corolla reddish, ca. 1.1 cm, tube as long as calyx; limb well developed, middle lobe subcircular, anterior lateral lobes ovate, posterior lateral lobes acute. Ovary bullate, hairy. Nutlets unknown.

- Wet field margins, plateaus; 1200–1800 m. Gansu, Shaanxi.

1a. Calyx glabrous, green 6a. var. *tsinlingense*

1b. Calyx pilose along veins, purplish
..... 6b. var. *porphyreum*

6a. *Teucrium tsinlingense* var. *tsinlingense*

秦岭香科科 qin ling xiang ke ke

Calyx green, glabrous.

- Wet field margins; 1200 m. Shaanxi.

6b. *Teucrium tsinlingense* var. *porphyreum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 335. 1965.

紫萼变种 zi e bian zhong

Calyx purplish, pilose along veins.

- Plateaus; 1800 m. Gansu.

7. *Teucrium pilosum* (Pampanini) C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 335. 1965.

长毛香科科 chang mao xiang ke ke

Teucrium japonicum Willdenow var. *pilosum* Pampanini, Nuovo Giorn. Bot. Ital., n.s. 17: 711. 1910.

Herbs perennial, stoloniferous. Stems erect, simple or occasionally branched apically, 50–100 cm tall, densely spreading white villous or yellow villous, hairs to 3 mm. Petiole 0.4–1 cm, spreading villous; leaf blade ovate-lanceolate to oblong-lanceolate, 5–8(–12) × 1.5–2.5(–5) cm,

adaxially with villous midrib otherwise appressed pubescent and unevenly pubescent, abaxially with villous veins, base truncate to subcordate, margin irregularly double serrulate, apex short acuminate to acuminate. Spikes terminal, 3.5–7(–15) mm, villous, verticillasters 2–4-flowered; bracts linear-lanceolate, villous. Pedicel ca. 1.5 mm, villous. Calyx campanulate, ca. 4 × 3 mm, villous, yellow glandular outside; upper 3 teeth triangular, lower 2 triangular-subulate. Corolla reddish, 1.2–1.5 cm; tube less than 1/3 as long as corolla; limb straight, middle lobe obovate-orbicular, to 5.5 mm in diam., apex apiculate; lateral lobes ovate-oblong, apically acute. Nutlets unknown. Fl. Jul–Aug.

- Forest margins, slopes, river banks; 300–2500 m. Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Zhejiang.

Used medicinally.

8. *Teucrium ussuriense* V. Komarov, Izv. Bot. Sada Akad. Nauk. SSSR 30: 208. 1932.

黑龙江香科科 hei long jiang xiang ke ke

Teucrium japonicum Willdenow var. *continentale* Kitagawa.

Herbs perennial, stoloniferous. Stems erect, 25–45 cm tall, simple or very short branched, white lanate. Petiole 4–7 mm, white lanate; leaf blade ovate-oblong, 2.5–4 × 1–1.6 cm, papery, adaxially appressed pubescent and ± rugulose, abaxially densely white lanate, base truncate or broadly cuneate, margin irregularly serrulate, apex obtuse or acute. Spikes 2–4.5 cm, verticillasters 2–4-flowered; bracts linear-lanceolate, 3–4 mm, pilose. Pedicel ca. 2 mm, pilose. Calyx campanulate, ca. 5 × 2.5 mm, pilose outside, 2-lipped; teeth ca. 1/4 as long as calyx and ciliate, upper 3 ovate-triangular and lower 2 triangular-lanceolate, apically acute. Corolla purple, ca. 1.2 cm, sparsely white puberulent outside, throat white puberulent, tube ca. 1/3 or more as long as corolla; middle lobe rhombic-obovate, ca. 2/5 as long as limb, lateral lobes ovate-oblong. Anterior stamens as long as corolla limb. Style slightly exerted. Nutlets brownish, 2 or 3, well developed, unequal, subglobose, ca. 1 mm in diam., smooth. Fl. Aug, fr. Sep.

Open, stony slopes, riverbanks. Hebei, Liaoning, Shanxi [Russia].

9. *Teucrium quadrifarium* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 108. 1825.

铁轴草 tie zhou cao

Teucrium fortunei Benth; *T. fulvoaureum* H. Léveillé; *T. fulvum* Hance; *T. kouytchouense* H. Léveillé.

Subshrubs. Stems erect, 30–110 cm tall, subterete, densely golden yellow, rusty villous, purple villous, or upwardly strigose. Petiole absent or to 1 cm; leaf blade ovate to oblong-ovate, 3–7.5 × 1.5–4 cm, adaxially appressed pubescent, abaxially gray tomentose to densely pubescent except villous or strigose on veins, base subcordate to truncate, margin double serrate to double crenate, apex obtuse to acute. Spikes on main stems and branches of apical 1/3 of plant, in panicles; verticillasters, usually close together; bracts 4–8 × 2–4 mm, sparsely villous, apically acuminate to caudate-acuminate. Calyx campanulate, 4–5 × 2 mm, villous or pubescent outside, pilose annulate at throat; middle tooth of upper lip obovate-oblate, lateral teeth triangular, teeth of lower lip lanceolate. Corolla reddish, 1.2–1.3 cm, sparsely pubescent and yellowish glandular outside, white puberulent

on lower part of limb inside, tube ca. 1/3 as long as corolla; middle lobe of limb obovate-subcircular, less than 1/2 as long as limb, lateral lobes ovate-oblong, posterior lobes reflexed. Nutlets dark brown, obovate-subglobose, ca. 1 mm, netted on back. Fl. Jul-Sep.

Open slopes, forests, thickets; 400–2400 m. Fujian, Guangdong, Guizhou, Hunan, Jiangxi, Yunnan [India (Sikkim), Indonesia (Sumatra), N Myanmar, Nepal].

Used medicinally.

10. *Teucrium nanum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 337. 1965.

矮生香科科 ai sheng xiang ke ke

Herbs perennial. Stems erect or ascending, 20–25 cm tall, terete, simple, scabrid villous. Leaves opposite or in whorls of 3; petiole 3–5 mm, villous; leaf blade oblong to obovate, 2–4 × 1.2–2 cm, adaxially villous, abaxially tomentose, base cuneate-decurrent, margin of apical half crenate, apex rounded to obtuse. Spikes 6–8 cm, villous; bracts oblong-lanceolate to obovate-lanceolate, shorter than calyx. Pedicel ca. 1.5 mm, densely yellow villous. Calyx campanulate, ca. 5 × 3.3 mm, densely yellow villous outside, throat pilose annulate; middle tooth of upper lip oblate, apex acute, lateral teeth obliquely ovate-triangular, lower lip teeth subulate. Corolla 1.1–1.2 cm, pilose outside, white puberulent inside, tube ca. 1/2 as long as corolla; middle lobe subcircular, clawed, lateral lobes ovate-lanceolate. Nutlets brown, oblong, ca. 1 mm, slightly netted. Fl. Aug-Sep.

• Grassy slopes. Sichuan, Yunnan.

11. *Teucrium anlungense* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 338. 1965.

安龙香科科 an long xiang ke ke

Herbs perennial. Stems erect or ascending, much branched, 60–70 cm tall, covered with small hooked hairs. Petiole 3–9 mm, strigose; leaf blade ovate to obovate, 1.2–3.8 × 0.8–2.2 cm, adaxially strigose, abaxially hispid, base cuneate-decurrent, margin undulate-crenate to crenate, apex rounded to obtuse. Spikes of secund, widely spaced, 2-flowered verticillasters; bracts oblong to subcircular, 1.5–5 × 1.2–3.8 mm, ciliate. Pedicel ca. 2 mm. Calyx campanulate, ca. 5 × 3.5 mm, yellowish glandular, pilose at base of veins outside, throat pilose annulate; middle tooth of upper lip very large, circular, acute at apex, lateral teeth obliquely ovate-triangular, lower lip teeth lanceolate. Corolla white or purplish, ca. 1.6 cm; throat bullate outside and inside, tube ca. 6 mm; middle lobe obovate-orbicular, ca. 3.8 mm, anterior lateral lobes ca. 0.7 mm, posterior lateral lobes ca. 1 mm. Ovary bullate, hairy. Nutlets yellow-brown, obovoid, ca. 1 mm, netted. Fl. Oct.

• Open hillsides; 600–1500 m. Guizhou, Yunnan.

Used medicinally for indigestion.

12. *Teucrium manghuaense* Sun ex S. Chow, Acta Phytotax. Sin. 10: 339. 1965.

巍山香科科 wei shan xiang ke ke

Stems erect, ca. 40 cm tall, densely strigose, unbranched or sometimes with clusters of leaves in leaf axils. Petiole 1–2.5 cm, densely villous; leaf blade ovate to oblong, adaxially strigose, abaxially sparsely pubescent, base cuneate, apex acute. Spikes sometimes axillary, 3–7 cm; verticillasters 2-

flowered, secund; bracts ovate, 4–8 × 1.7–3 mm, ciliate. Pedicel ca. 1.5 mm strigose. Calyx campanulate, ca. 6 mm, glabrous or slightly puberulent outside, throat pilose annulate, tube ca. 4 mm; upper lip triangular, ca. 2.3 × 4 mm; middle tooth ovate, ca. 2 × 3 mm; lateral teeth triangular; lower lip teeth narrowly triangular, ca. 1.8 × 1 mm. Corolla greenish white, ca. 1.2 cm, pubescent outside, throat puberulent, tube ca. 5.5 mm; limb reflexed, ca. 6.5 mm; middle lobe ovate, ca. 2.5 × 1.8 mm; lateral lobes elliptic, ca. 1 mm. Nutlets unknown. Fl. Aug-Sep.

• Broad-leaved forests. Yunnan.

- 1a. Plants densely strigose; leaves 3–6 × 1.5–3.3 cm; bracts ovate 12a. var. *manghuaense*
1b. Plants subglabrous; leaves to 11 × 4.5 cm; bracts lanceolate 12b. var. *angustum*

12a. *Teucrium manghuaense* var. *manghuaense*

巍山香科科 wei shan xiang ke ke

Plants densely strigose. Leaf blade 3–6 × 1.5–3.3 cm. Bracts ovate.

• Broad-leaved forests; 2800 m. Yunnan.

12b. *Teucrium manghuaense* var. *angustum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 340. 1965.

狭苞变种 xia bao bian zhong

Plants subglabrous. Leaf blade to 12 × 4.5 cm. Bracts lanceolate.

• Broad-leaved hillside forests; below 2000 m. Yunnan.

13. *Teucrium omeiense* Sun ex S. Chow, Acta Phytotax. Sin. 10: 340. 1965.

峨嵋香科科 e mei xiang ke ke

Herbs erect, perennial. Stems ca. 50 cm tall, subglabrous, few branched. Petiole (0.5–)1–1.5 cm, glabrous; leaf blade ovate-lanceolate, 3.5–12 × 1.5–3.5 cm, base rounded to cuneate, margin irregularly serrate, apex acute to acuminate. Spikes 4–10 cm; verticillasters close together, secund, 2-flowered; bracts lanceolate to linear-lanceolate, 2.5–5 × 0.8–1.5 mm, margin entire or 1- or 2-serrate, ciliate. Pedicel ca. 2 mm, pubescent or puberulent. Calyx campanulate, ca. 6 mm, sparsely pubescent or subglabrous except at base, pilose annulate at throat, tube ca. 4 mm; middle tooth of upper lip subcircular, ca. 3 mm wide, acute at apex; lateral teeth triangular, ca. 1.5 × 1.5 mm; lower lip teeth lanceolate, ca. 2 × 1.2 mm, and apically short acuminate. Corolla white, ca. 1.8 cm, pubescent outside, tube ca. 7 × 2 mm, limb ca. 1.1 cm; middle lobe ovate, ca. 4.5 × 3 mm; lateral lobes lanceolate, 1.6–2 mm. Style ca. 1.2 cm, sparsely puberulent. Nutlets ovoid, ca. 1.3 mm, netted. Fl. Jul-Sep.

• Moist forests; 1200–2600 m. Sichuan, Yunnan.

- 1a. Leaf blade adaxially pubescent, green, abaxially subglabrous except on veins, greenish; petiole 0.5–1.5 cm 13a. var. *omeiense*
1b. Leaves glabrous, adaxially bluish green, abaxially purplish; petiole to 2.5 cm 13b. var. *cyanophyllum*

13a. *Teucrium omeiense* var. *omeiense*

峨眉香科科 e mei xiang ke ke

Petiole 0.5–1.5 cm; leaf blade adaxially pubescent, abaxially green and subglabrous except on veins.

- Moist forests; 1200–2000 m. Sichuan.

13b. *Teucrium omeiense* var. *cyanophyllum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 341. 1965.

蓝叶变种 lan ye bian zhong

Petiole to 2.5 cm; leaf blade glabrous, adaxially bluish green, abaxially purplish.

- Moist hillside forests; 2300–2600 m. Yunnan.

14. *Teucrium simplex* Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 186. 1904.

香科科 xiang ke ke

Herbs erect, ca. 50 cm tall, spreading villous, unbranched or short branched. Petiole 1.5–2.5 cm, strigose-villous; leaf blade ovate-lanceolate to oblong-lanceolate, 5–9 × 1.5–2.4 cm, sparsely villous, base cuneate-decurrent, margin coarsely serrate, apex acuminate. Spikes terminal, 4–7 cm, verticillasters 2- or 3-flowered; rachis densely strigose-villous; bracts reduced apically, pilose. Pedicel 1.5–2 mm, densely villous. Calyx campanulate, 6–6.5 mm, pilose outside, pilose annulate at throat; middle tooth of upper lip circular, ca. 2 mm wide, apex apiculate, lateral teeth obliquely triangular; lower lip teeth subulate, apically caudate-acuminate, ca. 2.5 mm. Corolla white, to 1.9 cm, pilose outside, tube ca. 9 × 1.5 mm; middle lobe ovate, ca. 4 × 2.8 mm, apex rounded; lateral lobes subulate-lanceolate, ca. 2.2 mm. Stamens 6–7 mm. Style ca. 1 cm. Nutlets ocher colored, obovoid, netted. Fl. Jul–Aug.

- Moist areas in broad-leaved forests; 2000 m. Guizhou, Yunnan.

15. *Teucrium labiosum* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 342. 1965.

大唇香科科 da chun xiang ke ke

Herbs perennial, stoloniferous, ascending. Stems ca. 60 cm tall, unbranched or short branched, with dense, purple, hooked hairs. Petiole 0.5–2 cm; leaf blade ovate-oblong, 3–6 × 1.5–2.6 cm, adaxially puberulent or subglabrous, abaxially subglabrous except for pubescent veins, base cuneate to broadly cuneate-decurrent, margin double crenate, apex obtuse to acute. Spikes on short branches, 3–15 cm; verticillasters secund, 2-flowered; bracts subsessile, ovate, margin entire. Pedicel 2–2.5 mm, to 4 mm in fruit, densely pubescent. Calyx campanulate, ca. 5 mm, pubescent outside, pilose annulate at throat; middle tooth of upper lip subcircular, apex acute, ca. 2 mm wide, lateral teeth triangular; lower lip teeth subulate, ca. 2.5 mm. Corolla white, to 2 cm, tube ca. 8 × 1.2 mm, pilose outside; middle lobe rhombic-oblate, ca. 4.5 × 5 mm, apex acute, constricted into claw at base; posterior lateral lobes linear-lanceolate, apically ciliate. Ovary bullate, hairy. Nutlets yellow-brown, obovoid, ca. 1.1 mm, slightly netted. Fl. Jul–Aug.

- Hilly forests; 1200 m. Guizhou, Sichuan, Yunnan.

16. *Teucrium pernyi* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 6: 125. 1883.

庐山香科科 lu shan xiang ke ke

Kinostemon ningpoense (Hemsley) Kudô; *K. pernyi* (Franchet) Kudô var. *ningpoense* (Hemsley) Kudô; *Teucrium huoshanense* S. W. Su & J. Q. He; *T. ningpoense* Hemsley.

Herbs perennial, erect, stoloniferous. Stems 60(–100) cm tall, with dense, retrorse white pubescence, with hairs ca. 0.5 mm. Petiole 3–7 mm; leaf blade ovate-lanceolate, 3.5–5.3(–8.5) × 1.5–2(–3.5) cm, puberulent except white pubescent on abaxial veins, base broadly cuneate-decurrent, apex short acuminate to acuminate. Spikes terminal, on short axillary branches, verticillasters 2(–6)-flowered; bracts ovate, pubescent, as long as pedicel. Pedicel 3–4 mm, pubescent. Calyx campanulate, swollen in front at base, ca. 5 × 3.5 mm, sparsely puberulent outside, pilose annulate at throat; middle tooth of upper lip subcircular, apex mucronate; lateral teeth triangular-ovate, less than 1/2 as long as middle tooth; lower lip teeth triangular-subulate, apically acuminate. Corolla white, sometimes tinged red, ca. 1 cm; tube slightly exerted, ca. 4.5 mm, sparsely puberulent outside; middle lobe of limb well developed, elliptic-subulate, ca. 4 × 2.6 mm, apex acute; posterior lobes obliquely triangular-ovate. Stamens more than 2 × as long as corolla tube. Style unequally 2-cleft at apex. Ovary bullate, hairy. Nutlets brownish black, obovoid, ca. 1.2 mm, conspicuously netted.

- Hilly areas, fields; 200–1100 m. Anhui, Fujian, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Zhejiang.

17. *Teucrium bidentatum* Hemsley, J. Linn. Soc., Bot. 26: 312. 1890.

二齿香科科 er chi xiang ke ke

Kinostemon bidentatum (Hemsley) Kudô; *Plectranthus hanceiformis* H. Léveillé; *Teucrium bidentatum* Hemsley var. *purpureum* Diels.

Herbs erect, perennial. Stems 60–90 cm tall, sparsely retrorse puberulent; branches subhorizontal. Petiole 5–9 mm, puberulent; leaf blade ovate to lanceolate, 4–11 × 1.5–4 cm, glabrous except sparsely puberulent on midrib and veins, abaxially minutely papillate, base cuneate to broadly cuneate-decurrent, margin of apical half 3- or 4-serrate, apex acuminate to caudate-acuminate. Spikes 1.5–4.5 cm, puberulent; verticillasters 2-flowered; bracts ovate-lanceolate, glabrous except ciliate on margin, as long as or longer than pedicel. Pedicel ca. 3 mm, puberulent or subglabrous. Calyx campanulate, swollen in front at base, ca. 4.6 × 4 mm, glabrous except for puberulent base outside, pilose annulate at throat; middle tooth of upper lip oblate, to 3.5 mm wide, lateral teeth subcircular. Corolla white, ca. 1 cm, glabrous; tube slightly exerted, ca. 5 × 1.8 mm; middle lobe of limb subcircular, ca. 3 mm wide, basally constricted; anterior lateral lobes oblong, ca. 1.2 × 0.8 mm; posterior lateral lobes subcircular, ca. 1.2 × 1.5 mm. Stamens ca. 3 × as long as corolla tube. Nutlets yellow-brown, ovoid, ca. 1.2 × 1 mm, netted.

- Hilly forests; 1000–1300 m. Guangxi, Guizhou, Hubei, Sichuan, Taiwan, Yunnan.

Used medicinally.

18. *Teucrium integrifolium* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 345. 1965.

全叶香科科 quan ye xiang ke ke

Herbs erect, perennial. Stems ca. 90 cm tall, basally terete and woody, apically subglabrous or sparsely puberulent. Leaves sessile; leaf blade ovate-lanceolate, 3.5–11 × 0.8–2.8 cm, glabrous, abaxially with small yellowish glands, base rounded, slightly decurrent, margin entire, apex caudate-acuminate. Spikes 3.5–4.5(–6) cm, verticillasters 2-flowered; bracts linear, as long as pedicel, subglabrous. Pedicel ca. 2.5 mm, puberulent. Calyx swollen in front at base, ca. 5 × 4.5 mm, base puberulent outside, throat pilose annulate, tube ca. 2.6 mm; middle tooth of upper lip oblate,

ca. 2.4 × 3 mm, lateral teeth subcircular; lower lip teeth subulate. Corolla white, to 1.2 cm, glabrous, yellowish glandular outside, center of lip white bullate, hairy, tube ca. 5 × 1.8 mm; middle lobe spatulate, ca. 4 × 3.5 mm, apex apiculate; anterior lateral lobes oblong, ca. 1.8 × 1 mm; posterior lateral lobes obliquely triangular, ca. 1.2 × 2 mm. Stamens more than 2 × as long as corolla tube; filaments basally pubescent. Nutlets unknown. Fl. Jul.

- Thickets; 1000 m. Guizhou.

4. KINOSTEMON Kudô, Trans. Nat. Hist. Soc. Taiwan 19: 1. 1929.

动蕊花属 dong rui hua shu

Herbs perennial. Leaves short petiolate; leaf blade ovate to linear-oblong. Verticillasters 2-flowered, arranged in lax, terminal and axillary, simple or branched thyrses; bracts lanceolate, sometimes early deciduous. Flowers pedicellate. Calyx campanulate, 10-veined, 2-lipped; upper lip 3-toothed, middle tooth largest, conspicuously netted, lateral 2 teeth smaller; lower lip 2-toothed. Corolla 2-lipped, upper lip 2-lobed, lower lip 3-lobed with middle lobe largest. Stamens 4, straight, exerted from upper lip of corolla, anterior 2 slightly longer, ca. 2 × as long as corolla; filaments filiform; anther cells divergent, confluent at apex. Ovary shallowly 4-lobed, apically truncate. Nutlets 4, obovoid, netted on back, areole nearly 1/2 as long as nutlet.

Three species: endemic to China.

- 1a. Plants glabrous; lobes of upper corolla lip obliquely triangular-ovate 1. *K. ornatum*
- 1b. Plants villous or pubescent; lobes of upper corolla lip ovate or oblate.
 - 2a. Leaves ovate to ovate-lanceolate, 3–6 × 1–2 cm, irregularly dentate, lateral veins 3–15-paired; inflorescences of 3–7 verticillasters; corolla to 1.1 cm, glabrous inside 2. *K. alborubrum*
 - 2b. Leaves subcircular to ovate, less than 2 × 1.3 cm, 2- or 3- (or 5)-crenate, lateral veins 2- or 3-paired; inflorescences of 4 verticillasters; corolla ca. 7.5 mm, bearded annulate inside 3. *K. veronicifolia*

1. Kinostemon ornatum (Hemsley) Kudô, Trans. Nat. Hist. Soc. Taiwan 19: 2. 1929.

动蕊花 dong rui hua

Teucrium ornatum Hemsley, J. Linn. Soc., Bot. 26: 313. 1890; *Orthosiphon delavayi* H. Léveillé.

Stems erect, 50–80 cm tall, glabrous, branched from base. Petiole 3–10 mm; leaf blade ovate-lanceolate to linear-oblong, 7–13 × 1.3–3.5 cm, glabrous, lateral veins 6–8-paired, base cuneate-decurrent, margin remotely dentate to sometimes entire, apex caudate-acuminate or sometimes falcate-acuminate. Verticillasters widely spaced, secund, in terminal and axillary glabrous thyrses, axillary thyrses slightly shorter than leaves; bracts ca. 5 × 1 mm, early deciduous. Pedicel ca. 3 mm, glabrous. Calyx ca. 4.7 × 4.5 mm, tube ca. 2 mm, glabrous outside, pilose annulate at throat; middle tooth of upper lip circular, ca. 3 mm in diam., apex acute, lateral teeth ovate; lower lip slightly longer than upper. Corolla purplish red, ca. 1.1 cm, very sparsely pubescent outside, with yellow glands, glabrous inside; tube to 8 mm, ca. 1.2 mm wide basally, dilated apically; lobes of upper lip obliquely triangular-ovate, ca. 2 mm; middle lobe of lower lip ovate-spatulate, ca. 4 × 2.8 mm, apex apiculate; lateral lobes oblong, ca. 2.5 × 1 mm. Nutlets ca. 1 mm in diam. Fl. Jun-Aug, fr. Aug-Nov.

- Forested slopes; 700–2600 m. Anhui, Guizhou, Hubei, Shaanxi, Sichuan, Yunnan.

2. Kinostemon alborubrum (Hemsley) C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 247. 1965.

粉红动蕊花 fen hong dong rui hua

Teucrium alborubrum Hemsley, J. Linn. Soc., Bot. 26: 311. 1890.

Plants rhizomatous. Stems ascending, over 1 m tall, much branched, finely striate apically, densely spreading white pilose. Petiole 4–12 mm; leaf blade ovate to ovate-lanceolate, 3–6 × 1–2 cm, pilose, veins densely villous abaxially, base broadly cuneate to cuneate-decurrent, margin irregularly dentate, apex short acuminate to caudate-acuminate. Verticillasters widely spaced, secund, in terminal and axillary thyrses 3–6 cm; bracts ca. 1/2 as long as pedicel, pilose. Pedicel 3–4 mm, puberulent. Calyx ca. 4 × 4 mm, pilose outside, pilose annulate at throat, tube ca. 2 mm; middle tooth of upper lip oblate, ca. 1.7 mm in diam., apex acute; lateral teeth ovate, ca. 1/2 as long as middle tooth; lower lip teeth triangular-subulate, slightly longer than upper lip, ca. 2 mm. Corolla reddish, ca. 1.1 cm, lanate-villous, with yellow glands outside, glabrous inside; tube to 7 × 1.7 mm, slightly dilated at throat; limb spreading almost at a right angle to tube, lobes of upper lip oblate, ca. 1 × 2 mm; middle lobe of lower lip oblong, ca. 4 × 2 mm, concave, apex rounded; lateral lobes ovate, ca. 1.2 mm. Style greatly exerted. Nutlets unknown. Fl. Jul.

- Hilly grasslands. Hubei, Sichuan.

3. Kinostemon veronicifolia H. W. Li, Bull. Bot. Res. 3(3): 70. 1983.

保康动蕊花 bao kang dong rui hua

Plants ca. 20 cm tall. Stems ascending, much branched, striate, densely spreading yellow-brown pubescent. Petiole 2–3 mm, densely spreading pubescent; leaf blade subcircular to ovate, (0.5–)1.3–2 × (0.5–)1–1.3 cm, abaxially densely pubescent especially along midrib and veins, lateral veins 2- or 3-paired, base rounded, margin 2- or 3- (or 5)-crenate, apex acute. Thyrses terminal, to 4 cm, composed of 4 verticillasters; rachis white pubescent; bracts ovate-lanceolate, 1–1.5 mm, apically acute. Pedicel to 4 mm. Calyx ca. 3.8 mm, tubular-campanulate, pubescent outside, pilose annulate at

throat; upper lip ca. 1.5 mm, middle tooth oblate, ca. 1.7 mm wide, lateral teeth nearly semicircular, ca. 0.5 × 1 mm; lower lip ca. 2 mm, with ovate-triangular, apically acute teeth. Corolla purple-red, ca. 7.5 mm, white pubescent outside, bearded annulate inside; tube ca. 6 × 1.5 mm, throat slightly dilated; limb nearly at a right angle to tube; lobes of upper lip ovate, ca. 2.5 mm; middle lobe of lower lip oblong-ovate, ca. 3 × 2 mm, concave, apex rounded; lateral lobes ovate, ca. 1 mm. Nutlets unknown. Fl. Sep.

• Waste areas; 400 m. Hubei (Baokang Xian).
5. HOLOCHEILA (Kudô) S. Chow, Acta Bot. Sin. 10: 250. 1962.

全唇花属 quan chun hua shu

Teucrium Linnaeus sect. *Holocheila* Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 11: 296. 1929.

Herbs stoloniferous, perennial. Stems simple, erect. Leaves long petiolate; leaf blade cordate. Cymes axillary, long pedunculate. Calyx obliquely campanulate, 10-veined, 2-lipped, upper lip 3-toothed, lower lip 2-toothed. Corolla tubular, base narrow, gradually dilated into ample throat, conspicuously 2-lipped, lips entire; lower lip spatulate-concave, slightly declined. Stamens 4, involute in bud, exerted from upper lip of corolla, anterior 2 slightly longer, inserted at corolla throat; anther cells 2, divaricate, apically confluent. Style subterminal, as long as stamens, 2-cleft, anterior lobe longest. Nutlet 1 per flower when mature, subglobose.

A monotypic genus: endemic to China.

1. Holocheila longipedunculata S. Chow, Acta Bot. Sin. 10: 251. 1962.

全唇花 quan chun hua

Teucrium holocheilum W. E. Evans.

Stems 20–30 cm tall, spreading hirsute with hairs to 2 mm. Petiole 2.5–5.5 cm, glandular hirsute; leaf blades of mid stem and upper leaves circular, 2.2–4.9 × 2.5–4.7 cm, hirsute, base truncate to subcordate, margin crenate, apex obtuse; leaf blade of basal leaves broadly circular to reniform, smaller. Cymes corymbose, 7–13-flowered; peduncle ca. 2 cm; bracts obovate-lanceolate to linear, margin entire, basal bracts

margin 1- or 2-serrate and 5–8 × 1–2 mm. Calyx hirsute, pilose inside, ca. 5 × 2.5 mm, tube ca. 2.4 mm; upper teeth ovate-triangular, apically acute, middle lobe largest; lower teeth triangular-subulate, straight, shorter than lateral lobes. Corolla rose, to 1.2 cm; tube ca. 1 cm, ca. 1.2 mm wide at middle, long exerted; upper lip ca. 1 × 3 mm; lower lip spatulate, concave, apex rounded, ca. 6 × 4.5 mm, slightly declinate. Anterior stamens ca. 4 mm. Ovary glabrous. Nutlet ca. 0.9 × 1 mm, black, hairy, finely pitted, areole basal-central and concave. Fl. Mar-May, fr. May-Jun.

• Mixed and bamboo forests, shady thickets, grasslands; 1600–2200 m. Yunnan.

6. AJUGA Linnaeus, Sp. Pl. 2: 561. 1753.

筋骨草属 jin gu cao shu

Plants annual, biennial or perennial, herbaceous, rarely shrubs. Leaves simple; leaf blade papery, margin dentate to incised, rarely subentire. Verticillasters 2- to many flowered, in false spikes; floral leaves similar to stem leaves or gradually reduced to bracts, rarely dissimilar, larger than stem leaves. Flowers sessile. Calyx ovoid to globose, campanulate to funnelform, 10-veined, sometimes with inconspicuous accessory veins; teeth 5, slightly irregular. Corolla purple to blue, rarely yellow or white, 2-lipped, often persistent in fruit; tube straight to slightly curved, base slightly bent/swollen; throat slightly dilated, villous annulate, rarely glabrous inside; upper lip straight, entire to 2-lobed; lower lip elongate, 3-lobed, with middle lobe obcordate to nearly flabellate and lateral lobes oblong. Stamens 4, didynamous, exerted from upper lip, involute in bud, anterior 2 longer; filaments straight to slightly curved; anther cells 2, apically confluent. Style subequally 2-cleft, lobes subulate. Nutlets obovoid, triquetrous, netted on back, lateral-ventral side with an areole 1/2–2/3 its length, with an elaiosome.

About 40–50 species: Asia, Europe, especially in the Near East; 18 species in China.

- 1a. Verticillasters 2(–4, rarely more)-flowered, widely spaced; floral leaves similar to stem leaves; fertile branches (only) erect to ascending.
 - 2a. Base of corolla tube not villous annulate inside; leaf base cordate to subtruncate 1. *A. lobata*
 - 2b. Base of corolla tube villous annulate inside; leaf base cuneate to subtruncate, decurrent.
 - 3a. Leaves spatulate, 2–3 × 4–6 mm 2. *A. pygmaea*
 - 3b. Leaves ovate to oblong, more than 10 mm wide.
 - 4a. Leaves 3–5.3 × 2.5–3.8 cm, ovate to ovate-oblong, basally cuneate to subtruncate, slightly decurrent 3. *A. sciaphila*
 - 4b. Leaves 2–3.4 × 1.2–2.3 cm, oblong to ovate-oblong, basally cuneate to decurrent 4. *A. nubigena*
- 1b. Verticillasters 6- or more flowered, close together; floral leaves unlike stem leaves (except in *A. linearifolia*); plants erect, rarely trailing.
 - 5a. Floral leaves longer than flowers, whitish yellow, white, or purple 5. *A. lupulina*

- 5b. Floral leaves equal to or slightly shorter than flowers, rarely longer, green or purplish.
- 6a. Corolla tube (1.5–)2–3 cm, upper lip 2-lobed 6. *A. ovalifolia*
- 6b. Corolla tube less than 1.6 cm, rarely to 2 cm, upper lip shallowly 2-lobed.
- 7a. Floral and stem leaves similar, of 1 color; stem leaves linear to linear-lanceolate 18. *A. linearifolia*
- 7b. Floral and stem leaves dissimilar; stem leaves of other shapes.
- 8a. Corolla tube erect to slightly curved, not saccate or bent above annulus of hairs.
- 9a. Calyx ciliate along veins and teeth margin, villous to puberulent apically, glabrous basally, or subglabrous throughout.
- 10a. Stems 25–40 cm tall, purplish red or greenish purple, glabrous, gray villous only on younger parts; leaves ovate-oblong to narrowly oblong, 4–7.5 × 3.2–4 cm, irregularly double dentate 7. *A. ciliata*
- 10b. Stems less than 20 cm tall, sometimes to 30 cm, not brightly colored, densely gray pubescent to gray villous; leaves ovate to lanceolate-oblong, less than 3.2 cm wide, margin repand.
- 11a. Inflorescences 1–3 cm; floral leaves usually shorter than flowers; calyx white villous on teeth 9. *A. campylanthoides*
- 11b. Inflorescences ca. 6 cm; floral leaves much longer than flowers; calyx ciliate along veins and apical teeth margin 11. *A. forrestii*
- 9b. Calyx strigose, villous, or lanate-villous throughout, especially on teeth.
- 12a. Calyx strigose; corolla tube slightly curved; stamens nearly included; plants sub-prostrate, basally stoloniferous 10. *A. campylantha*
- 12b. Calyx villous or lanate-villous; corolla tube straight; stamens slightly exerted; plants erect or stoloniferous.
- 13a. Stems erect, unbranched, 6–21 cm tall, densely gray lanate or silky 8. *A. multiflora*
- 13b. Plants with stolons and erect fertile stems ca. 10 cm tall, gray villous or lanate-villous 12. *A. bracteosa*
- 8b. Corolla tube slightly swollen, shallowly saccate to bent above annulus of hairs.
- 14a. Calyx teeth lanceolate to lanceolate-triangular; plants spreading ascending or with stolons 13. *A. pantantha*
- 14b. Calyx teeth narrowly triangular to broadly ovate; plants erect, sometimes trailing-ascending.
- 15a. Corolla 6–8(–9) mm; calyx teeth ovate to ovate-triangular; stamens exerted ca. 1/2 their length.
- 16a. Corolla white, upper lip shorter than lateral lobes of lower lip; calyx teeth ovate-triangular 16. *A. dictyocarpa*
- 16b. Corolla blue, blue-purple, or purple, upper lip nearly as long as lateral lobes of lower lip; calyx teeth ovate to broadly ovate 17. *A. macrosperma*
- 15b. Corolla more than 8 mm; calyx teeth narrowly or short triangular; stamens exerted 1/4–1/3 their length.
- 17a. Leaves spatulate to suboblong; plants prostrate, with basal leaves at anthesis 14. *A. decumbens*
- 17b. Leaves broadly oblong to obovate-elliptic; plants erect or rarely prostrate, branched at base, without basal leaves at anthesis 15. *A. nipponensis*

1. *Ajuga lobata* D. Don, Prodr. Fl. Nepal. 108. 1825.

匍枝筋骨草 pu zhi jin gu cao

Herbs perennial, erect, stoloniferous, 7–12 cm tall. Branches trailing, rooting at nodes, brownish villous/pilose. Petiole 2–4(–5) cm; leaf blade circular to elliptic-circular, 2–2.5 × 1.8–2.4 cm, sparsely strigose, densely so on abaxial veins, basal blades purplish, base cordate to subtruncate, margin irregularly crenate, ciliate, apex rounded to obtuse. Floral leaves similar to stem leaves. Flowers solitary. Pedicel 3–4 mm. Calyx campanulate, ca. 5 mm, slightly swollen; teeth ovate-lanceolate, 1/2 or more as long as calyx, posterior tooth slightly shorter and somewhat obtuse, ciliate. Corolla purple or reddish purple, tubular, straight, 1.3–1.5 cm, pubescent, not hairy annulate inside; upper lip erect, semicircular, emarginate; lower lip with middle lobe flabellate, 2-lobed, lateral lobes oblong-lanceolate. Nutlets ca. 2 mm, netted on back, with an areole to 4/5 of nutlet length. Fl. Apr–May, fr. May–Jul.

Dense forests; 1500–3000 m. Xizang, Yunnan [Bhutan, India (Sikkim), N Myanmar, Nepal].

2. *Ajuga pygmaea* A. Gray, Mem. Amer. Acad. Arts, n.s. 6: 402. 1858.

台湾筋骨草 tai wan jin gu cao

Herbs procumbent, stoloniferous. Internodes of stolons 4–6 cm. Leaves in a rosette, petiolate; leaf blade spatulate, 2–3 cm × 4–6 mm, sparsely strigose, base cuneate, decurrent, margin 1- or 2-undulate-dentate, ciliate, apex widely obtuse to rounded. Floral leaves similar. Flowers sky blue, solitary in apical axils. Calyx campanulate, ca. 4 mm, 10-veined; teeth oblong, ca. 1/2 as long as calyx, obtuse, ciliate, pilose. Corolla ca. 1.2 cm, tubular; tube straight, pilose, villous annulate inside; upper lip straight, 2-lobed, with obtusely triangular lobes; lower lip 2–3 × as long as upper lip, with middle lobe narrowly obovate-triangular, base truncate, apex emarginate; lateral lobes quadrate, almost as long as middle lobe. Nutlets ca. 2 mm, areole to 2/3 of nutlet length.

Jiangsu, Taiwan [Japan].

3. *Ajuga sciaphila* W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 193. 1920.

喜荫筋骨草 xi yin jin gu cao

Herbs perennial, stoloniferous. Stems erect, 10–30 cm tall, villous to pilose. Petiole 1.3–2(–3.7) cm; leaf blade ovate to ovate-elliptic, 3–5.3 × 2.5–3.8 cm, papery, strigose and densely so abaxially on veins, base cuneate to subtruncate and

decurrent, margin irregularly to coarsely crenate, apex obtuse to subrounded. Verticillasters widely spaced, 2–(6)-flowered. Pedicel 3–6(–12) mm, villous. Calyx campanulate, sparsely villous, 5.5–7 mm; teeth subequal, ovate-triangular to triangular, ciliate, ca. 1/2 as long as calyx. Corolla blue or purplish blue with purple lines; tube straight, 1.5–1.8 cm, sparsely pubescent, villous annulate and puberulent inside; upper lip semicircular, emarginate; middle lobe of lower lip 0.9–1.1 cm, triangular-obcordate, 2-lobed; lateral lobes oblong, to 5 mm. Nutlets obovoid, triquetrous, glabrous, netted on back, with an areole adaxially. Fl. Jun-Jul.

• Grassy slopes, moist riverbanks in pine forests, broad-leaved forests; 2500–3700 m. Sichuan, Yunnan.

4. *Ajuga nubigena* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1030. 1926.

高山筋骨草 gao shan jin gu cao

Herbs perennial, stoloniferous. Stolons ca. 10 cm, pilose or villous especially on younger parts. Fertile branches erect, ca. 6 cm tall. Petiole 1–2 cm, sometimes narrowly winged; leaf blade purplish green or purplish red abaxially, elliptic to ovate-elliptic, 2–3.4 × 1.2–2.3 cm, papery, pilose, base cuneate to decurrent, margin irregularly coarse crenate, apex obtuse to subrounded. Verticillasters 2-flowered, subapical, 2 or 3 together. Pedicel 2–4 mm. Calyx campanulate, ca. 7 mm; teeth ovate-triangular, subregular, ca. 1/2 as long as calyx, ciliate. Corolla purplish with purple spots or lines, tubular, 1–2 × as long as calyx, sparsely pubescent, villous annulate inside; upper lip straight, apex emarginate; middle lobe of lower lip 5–7 mm, flabellate, apex emarginate, lateral lobes linear-oblong. Nutlets glabrous, with an areole adaxially. Fl. May-Aug, fr. Jul-Sep.

• Sparse forests, rocky crevices in alpine regions; 2500–4800 m. Sichuan, Xizang, Yunnan.

5. *Ajuga lupulina* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, sér. 3, 23: 391. 1877.

白苞筋骨草 bai bao jin gu cao

Herbs perennial, rhizomatous. Stems robust, erect, angles and nodes villous. Petiole narrowly winged, basally amplexicaul; leaf blade lanceolate to rhombic-ovate, 5–11 × 1.8–3 cm, base cuneate-decurrent, margin remotely undulate-crenate, inconspicuously crenate-dentate, to subentire, apex obtuse. Floral leaves white-yellow, white, or greenish purple, reduced apically, ovate to broadly ovate, 3.5–5 × 1.8–2.7 cm, base rounded, amplexicaul, margin entire to dentate, apex acuminate. Calyx campanulate to subfunneliform, 7–9 mm, slightly swollen in front, with inconspicuous accessory veins; teeth narrowly triangular, 1/2 or more as long as calyx, regular, apically acuminate, ciliate. Corolla white, whitish green, or whitish yellow with purple lines, narrowly funneliform, (1.1–)1.8–2.5 cm, sparsely villous; tube slightly swollen to saccate near base, villous annulate inside, curved; upper lip straight, 2-lobed, with subcircular lobes; lower lip projected, with middle lobe narrowly flabellate, ca. 6.5 mm, apex emarginate; lateral lobes semicircular, deltate to oblong, ca. 3 mm. Nutlets slightly swollen at middle, areole almost 1/2 as long as adaxial side of nutlet. Fl. Jul-Sep, fr. Aug-Oct.

• Sandy areas along riverbanks, alpine grasslands, grassy slopes near villages, crevices of steep rocky slopes; 1300–4200 m. Gansu, Hebei, Qinghai, Shanxi, Sichuan, Xizang, Yunnan.

1a. Floral leaves entire; leaf blade lanceolate-oblong

to lanceolate, adaxially glabrous or very sparsely pilose, abaxially villous on veins or sparsely pilose near apex; plants 8–25 cm tall

- 5a. var. *lupulina*
1b. Floral leaves dentate; leaf blade ovate-circular to rhombic-ovate, pilose; plants more than 25 cm tall 5b. var. *major*

5a. *Ajuga lupulina* var. *lupulina*

白苞筋骨草 bai bao jin gu cao

Plants 8–25 cm tall. Leaf blade lanceolate-oblong to lanceolate, adaxially glabrous or very sparsely pilose, abaxially villous on veins or sparsely pilose near apex. Floral leaves entire.

• Sandy areas along riverbanks, alpine grasslands, crevices of steep rocky slopes; 1300–3500 m. Gansu, Hebei, Qinghai, Shanxi, Sichuan, Xizang.

5b. *Ajuga lupulina* var. *major* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 242. 1912.

齿苞变种 chi bao bian zhong

Plants more than 25 cm tall; leaf blade ovate to rhombic-ovate, pilose, veins abaxially conspicuously elevated. Floral leaves more than 2.5 cm wide, dentate.

• Grasslands near alpine forests, grassy slopes near villages; 2800–4200 m. Sichuan, Yunnan.

6. *Ajuga ovalifolia* Bureau & Franchet, J. Bot. (Morot) 5: 150. 1890.

圆叶筋骨草 yuan ye jin gu cao

Herbs annual. Stems 3–23(–30) cm tall, erect, white villous, unbranched. Petiole 0.7–2 cm, narrowly winged, greenish white, sometimes red or greenish purple; leaf blade (3–)4–8 × (1.5–)2.2–7 cm, sparsely strigose, base cuneate-decurrent, margin undulate to irregularly crenate, ciliate, apex obtuse to rounded. Inflorescences terminal, subcapitate, 2–3 cm, of 3 or 4 verticillasters; basal floral leaves green, red, or blue, shaded purplish, ovate to elliptic, 1.5–4.5 cm, crenate to entire, ciliate. Calyx tubular-campanulate, 5–8 mm, glabrous or ciliate on margin; teeth narrowly triangular to linear-lanceolate, to 1/2 as long as calyx. Corolla red-purple to blue, tubular, slightly curved, 1.5–3 cm, pilose, villous annulate inside; upper lip 2-lobed, with circular and equal lobes; lower lip with flabellate middle lobe slightly larger than circular lateral lobes. Fl. Jun-Aug, fr. Sep.

• Grassy slopes, thickets; 2800–3700 m. Gansu, Sichuan.

- 1a. Stems 10–23(–30) cm tall, with 3 or more pairs of leaves; leaf blade oblong-elliptic to broadly ovate-elliptic, 4–8 × 2.2–5 cm; corolla 2–2.5 cm 6a. var. *ovalifolia*
1b. Stems 3–6(–12) cm tall, with 2 or occasionally 3 pairs of leaves; leaf blade narrowly lanceolate to broadly ovate or subrhombic, (3–)4–6 × (1.5–) 3–7 cm; corolla 1.5–2(–3) cm 6b. var. *calantha*

6a. *Ajuga ovalifolia* var. *ovalifolia*

圆叶筋骨草 yuan ye jin gu cao

Stems 10–23(–30 or more) cm tall, with 3 or more pairs of leaves. Leaf blade oblong-elliptic to broadly ovate-elliptic, 4–8 × 2.2–5 cm. Corolla 2–2.5 cm.

• Sandy, grassy, barren slopes, thickets; 2800–4300 m. Gansu, Sichuan.

6b. *Ajuga ovalifolia* var. *calantha* (Diels ex Limpricht) C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 23. 1974.

美花变种 mei hua bian zhong

Ajuga calantha Diels ex Limpricht, Repert. Spec. Nov. Regni Veg. Beih. 12: 475. 1922; *A. ovalifolia* var. *calantha* (Diels ex Limpricht) C. Y. Wu & C. Chen f. *albiflora* Sun ex C. Y. Wu & C. Chen; *A. ovalifolia* var. *calantha* f. *angustifolia* (Diels) C. Y. Wu & C. Chen; *A. calantha* var. *angustifolia* Diels; *A. ovalifolia* var. *angustifolia* (Diels ex Limpricht) Handel-Mazzetti.

Stems 3–6(–12) cm tall, with 2 (or 3) pairs of leaves. Leaf blade narrowly lanceolate to broadly ovate to subrhombic, (3–)4–6 × (1.5–)3–7 cm, basally decurrent. Corolla 1.5–2(–3) cm.

• Sandy, grassy, barren slopes; 3000–4300 m. Gansu, Sichuan.

7. *Ajuga ciliata* Bunge, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 2: 125. 1833.

筋骨草 jin gu cao

Herbs perennial. Stems erect, 25–40 cm tall, purplish red or greenish red. Petiole 1 cm or more, sometimes purple-red, amplexicaul, gray pilose or ciliate only on margin; leaf blade ovate-elliptic to narrowly elliptic, 4–7.5 × 3.2–4 cm, strigose or pilose, base cuneate-decurrent, margin irregularly double dentate, ciliate, apex obtuse to acute. Inflorescences terminal, 5–10 cm, of crowded verticillasters; floral leaves sometimes purplish red, ovate, 1–1.5 cm, base cuneate, margin entire to slightly incised, apex acute. Calyx funnelform-campanulate, 7–8 mm, glabrous; teeth pilose, ciliate, narrowly triangular, 1/2 or more as long as calyx, apically acute, regular. Corolla tube 2 × or more as long as calyx, pilose, puberulent, villous annulate inside; upper lip straight, apex rounded and emarginate; lower lip enlarged, elongated, with middle lobe obcordate and lateral lobes linear-oblong. Nutlets adaxially swollen at middle, areole covering almost entire adaxial side. Fl. Apr–Aug, fr. Jul–Sep.

• Streamsides, moist grasslands, moist areas in forests, dense grass; 300–2500 m. Gansu, Hebei, Hubei, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang.

1a. Plants glabrous or subglabrous.

2a. Corolla white to pale rose or red; calyx teeth narrowly triangular 7b. var. *glabrescens*

2b. Corolla whitish green; calyx teeth ovate 7c. var. *ovatisepala*

1b. Plants conspicuously hairy.

3a. Plants pilose or strigose except for gray villous on younger stems 7a. var. *ciliata*

3b. Plants villous or densely white villous.

4a. Abaxial leaf surface purplish red; corolla purple with blue lines; plants villous 7d. var. *hirta*

4b. Abaxial leaf surface greenish; corolla tube whitish, limb blue or purple; plants densely white villous 7e. var. *chanetii*

7a. *Ajuga ciliata* var. *ciliata*

筋骨草 jin gu cao

Plants pilose or strigose except gray villous on younger parts of stem.

• Streamsides, moist grasslands, moist areas in forests; 300–1800 m. Gansu, Hubei, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang.

Used medicinally for hemolysis, tonsillitis, and sore throat.

7b. *Ajuga ciliata* var. *glabrescens* Hemsley, J. Linn. Soc., Bot. 26: 315. 1890.

微毛变种 wei mao bian zhong

Ajuga ciliata f. *glabrescens* (Hemsley) Kudô.

Leaf blade glabrous, subglabrous, or puberulent, broadly elliptic to elliptic-ovate. Calyx sparsely puberulent or subglabrous. Corolla white to pale rose or red.

• Grassy slopes, forests; 1100–2500 m. Gansu, Hubei, Shaanxi, Sichuan.

7c. *Ajuga ciliata* var. *ovatisepala* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 25. 1974.

卵齿变种 luan chi bian zhong

Plants glabrous or subglabrous. Leaf blade membranous, 7–13 × 2–2.5 cm. Calyx funnelform, sparsely puberulent, teeth ovate with pilose margin. Corolla whitish green, 1–1.5 cm.

• Grassy areas; 2500 m. Sichuan.

7d. *Ajuga ciliata* var. *hirta* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 25. 1974.

长毛变种 chang mao bian zhong

Plants villous. Leaf blade 5–8(–13) × 3–4.5(–8) cm, papery, abaxially purplish red. Calyx teeth triangular to narrowly triangular with villous-ciliate margin.

• Forests; 2000 m. Sichuan.

7e. *Ajuga ciliata* var. *chanetii* (H. Léveillé & Vaniot) C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 26. 1974.

陕甘变种 shan gan bian zhong

Ajuga chaneti H. Léveillé & Vaniot, Repert. Spec. Nov. Regni Veg. 8: 258. 1910; *A. ciliata* f. *chanetii* (H. Léveillé & Vaniot) Kudô; *A. ciliata* var. *chanetii* f. *pauciflora* C. Y. Wu & C. Chen.

Plants densely gray villous. Calyx teeth villous-ciliate, hairs longer than those on corolla tube. Corolla tube whitish, limb blue or purple.

• Low grass; 1800 m. Gansu, Hebei, Shaanxi.

8. *Ajuga multiflora* Bunge, Mém. Acad. Imp. Sci. St. Pétersbourg. Divers Savans 2: 125. 1833.

多花筋骨草 duo hua jin gu cao

Herbs perennial. Stems erect, unbranched, 6–23 cm tall. Basal leaves often in a rosette, petiolate, upper leaves sessile to petiolate, sometimes alternate; petiole 0.7–2 cm; leaf blade lanceolate to ovate-oblong, 1.5–4 × 1–1.5 cm, adaxially densely villous-strigose, abaxially sparsely villous-ciliate, margin villous-ciliate. Apical verticillasters crowded, forming dense spikes 3–10 cm; apical floral leaves reduced, lanceolate to ovate, margin subentire or entire. Calyx broadly campanulate, 5–7 mm, lanate-villous; teeth regular, subulate-

triangular, to 2/3 as long as calyx, apically acute, villous-ciliate. Corolla blue-purple or blue, tubular, 1–1.8 cm, puberulent, villous annulate inside; upper lip straight, with 2 circular lobes; middle lobe of lower lip flabellate, lateral lobes oblong. Nutlets adaxially swollen at middle, areole to 2/3 as long as adaxial side of nutlet. Fl. Apr-May, fr. May-Jun.

Sparse grass on slopes, thickets, riverbank grasslands. Anhui, Hebei, Heilongjiang, Jiangsu, Liaoning, Nei Mongol [Korea, Russia].

- 1a. Plants 13–23 cm tall; basal leaves in a rosette, ovate-oblong; upper leaf blades broadly ovate to subcircular, coarsely serrate; corolla to 1.8 cm 8b. var. *serotina*
- 1b. Plants 6–20 cm tall; basal leaves not in a rosette, elliptic-oblong to elliptic-ovate; upper leaf blades lanceolate to oblong-lanceolate, undulate to undulate-crenate; corolla 1–1.2 cm.
- 2a. Stems and inflorescences densely gray lanate-villous; inflorescences ca. 10 cm; upper leaves opposite, sessile 8a. var. *multiflora*
- 2b. Stems and inflorescences densely long sericeous; inflorescences ca. 4 cm; upper leaves alternate, petiolate 8c. var. *brevispicata*

8a. *Ajuga multiflora* var. *multiflora*

多花筋骨草 duo hua jin gu cao

Ajuga amurica Freyn; *A. lanosa* Sun.

Plants 6–20 cm tall. Stems densely lanate-villous. Basal stem leaves petiolate, apical ones sessile; leaf blade elliptic-oblong to elliptic-ovate, margin slightly undulate to undulate-crenate. Inflorescences ca. 10 cm, densely lanate-villous; floral leaves similar to stem leaves, reduced apically, lanceolate to ovate. Corolla 1–1.2 cm.

Sparse grassy slopes, thickets, riverbank grasslands. Anhui, Hebei, Heilongjiang, Jiangsu, Liaoning, Nei Mongol [Korea, Russia].

Used medicinally as a diuretic in Korea.

8b. *Ajuga multiflora* var. *serotina* Kitagawa, Lin. Fl. Mansh. 375. 1939.

莲座变种 lian zuo bian zhong

Plants 13–23 cm tall. Basal leaves in a rosette, ovate-oblong; upper leaves broadly ovate to subcircular, coarsely serrate. Floral leaves broadly ovate to subcircular, coarsely serrate. Corolla to 1.8 cm.

• Heilongjiang, Liaoning.

8c. *Ajuga multiflora* var. *brevispicata* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 26. 1974.

短穗变种 duan sui bian zhong

Plants ca. 12 cm tall. Stems densely long sericeous. Upper leaves alternate, long petiolate, lanceolate to oblong-lanceolate. Inflorescences 3–4 cm, densely long sericeous; floral leaves lanceolate, long sericeous.

• Liaoning.

9. *Ajuga campylanthoides* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 26. 1974.

康定筋骨草 kang ding jin gu cao

Herbs stoloniferous. Stems erect, 2.5–18 cm tall, unbranched, white villous. Petiole 4–7 mm, grooved, narrowly winged; leaf blade lanceolate-oblong to broadly

ovate, 2.5–4 × 1–2(–3) cm, strigose, ciliate, base cuneate-decurrent, margin undulate-dentate, upper leaves sometimes entire, apex rounded to obtuse. Verticillasters in terminal spikes 1–3 cm, rarely in basal leaf axils; floral leaves reduced apically, ovate to sublanceolate. Pedicel ca. 2 mm. Calyx funnelform, ca. 4 mm, glabrous, inconspicuous 5-veined; teeth narrowly triangular to triangular-ovate, to 1/2 as long as calyx, ciliate on margin, white villous. Corolla white or reddish, tubular, straight, 1.2–1.8 cm, apically sparsely puberulent, villous annulate inside; upper lip straight, circular, apex emarginate, ciliate; lower lip glabrous, with middle lobe obcordate and lateral lobes oblong. Nutlets unknown. Fl. Jul-Sep.

• Grassy slopes, streamsides; 2000–2800 m. Gansu, Sichuan, Xizang, Yunnan.

1a. Plants (5–)8–18 cm tall; stems and abaxial surface of leaf greenish; leaf blade ovate to oblong-lanceolate; corolla white 9a. var. *campylanthoides*

1b. Plants 2.5–7 cm tall; stems and abaxial surface of leaf purplish red; leaf blade broadly ovate; corolla reddish 9b. var. *subcaulis*

9a. *Ajuga campylanthoides* var. *campylanthoides*

康定筋骨草 kang ding jin gu cao

Plants (5–)8–18 cm tall. Stems greenish. Leaf blade ovate to lanceolate-oblong, abaxially greenish. Corolla white.

• Grassy slopes; 2200–2800 m. Sichuan, Xizang, Yunnan.

9b. *Ajuga campylanthoides* var. *subcaulis* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 28. 1974.

短茎变种 duan jing bian zhong

Plants 2.5–7 cm tall. Stems purplish red. Leaf blade broadly ovate, abaxially purplish red. Corolla reddish.

• Sloping grasslands on sandy, stony soils, streamsides; 2000–2600 m. Gansu.

10. *Ajuga campylantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 243. 1912.

弯花筋骨草 wan hua jin gu cao

Herbs perennial, prostrate, 6–16 cm tall, densely brownish floccose-villous/strigose. Petiole less than 1.5 cm; leaf blade elliptic to oblong-lanceolate, rarely lanceolate, 4–6.5 × 1.5–2.6 cm, strigose, base cuneate, margin undulate-serrate to crenate, ciliate, apex obtuse to sometimes acute. Inflorescences terminal, less than 3 cm, of many crowded verticillasters; floral leaves ovate, base rounded, margin subentire to undulate-crenate. Pedicel short to obsolete. Calyx campanulate, 5–6 mm, strigose, especially on teeth; teeth triangular-ovate, to 2/3 as long as calyx, ciliate. Corolla white with purple lines, tubular, slightly incurved, villous, villous annulate inside; upper lip straight, lobes circular, almost as long as lateral lobes of lower lip, ciliate; middle lobe of lower lip obcordate, lateral lobes oblong, ciliate. Nutlets adaxially swollen at middle, areole covering most of adaxial side. Fl. May-Aug, fr. Jun-Sep.

• Alpine and *Rhododendron* thickets, pine forests, pastures; 2800–3500 m. Yunnan.

Used medicinally.

11. *Ajuga forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 242. 1912.

痢止蒿 li zhi hao

Ajuga mairei H. Léveillé.

Herbs erect, perennial, stoloniferous. Stems 6–20(–30 or more) cm tall, gray pubescent or villous, base woody, branched; branches gray pubescent or villous. Petiole 0–8 mm, narrowly winged; leaf blade ovate to lanceolate-oblong, 4–8(–12) × 1.8–3.5(–4.5) cm, densely gray pubescent or villous, base cuneate-decurrent, margin undulate-serrate to crenate, ciliate, apex obtuse to rounded. Inflorescences terminal, ca. 6 cm. Pedicel short or absent. Calyx funnelform, 5–6.5 mm, ciliate along veins and margin; teeth purple, ovate, to 1/2 as long as calyx, subregular. Corolla purplish, purplish blue, or blue, tubular, straight, 7–11 mm, sparsely pubescent, obliquely villous annulate inside; upper lip straight, circular, apex emarginate; middle lobe of lower lip narrowly obcordate, with dark purple lines; lateral lobes linear-oblong. Nutlets areole to 2/3 or more as long as adaxial side of nutlet. Fl. Apr-Aug, fr. May-Oct.

• Patches in moist grasslands, grassy streamsides, open roadsides; 1700–4000 m. Sichuan, Xizang, Yunnan.

Used medicinally for dysentery and ascariasis in NW Yunnan.

12. *Ajuga bracteosa* Wallich ex Benth, Pl. Asiat. Rar. 1: 59. 1830.

九味一枝蒿 jiu wei yi zhi hao

Herbs perennial, erect, stoloniferous. Stems branched from base, 10–30 cm tall, gray villous or lanate-villous especially on young parts. Basal petioles 1–1.5 cm; basal leaf blade spatulate to oblanceolate, 2–4 × 0.7–1.2 cm; stem blades sessile or subsessile, obovate to subcircular, 1–1.5 × 0.6–1 cm, pilose or strigose, base cuneate-decurrent, margin inconspicuously to irregularly undulate-crenate, ciliate, apex obtuse to subrounded. Basal verticillasters widely spaced, apical verticillasters in dense spikes; basal floral leaves densely lanate-villous, incised, ciliate. Calyx campanulate, 4.5–6 mm, villous especially on teeth; teeth subulate-triangular, regular, 1/2 or more as long as calyx, apically acute, margin villous-ciliate. Corolla purple or purplish with dark purple spots, tubular, slightly exerted, puberulent, yellowish glandular, villous annulate inside; upper lip straight, apex emarginate; middle lobe of lower lip obcordate, lateral lobes oblong. Nutlets oblong to oblong-obovoid, adaxially swollen at middle, areole to 2/3 or more as long as adaxial side of nutlet. Fl. Apr-Jun, fr. May-Jun (or later).

Grassy slopes. Sichuan, Yunnan [Afghanistan, India, Myanmar, Nepal].

Used medicinally to stop bleeding and reduce inflammation.

13. *Ajuga pantantha* Handel-Mazzetti, Symb. Sin. 7: 911. 1936.

散瘀草 san yu cao

Herbs perennial, spreading-ascending or with stolons. Stems 1 to few, 7–32 cm tall, basally leafless, densely gray villous or lanate-villous. Petiole obsolete to 5 mm, grooved, narrowly winged; leaf blade oblong-obovate to triangular-obovate, 1.5–3 × 0.8–1.8 cm, black when dry, abaxially reddish, pilose, base cuneate-decurrent, margin irregularly, remotely serrate to subentire, ciliate, apex obtuse to 3-lobed. Verticillasters 4–8-flowered. Pedicel absent to obsolete. Calyx purple, funnelform, 5–7 mm, villous; teeth lanceolate to lanceolate-triangular, more than 1/2 as long as calyx, villous-ciliate. Corolla rose to purple-red or purple-blue, tubular, straight, base slightly bent, 8–10 mm, pilose or

sparsely puberulent, yellowish glandular, villous annulate inside; upper lip erect, circular, apex emarginate; middle lobe of lower lip obovate, apex emarginate, lateral lobes oblong. Nutlets brown, areole to 1/2 as long as adaxial side of nutlet. Fl. Aug-Nov, fr. Oct.

• Dry, sloping areas in low grass; 2400–2700 m. Yunnan.

Used medicinally.

14. *Ajuga decumbens* Thunberg, Syst. Veg. ed. 14, 525. 1784.

金疮小草 jin chuang xiao cao

Herbs annual or biennial, stoloniferous. Stems 10–30 cm tall, white villous or lanate-villous especially on young parts. Basal leaves numerous, longer than stem leaves; petiole 1–2.5 cm or more, narrowly winged, purplish green or greenish, villous; leaf blade 3–6(–14) × 1.5–2.5(–5) cm, sparsely strigose to pilose, base attenuate-decurrent, ciliate, apex obtuse to rounded. Verticillasters many flowered, basally widely spaced, apically crowded in interrupted spikes 7–12 cm; apical floral leaves bractlike, lanceolate. Pedicel short. Calyx funnelform, 5–8 mm, margin pilose; teeth triangular, to 1/2 as long as calyx. Corolla tubular, straight, basally slightly swollen, 8–10 mm, pilose, villous annulate inside; upper lip of limb straight, circular, apex emarginate; middle lobe of lower lip narrowly flabellate to obcordate, lateral lobes oblong to subelliptic. Nutlets areole to nearly 2/3 as long as adaxial side of nutlet. Fl. Mar-Jul, fr. May-Nov.

Streamsides, roadsides, wet grassy slopes, wet areas in bamboo forests; 400–2300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

- 1a. Stems erect, rarely trailing, to 30 cm tall; leaves oblanceolate to nearly oblong, irregularly dentate; corolla white or whitish green, 1.5–2 cm 14b. var. *oblancifolia*
- 1b. Stems ascending to prostrate, 10–20 cm; leaves spatulate to obovate-lanceolate, irregularly undulate-crenate to subentire; corolla bluish or reddish purple, 0.8–1 cm 14a. var. *decumbens*

14a. *Ajuga decumbens* var. *decumbens*

金疮小草 jin chuang xiao cao

Stems erect, rarely trailing, 20–30 cm tall. Leaf blade oblanceolate to suboblong, margin irregularly dentate. Corolla white or whitish green, 1.5–2 cm.

Streamsides, roadsides, wet grassy slopes; 400–1400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Qinghai, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

Used medicinally.

14b. *Ajuga decumbens* var. *oblancifolia* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 35. 1966.

狭叶变种 xia ye bian zhong

Stems ascending to prostrate, 10–20 cm. Leaf blade spatulate to obovate-lanceolate, margin irregularly undulate-crenate to subentire. Corolla bluish or reddish purple, 0.8–1 cm.

• Wet areas in bamboo forests, roadsides; 1500–2300 m. Guizhou, Sichuan.

15. *Ajuga nipponensis* Makino, Bot. Mag. (Tokyo) 23: 67. 1909.

紫背金盘 zi bei jin pan

Ajuga decumbens Thunberg var. *pallescens* (Maximowicz) Handel-Mazzetti; *A. genevensis* Linnaeus var. *pallescens* Maximowicz; *A. labordei* Vaniot; *A. matsumurana* Kudô; *A. nipponensis* Makino var. *pallescens* (Maximowicz) C. Y. Wu & C. Chen; *A. pallescens* Price & Metcalf.

Herbs annual or biennial. Stems rarely prostrate or ascending, (8-)10-20 cm or more tall, villous or pilose, base purplish. Basal leaves absent or few; petiole 1-1.5 cm, to 2.5 cm in basal leaves, narrowly winged, sometimes purplish green; leaf blade obovate, broadly elliptic to subcircular or spatulate, 2-4.5 × 1.5-2.5 cm, sparsely strigose or pilose, base cuneate-decurrent, margin dentate to undulate-crenate, ciliate, apex obtuse. Verticillasters many flowered, apical ones in crowded terminal spikes; apical floral leaves bractlike, ovate to broadly lanceolate, 0.8-1.5 cm, margin entire to incised. Calyx campanulate, 3-5 mm, villous apically and on margin; teeth triangular, to 1/2 as long as calyx, apically acuminate. Corolla bluish or blue-purple, rarely whitish, with dark lines, tubular, (6-)8-11 mm, base slightly swollen, sparsely pubescent, villous annulate inside; upper lip straight, 2-lobed; middle lobe of lower lip flabellate, with apex truncate to emarginate, lateral lobes narrowly oblong. Nutlets areole to 3/5 as long as adaxial side of nutlet. Fl. Apr-Jun (E China), Dec-Mar (SW China), fr. Jan-May.

Field margins, wet areas on grasslands, sunny slopes, forests; 100-2300 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

A folk remedy for traumatic injuries and inflammation caused by various diseases.

16. *Ajuga dictyocarpa* Hayata, Icon. Pl. Formos. 8: 84. 1919.

网果筋骨草 wang guo jin gu cao

Herbs ascending, sometimes stoloniferous. Stems 20-30 cm tall, pubescent, branched apically. Petiole narrowly winged, 1-3 cm; leaf blade obovate to oblong-obovate, rarely triangular-obovate, 3-4(-10) × 2(-5) cm, subglabrous, pubescent along midrib, base cuneate to decurrent, margin coarsely dentate to irregularly crenate, sparsely ciliate, apex obtuse to subrounded. Verticillasters 12- or more flowered, in terminal spikes 5-12 cm; apical floral leaves bractlike, ovate to ovate-lanceolate, margin dentate to entire, smallest ca. 8 × 4 mm. Calyx campanulate, 3.5-4.5 × 3-3.5 mm; teeth ovate-triangular, to 1/2 as long as calyx, ciliate, sparsely villous. Corolla white, tubular, straight, slightly bent, 6-8 mm, tube glabrous, limb ± villous, villous annulate inside; upper lip semicircular, 2-lobed; lower lip projected, with middle lobe narrowly cordate, ca. 2 × 1.5 mm, apex emarginate; lateral lobes oblong, ca. 1.5 × 1 mm. Nutlets areole to 2/3 length of adaxial side of nutlet. Fl. and fr. Mar-Jun.

Wet grasslands. Fujian, Guangdong, Jiangxi, Taiwan [Japan (Ryukyu Islands), Vietnam].

17. *Ajuga macrosperma* Wallich ex Bentham, Pl. Asiat. Rar. 1: 58. 1830.

大籽筋骨草 da zi jin gu cao

Herbs erect or prostrate, sometimes stoloniferous, hairy or glabrous. Stems 15-40 cm or more tall, pilose or subglabrous when old, young parts densely white villous. Petiole 2-5 cm or more, narrowly winged, sometimes purplish, pilose; leaf blade oblanceolate, ovate-lanceolate to elliptic-ovate, 4-10(-15) × 1.8-4.5(-6.5) cm, villous to strigose, base cuneate-decurrent, margin undulate to irregularly undulate-crenate, ciliate, apex obtuse to acute. Verticillasters 6-12-flowered, in axils of apical and mid stem leaves, apically forming spikes; apical floral leaves bractlike, ovate-lanceolate, slightly longer than verticillasters. Pedicel very short or obsolete. Calyx funnellform, 5-6 mm, veins strigose; teeth ovate, to 1/3 as long as calyx, apically rounded, strigose, gray villous-ciliate at margin. Corolla blue to purple, tubular, 7-9 mm, obliquely spreading, slightly curved near middle, glabrous or pilose, villous annulate inside; upper lip oblong, straight, lobes subovate; middle lobe of lower lip narrowly cordate, emarginate at apex; lateral lobes oblong, as long as or slightly longer than upper lip. Nutlets areole 2/3-3/4 as long as adaxial side of nutlet. Fl. Jan-Mar, fr. Mar-May (or later).

Shady areas in forests, limestone forests, ravines, grassy roadsides; 400-2600 m. Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bhutan, India (Sikkim), Laos, Myanmar, Nepal, Thailand, Vietnam].

- 1a. Plants ± hairy; stems erect, sometimes stoloniferous; calyx teeth ovate to broadly ovate; corolla pilose 17a. var. *macrosperma*
- 1b. Plants glabrous; stems flaccid, prostrate, rooting; calyx teeth rounded apically; corolla glabrous 17b. var. *thomsonii*

17a. *Ajuga macrosperma* var. *macrosperma*

大籽筋骨草 da zi jin gu cao

Plants ± hairy. Stems erect, sometimes with stolons. Calyx teeth ovate to broadly ovate. Corolla pilose.

Shady areas in forests, ravines, grassy roadsides; 400-2600 m. Guangdong, Guangxi, Guizhou, Taiwan, Yunnan [Bhutan, Laos, Myanmar, Nepal, Thailand, Vietnam].

Used medicinally for nephritis.

17b. *Ajuga macrosperma* var. *thomsonii* (Maximowicz) J. D. Hooker, Fl. Brit. India 4: 704. 1885.

无毛变种 wu mao bian zhong

Ajuga thomsonii Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 11: 821. 1883.

Plants glabrous. Stems flaccid, rooting, prostrate. Calyx teeth very short, rounded apically. Corolla glabrous.

Limestone forests; 1700 m. Yunnan [India (Sikkim)].

18. *Ajuga linearifolia* Pampanini, Nouv. Giorn. Bot. Ital., n.s. 17: 703. 1910.

线叶筋骨草 xian ye jin gu cao

Ajuga pachyrrhiza Kitagawa.

Herbs erect, branched, perennial. Stems 25-40 cm tall, white glandular villous or glandular lanate, purplish red, young branches green. Leaves sessile; leaf blade linear-lanceolate to linear, 4-9 × 0.5-1.5 cm, adaxially sparsely strigose, abaxially hairy on veins, base attenuate-decurrent, amplexicaul, margin ± incised to undulate, villous-ciliate, apex rounded. Verticillasters forming ill-defined terminal

spikes. Calyx funnelliform, 6–7 mm; teeth narrowly triangular to linear-lanceolate, to 3/5 as long as calyx, apically acuminate, margin densely villous-ciliate. Corolla white or bluish, with purple-blue spots, tubular, erect, included, sparsely puberulent, villous annulate inside; upper lip straight, rounded, apex emarginate; lower lip 6–8 mm, middle lobe

flabellate, apex rounded to emarginate; lateral lobes linear-oblong. Nutlets areole nearly as long as adaxial side of nutlet. Fl. Apr–May(–Nov), fr. Jun(–Nov).

• Dry, grassy slopes, ravines; 700–900 m. Hebei, Hubei, Liaoning, Shaanxi, Shanxi.

7. CYMARIA Bentham, Edward's Bot. Reg. 15: t. 1292. 1829.

岐伞花属 qi san hua shu

Shrubs erect. Stems much branched; branches densely floccose-strigose. Petiole ± narrowly winged; leaf blade ovate to ovate-rhombic, margin dentate. Cymes axillary, dichotomous or helicoid, pedunculate, lax; bracts subulate to oblanceolate, persistent, minute. Calyx erect, campanulate, inconspicuously 10-veined, suburceolate and conspicuously veined in fruit; teeth 5, equal, triangular, apically acute. Corolla white, tube cylindric, straight, slightly exerted, somewhat bearded annulate inside, 2-lipped; upper lip erect, slightly concave, entire; lower lip enlarged, spreading, 3-lobed, middle lobe largest. Stamens 4, exerted from upper lip of corolla, anterior 2 longer; anther cells 2, divaricate. Ovary apically hairy. Style unequally 2-cleft. Nutlets obovoid, conspicuously pitted, areole lateral and large.

Three species: China (Hainan), Indonesia, Malaysia, Myanmar, Philippines, Vietnam; two species in China.

- 1a. Petiole 2–3.5(–4) cm, conspicuously attenuate winged; fruiting calyx ca. 1.5 mm in diam. 1. *C. acuminata*
1b. Petiole 0.5–2 cm, inconspicuously winged; fruiting calyx ca. 2 mm in diam. 2. *C. dichotoma*

1. *Cymaria acuminata* Decaisne, Nouv. Ann. Mus. Hist. Nat. 3: 399. 1834.

长柄岐伞花 chang bing qi san hua

Plants ca. 1 m tall. Petiole conspicuously attenuate winged, 2–3.5(–4) cm; mid stem leaf blade ovate, 5–8 × 2–4 cm, sparsely and minutely hispid to glabrous, densely orange glandular, adaxial veins densely minutely hispid, base broadly cuneate, attenuate-decurrent, margin irregularly shallowly mucronate-dentate, upper leaf blades sometimes ± undulate, apex acuminate. Cymes dichotomous, sometimes each branch forked, ultimate branchlets helicoid; peduncle 1–2 cm densely strigose; rachis densely strigose; bracts subulate, persistent. Pedicel less than 1 mm. Calyx ca. 1 mm, puberulent, sparsely orange glandular; fruiting calyx slightly enlarged, suburceolate, ca. 1.5 mm in diam., conspicuously netted. Corolla ca. 4 mm, puberulent and glandular outside; tube ca. 3 mm, cylindric, straight; upper lip oblong, apex emarginate; lower lip enlarged, spreading. Nutlets ovoid, apically hairy, glandular. Fl. Jul–Aug, fr. Sep–Nov.

Wet areas beside marshes in sparse valley forests. Hainan [Indonesia, Philippines].

2. *Cymaria dichotoma* Bentham, Pl. Asiat. Rar. 1: 64. 1830.

岐伞花 qi san hua

Plants ca. 1 m tall. Stems cylindric, woody. Petiole 0.5–2 cm, inconspicuously winged; mid stem blade ovate or ovate-rhombic, 4–8 × 2–4.5 cm, adaxially sparsely minutely hispid, abaxially strigose especially on veins, densely orange glandular, base cuneate, margin shallowly mucronate-dentate, apex acuminate. Cymes dichotomous, sometimes 2 × dichotomous, loosely flowered; peduncle 1.5–2 cm, densely strigose; rachis densely strigose; bracts oblanceolate to subulate, persistent, minute. Pedicel ca. 1 mm, densely strigose. Calyx broadly campanulate, ca. 1.5 mm, sparsely orange glandular, villous; fruiting calyx urceolate, ca. 2 mm in diam., conspicuously netted. Corolla ca. 3 mm, puberulent, glandular; tube ca. 2 mm, cylindric, straight; upper lip oblong, slightly concave; lower lip enlarged, spreading, 3-lobed, lobes elliptic, middle lobe largest. Nutlets ovoid, apically hairy, glandular. Fl. Jul, fr. Aug–Oct.

Dry, sparse forests; 0–100 m. Hainan [Malaysia, Myanmar].

8. WENCHENGIA C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 250. 1965.

保亭花属 bao ting hua shu

Subshrubs. Stems terete, solid. Leaves alternate, long petiolate. Racemes with spirally arranged flowers. Receptacle disciform, beaked at middle. Calyx funnelliform, 19-veined, 5-toothed. Corolla obliquely tubular-campanulate, 2-lipped, upper lip 2-lobed, lower lip 3-lobed. Disc absent. Stamens 4, posterior 2 longest; anther cells 2, divaricate. Ovary apex shallowly 4-lobed, ovules anatropous; style subterminal. Nutlets 4, lower 2 sometimes undeveloped, obovoid, dorsiventrally flattened, with special pore of funicle bundle; exocarp thin, longitudinally 5-ribbed. Embryos erect, radicle directed downward, cotyledons fleshy.

A monotypic genus: endemic to China.

1. *Wenchengia alternifolia* C. Y. Wu & S. Chow, Acta Phytotax. Sin. 10: 251. 1965.

保亭花 bao ting hua

Stems woody, basally nearly leafless, scars slightly elevated, reniform. Leaves alternate except for 1 or 2

subopposite pairs at mid stem; petiole ca. 2 cm at mid stem; leaf blade oblanceolate, 7–8.5 × 3–3.7 cm, adaxially subglabrous, abaxially glabrous with hirtellous veins, lateral veins anastomosing near margin, base cuneate-decurrent, margin shallowly undulate, apex obtuse. Racemes ca. 15 cm; peduncle hirtellous; bracts linear-lanceolate, hirtellous, as

long as pedicels. Pedicel ca. 2.2 mm in flower, to 4 mm in fruit, hirtellous. Calyx ca. 3.5 × to 4 mm, veins puberulent, shallowly dentate; upper teeth equal, deltoid, less than 1/2 as long as lower teeth. Corolla rose, ca. 2 cm sparsely puberulent, bearded at middle inside; tube to 1.6 cm, base narrow, gradually dilated into a broad throat to 8.5 mm wide; upper lip ca. 4.5 mm wide, slightly concave; lower lip

subelliptic, spreading, ca. 5 mm wide; lateral lobes ovate, ca. 3.5 mm wide. Ovary hirtellous. Nutlets ca. 2 × 1.8 mm, areole ca. 1/3 as long as nutlet, apically tuberculate, hirsute. Fl. Sep, fr. Sep-Nov.

- Dense tropical forests; 400 m. Hainan.

9. GOMPHOSTEMMA Bentham, Edward's Bot. Reg. 15: t. 1292. 1830.

锥花属 zhui hua shu

Shrubs or perennial herbs. Stems with stellate hairs. Leaves petiolate; leaf blade margin serrate, adaxially stellate puberulent/hirsute, abaxially densely stellate lanate. Inflorescences axillary, sometimes basal, rarely terminal, cymes pedunculate or sessile, sometimes in spikes or panicles; bracts subcircular to linear-lanceolate. Calyx campanulate to tubular, 10-veined, 5-toothed, teeth equal or subequal. Corolla purple-red or yellow to white, 2-lipped, straight or curved, long exerted; tube abruptly or gradually dilated at throat, not hairy annulate inside; upper lip straight, slightly galeate, entire or emarginate, sometimes mucronulate; lower lip spreading, 3-lobed, middle lobe longest. Stamens 4, underlying upper lip, anterior 2 longest; filaments complanate, hairy on two sides or glabrous; anthers close together in pairs, cells parallel, transverse. Style included, apically subequally 2-cleft. Nutlets 1–4 maturing per flower, obovoid to ovoid, rarely globose, rugulose, glabrous or hirsute, drupelike, areole oblique.

About 36 species: China, India, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam; 15 species in China. *Gomphostemma* is one of few tropical rain forest genera in the Lamiaceae.

- 1a. Inflorescences clearly pedunculate, inserted near base of stem.
- 2a. Bracts linear to capillary, 0.3–1.5 mm wide 6. *G. pseudocrinitum*
- 2b. Bracts lanceolate to ovate, 5–15 mm wide.
- 3a. Peduncle 2.5–7 cm; bracts purplish red, brownish purple when dry 15. *G. pedunculatum*
- 3b. Peduncle 0.2–2.2 cm; bracts greenish 14. *G. chinense*
- 1b. Inflorescences often subsessile, inserted at mid and upper stem leaf axils.
- 4a. Inflorescence an elongated thyrses of decussate, 1- or 2-flowered cymes.
- 5a. Calyx ca. 9 mm, teeth 3–3.2 mm; corolla 3.5–3.7 cm 1. *G. deltodon*
- 5b. Calyx 5–7 mm, teeth ca. 1 mm; corolla 1.6–2 cm 2. *G. microdon*
- 4b. Inflorescence a many-flowered cyme or group of cymes, often forming dense capitula.
- 6a. Bracts 0.5–3 mm wide.
- 7a. Cymes 3- or 4-flowered; calyx teeth 8–9 mm 4. *G. leptodon*
- 7b. Cymes many flowered; calyx teeth 3–7 mm.
- 8a. Bracts 1- or 3-veined; calyx teeth linear to triangular-lanceolate 3. *G. parviflorum*
- 8b. Bracts inconspicuously 1- or 3-veined; calyx teeth linear 5. *G. crinitum*
- 6b. Bracts 3–18 mm wide.
- 9a. Calyx teeth triangular, obtuse to short needlelike.
- 10a. Calyx teeth needlelike; nutlets compressed obovate, 3.5–4 mm wide, ± stellate at maturity 8. *G. lucidum*
- 10b. Calyx teeth obtuse; nutlets oblong triquetrous, 3–3.5 mm wide, glabrous at maturity 9. *G. arbusculum*
- 9b. Calyx teeth triangular-lanceolate to linear-lanceolate, ± acuminate.
- 11a. Leaf blade adaxially densely appressed tawny hirsute, abaxially with stipitate, tawny, stellate pubescence; corolla purple-red 11. *G. stellatohirsutum*
- 11b. Leaves sparsely pubescent or stellate hirsute/villous, abaxially stellate tomentose; corolla white to yellow (not recorded for *G. callicarpoides*).
- 12a. Leaves (7–)18–30 × (4–)7–14.5 cm, adaxially sparsely pubescent or minutely hispid.
- 13a. Bracts 3–3.5 mm wide; calyx teeth subacuminate 10. *G. latifolium*
- 13b. Bracts 7–14 mm wide; calyx teeth caudate-acuminate 13. *G. sulcatum*
- 12b. Leaves 4–16 × 2–7 cm, adaxially sparsely stellate hirsute.
- 14a. Leaf blade adaxially sparsely stellate hirsute 12. *G. callicarpoides*
- 14b. Leaf blade adaxially densely stellate pubescent 7. *G. hainanense*

1. *Gomphostemma deltodon* C. Y. Wu, Acta Phytotax. Sin. 10: 143. 1965.

三角齿锥花 san jiao chi zhui hua

Herbs erect. Stems ca. 1 m tall, densely stipitate stellate tomentose. Petiole 1.8–3 cm; leaf blade elliptic to oblong, 11.5–25 × 4.7–11 cm, adaxially stellate hirtellous, abaxially densely gray-yellow stipitate stellate tomentose, hairs on veins longer, becoming tawny, base cuneate to subrotund, generally asymmetrical, margin crenate-serrate to shallowly

serrate, apex obliquely subacute. Cymes axillary, in erect spike-panicles with 2–5 pairs of 1- or 2-flowered cymes, 3.5–6.5 cm, or solitary and 1- or 4-flowered; peduncle 1–3 cm; bracts ovate to oblong, 1.1–1.8 × 0.45–1 cm, reduced apically, margin remotely denticulate to subentire; bracteoles linear, 5–8 mm. Pedicel 1–2.5 mm. Calyx narrowly campanulate, ca. 9 × 4–4.5 mm, conspicuously veined, densely tawny stellate velutinous; teeth triangular, 3–3.2 × 2.6–3 mm, apically acute. Corolla purple-red, 3.5–3.7 cm; tube ca. 2 mm wide at base, apical 1/3 abruptly dilated to throat ca. 10.5 mm wide; upper

lip circular, ca. 5 mm in diam.; lower lip ca. 12 × 6 mm, middle lobe obcordate, emarginate; ovary glabrous except for tawny tomentose apex. Nutlets unknown. Fl. Aug.

• Tropical forests; 900–1100 m. Yunnan.

2. *Gomphostemma microdon* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 170. 1913.

小齿锥花 xiao chi zhui hua

Herbs erect. Stems ca. 1 m tall, densely gray stellate tomentulose. Petiole 1–4 cm; leaf blade oblong to elliptic, 8.5–24 × 3.5–10 cm, adaxially with overlapping stellate hairs, abaxially densely dark gray stellate tomentose, base acute to cuneate and sometimes asymmetrical, crenate-serrate or shallowly serrate, apex somewhat obliquely acute to obtuse. Inflorescences erect, axillary, 6.5–10.5 cm; peduncle 1.6–3.2(–7) cm; cymes 1- or 2- (or 3)-flowered; bracts oblong to lanceolate, 1.1–2.2 cm × 3–8 mm; bracteoles linear, 6–11 mm. Calyx narrowly campanulate, 5–7 × ca. 3.5 mm, veins very conspicuous; teeth broadly triangular, ca. 1 mm. Corolla purplish to yellowish, 1.6–2 cm; tube 1–2 mm wide at base, 6–7 mm wide at throat; upper lip circular, ca. 3.5 × 4.5 mm; lower lip ca. 6 × 7.5 mm, middle lobe longest. Nutlets 3, blackish brown, compressed oblong, ca. 4 × 2.5–3 mm, apically somewhat dilated, glabrous, grooved. Fl. and fr. Aug–Dec.

Tropical rain forest valleys and plains; 600–1300 m. Yunnan [Laos].

A folk remedy for pneumonia, bronchitis, nephritis, urinary tract infections, and urolithiasis.

3. *Gomphostemma parviflorum* Wallich ex Benth, Pl. Asiat. Rar. 2: 12. 1830.

小花锥花 xiao hua zhui hua

Herbs robust, ascending. Stems ca. 70 cm tall, densely gray tomentose. Leaf blade elliptic to obovate-elliptic, 14–24 × 5–11 cm, adaxially with short stellate, dusty hairs, abaxially densely gray stellate tomentose, base obliquely cuneate, decurrent, margin widely spaced serrulate, apex obtuse to acute. Cymes axillary, many flowered, densely stellate tomentose, ca. 3 × 2.5 cm, subsessile; bracts and bracteoles ovate-lanceolate to linear-lanceolate, ca. 1.2 × 3 mm, 1- or 3-veined. Calyx narrowly campanulate, 8–10 mm, densely stellate tomentose, veins comparatively conspicuous; teeth linear to triangular lanceolate, ca. as long as calyx tube. Corolla yellow, rarely white to purplish, exerted part 1.1–1.3(–1.5) cm, pubescent, somewhat dilated, ca. 2 mm wide at base, ca. 3.5 mm wide at throat; upper lip ovate, ca. 5 × 5 mm; lower lip ca. 4 × 6 mm. Nutlets brown, glabrous, smooth or striate. Fl. Jun.

Densely forested valleys, shady areas in dense forests; 600–1500 m. Yunnan [India, Malaysia, Myanmar, Thailand].

- 1a. Bracts and bracteoles linear-lanceolate, 1-veined; calyx teeth linear, as long as to slightly longer than calyx tube; nutlets smooth 3a. var. *parviflorum*
1b. Bracts and bracteoles lanceolate to lanceolate-ovate, 3-veined; calyx teeth linear-lanceolate to triangular-lanceolate, slightly shorter than calyx tube; nutlets striate 3b. var. *farinosum*

3a. *Gomphostemma parviflorum* var. *parviflorum*

小花锥花 xiao hua zhui hua

Bracts and bracteoles linear-lanceolate, 1-veined. Calyx teeth linear, as long as to slightly longer than calyx tube. Nutlets smooth.

Shady areas in dense forests; 800 m. Yunnan [India, Malaysia].

3b. *Gomphostemma parviflorum* var. *farinosum* Prain, Ann. Roy. Bot. Gard. (Calcutta) 3: 253. 1891.

被粉变种 bei fen bian zhong

Leonurus farinosus Buchanan-Hamilton ex Mukerjee.

Bracts and bracteoles ovate-lanceolate to lanceolate, 3-veined. Calyx teeth linear-lanceolate to triangular-lanceolate, slightly shorter than calyx tube. Nutlets striate.

Densely forested valleys, shady forest margins near streams; 600–1500 m. Yunnan [India, Myanmar, Thailand].

4. *Gomphostemma leptodon* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 170. 1913.

细齿锥花 xi chi zhui hua

Shrubs erect, 1–1.5 m tall. Petiole 5.5–6.7 cm; leaf blade broadly ovate, 10–18 × 6–13 cm, adaxially stellate hirtellous, abaxially gray stellate tomentose, base obtuse to subrotund, rarely attenuate-cuneate, margin dentate, apex acute, slightly oblique. Cymes solitary, axillary, with short, dense branches; peduncle ca. 2–3 mm; bracts and bracteoles 6–8 × 1–15 mm, 1-veined. Calyx campanulate, ca. 1.4 cm, ± conspicuously veined, teeth narrowly lanceolate, 8–9 mm; fruiting calyx enlarged, with teeth to 1.5 cm, tube eventually splitting. Corolla ca. 2.8 cm, puberulent outside, tube dilated beyond middle; upper lip straight, circular; lower lip as long as upper lip. Nutlets 1 or 2, subglobose, ca. 5 mm, not shiny. Fl. Mar–Apr, fr. Apr–Aug.

Dense forests, valley thickets, limestone mountains. Guangxi [Vietnam].

Used as a folk remedy for scalds and burns in Guangxi.

5. *Gomphostemma crinitum* Wallich ex Benth, Pl. Asiat. Rar. 2: 12. 1830.

长毛锥花 chang mao zhui hua

Herbs. Leaf blade oblong, 15–23 × 7–10 cm, bullate, adaxially sparsely hirtellous with stellate hairs, abaxially densely gray stellate tomentose, base attenuate-decurrent, margin irregularly coarse dentate, apex acute, slightly oblique. Cymes grouped in axils, much branched, subsessile, ca. 5 cm in diam.; bracts linear-lanceolate, ca. 12 × 3 mm, 1(–3)-veined; bracteoles linear. Calyx narrowly campanulate, 1–1.2 cm, 3–3.5 mm in diam., somewhat enlarged in fruit; teeth linear, 6–7 mm. Corolla yellow, ± straight, 2–2.5 cm; tube ca. 2 mm wide at base, to 3.5 mm at throat; upper lip ca. 5 × 3.5 mm, lower lip ca. 6 × 7 mm. Nutlet 1 at maturity, ca. 6 × 3 mm, glabrous, smooth. Fl. and fr. Oct.

Forests; 900 m. Yunnan [Malaysia, Myanmar, India].

6. *Gomphostemma pseudocrinitum* C. Y. Wu, Acta Phytotax. Sin. 10: 144. 1965.

拟长毛锥花 ni chang mao zhui hua

Shrubs erect. Stems simple, ca. 1.2 m tall, apically herbaceous, flexuous, densely tawny stellate tomentose. Petiole 2.2–4.5 cm; leaf blade ovate-oblong to oblong, 13–

17 × 6.5–7 cm, adaxially stellate hirtellous, abaxially densely gray stellate tomentose, base obtuse to rounded, margin irregularly coarse dentate, apex acuminate. Cymes chestnut to purple-brown when dry, inserted at stem base, 2–3 cm; peduncle 3–10 mm; bracts and bracteoles linear to capillary, curved, 1–1.2(–1.5) cm × 0.3–1.5 mm. Calyx narrowly campanulate, 1.2–1.5 cm, ca. 3 mm in diam.; teeth 7–8 mm, basally triangular, apically capillary, sparsely stipitate stellate villous and minutely hispid. Corolla yellow, ca. 3.5 cm, puberulent; tube incurved, base ca. 1.3 mm wide, gradually dilated for 3/4 its length, abruptly dilated to 7 mm wide at throat; upper lip subcircular, ca. 8 × 6 mm; lower lip ca. 10 mm, puberulent; middle lobe obcordate, apex emarginate, ca. 4 × 5.5 mm; lateral lobes subcircular, ca. 2.5 mm in diam. Nutlets unknown. Fl. Jul-Aug.

- Densely forested valleys; 1100 m. Guangxi.

7. *Gomphostemma hainanense* C. Y. Wu, Acta Phytotax. Sin. 10: 145. 1965.

海南锥花 hai nan zhui hua

Herbs perennial. Stems ca. 50 cm tall, very densely gray appressed stellate lanate. Petiole 1.5–2.5 cm; leaf blade lanceolate, 10–16 × 2.1–3.4 cm, adaxially densely stellate pubescent, abaxially densely gray appressed stellate tomentose, base attenuate-cuneate to subobtuse, margin undulate, apex acuminate. Cymes axillary, 3- or 4-flowered, subsessile; bracts ovate to oblong, 10–14 × 4–7 mm, margin entire to slightly dentate; bracteoles linear, ca. 9 × less than 1 mm. Calyx narrowly campanulate, ca. 8.5 × 4 mm, gray stellate lanate; teeth lanceolate, ca. 4.5 mm, apically acuminate. Corolla white, tinged yellow, ca. 3.8 cm, puberulent; tube ca. 1 mm wide, apical 2/3 dilated to ca. 7 mm wide at throat; upper lip straight, circular, ca. 5 mm wide; lower lip ca. 9 mm, middle lobe circular, ca. 3.5 mm wide; lateral lobes ca. 2 mm wide, undulate. Ovary white granular. Nutlets unknown. Fl. Aug.

- Forests; 700 m. Hainan.

8. *Gomphostemma lucidum* Wallich ex Benth, Pl. Asiat. Rar. 2: 12. 1830.

光泽锥花 guang ze zhui hua

Herbs or shrubs, erect, robust. Stems to 1.5 m tall, apically tawny stellate lanate, basally scabrid or sparsely stellate lanate. Petiole 1–3 cm; leaf blade 19–21 × 3–9 cm, abaxially densely gray or tawny stellate tomentose, base cuneate or obtuse, margin coarsely serrate to inconspicuously serrulate, apex acuminate to obtuse. Cymes axillary, crowded, many flowered, subsessile; bracts and bracteoles linear-lanceolate to linear, 7–10 × 1–2 mm. Calyx campanulate, 9–10 × 5–6 mm, densely stellate tomentose, dilated and eventually splitting in fruit; teeth triangular, 2–3 mm, apically short needlelike. Corolla white to yellowish, ca. 3.5 cm, puberulent; tube ca. 2 mm wide at base, ca. 10 mm wide at throat; upper lip straight, circular, ca. 6.5 × 7.5 mm; lower lip ca. 10 mm, middle lobe circular, ca. 5 mm in diam., lateral lobes ca. 4.5 × 6.5 mm. Nutlets 4, compressed obovoid, 4.5–5.5 × 3.5–4 mm, white, tawny when dry, scabrid, covered with sparse, stellate hairs. Fl. Apr-Jul and Oct-Jan.

Densely forested valleys, grassy streamside slopes; 100–1400 m. Guangdong, Guangxi, Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

- 1a. Herbs or small shrubs; leaf blade obovate-elliptic to oblanceolate, adaxially scabrid, hirtellous, sometimes also stellate hirtellous 8a. var. *lucidum*
- 1b. Shrubs; leaf blade obovate-elliptic, adaxially finely stellate, hirsute, somewhat scabrid 8b. var. *intermedium*

8a. *Gomphostemma lucidum* var. *lucidum*

光泽锥花 guang ze zhui hua

Herbs or small shrubs. Petiole 1–3 cm; leaf blade obovate-elliptic to oblanceolate, adaxially hirtellous and scabrid or stellate hirtellous, abaxially densely tawny stellate tomentose.

Densely forested valleys; 100–1100 m. Guangdong, Guangxi, Yunnan [India, Laos, Myanmar, Thailand, Vietnam].

8b. *Gomphostemma lucidum* var. *intermedium* (Craib) C. Y. Wu, Acta Phytotax. Sin. 10: 145. 1965.

中间变种 zhong jian bian zhong

Gomphostemma intermedium Craib, Bull. Misc. Inform. 23. 1910.

Shrubs erect. Petiole 2–2.5 cm; leaf blade obovate-elliptic, adaxially hirsute and somewhat scabrid with fine stellate hairs, abaxially densely gray or tawny stellate tomentose.

Forested valleys, grassy streamside slopes; 500–1400 m. Yunnan [Laos, Vietnam].

9. *Gomphostemma arbusculum* C. Y. Wu, Acta Phytotax. Sin. 10: 146. 1965.

木锥花 mu zhui hua

Shrubs or robust herbs. Stems 1–5 m tall, flexuous, densely tawny stellate lanate. Petiole 1–4.5 cm; leaf blade oblong to broadly ovate, 11.5–26.5 × 4–11.5 cm, adaxially with minutely hispid and stipitate furcate-stellate hairs, abaxially densely gray stellate pubescent, base cuneate to cuneate-attenuate, margin coarsely serrate to crenate-dentate, apex acute to acuminate. Cymes many flowered, crowded, subsessile; bracts oblong, 9–14 × 3–4 mm; bracteoles linear, 6–9 × to 1.5 mm. Calyx campanulate, 9–11 × 5–6 mm, densely tawny stellate lanate, conspicuously veined, slightly enlarged and eventually splitting in fruit; teeth broadly triangular, 1–1.5 × ca. 3.5 mm. Corolla white or purplish, 2.4–3 cm, densely stellate lanate; tube ca. 1.5 mm in diam., apical half abruptly dilated to 9 mm wide at throat; upper lip straight, circular, ca. 5 × 7–8 mm; lower lip ca. 8 × 11 mm, middle lobe larger and obcordate, lateral lobes ovate. Ovary densely tawny hispidulous. Nutlets 4, abaxially oblong, triquetrous rounded, 4–5 × 3–3.5 mm, chestnut brown, with deciduous hairs. Fl. May, fr. Aug-Dec.

- Valley thickets, evergreen streamside forests; 700–1100 m. Yunnan.

10. *Gomphostemma latifolium* C. Y. Wu, Acta Phytotax. Sin. 10: 147. 1965.

宽叶锥花 kuan ye zhui hua

Shrubs erect. Stems (0.6–)1–2 m tall, densely tawny stellate lanate. Petiole 1.5–5 cm; leaf blade ovate to ovate-elliptic, (7–)20–28 × (4–)9.5–14.5 cm, adaxially sparsely pubescent, abaxially densely gray-yellow stellate tomentose,

veins conspicuously impressed adaxially, base cuneate to subrotund, margin shallowly crenate, apex apiculate. Cymes subsessile, dense, many flowered; bracts oblong, ca. 5–7 × 3–3.5 mm; bracteoles linear, 6–9 mm. Calyx campanulate, ca. 10 × 6 mm, densely tawny stellate lanate, slightly dilated and eventually splitting in fruit; teeth triangular-lanceolate, ca. 3.5 × 2.5 mm. Corolla white or yellowish, to 4.8 cm, stellate puberulent; tube ca. 1.5 mm wide, apical half dilated to 10 mm wide at throat; upper lip straight, rounded, ca. 5 × 10 mm; lower lip ca. 1.3 × 1.4 cm, middle lobe obcordate, ca. 8 × 9 mm; lateral lobes circular, ca. 10 mm wide. Ovary densely tawny hirsute. Nutlets oblong, triquetrous, dorsiventrally flattened, 6–6.5 × 3–3.5 mm, adaxially ribbed, abaxially rounded, covered with early deciduous tawny stellate hairs. Fl. Jul-Aug, fr. Sep-Apr.

• Wet forests, thickets, waste places; 800–1500 m. Guangdong, Yunnan.

11. *Gomphostemma stellatohirsutum* C. Y. Wu, Acta Phytotax. Sin. 10: 148. 1965.

硬毛锥花 ying mao zhui hua

Herbs robust. Stems to 1 m tall, base trailing, densely tawny stellate lanate or sparsely stellate villous, hairs early deciduous. Petiole 1.4–3.2 cm; leaf blade oblong-elliptic to narrowly oblong, 13–22 × 4–7 cm, adaxially densely tawny hirsute, abaxially tawny stipitate stellate especially on veins, base cuneate-attenuate to cuneate, margin shallowly serrate to irregularly denticulate, apex obtuse to acuminate. Cymes axillary, sessile, many flowered, dense; bracts leaflike, oblong to ovate-elliptic, 1.4–3.5 × 0.7–1.8 cm; bracteoles linear, 6–13 × 1–1.5 mm. Calyx campanulate, 14 × ca. 5 mm, conspicuously veined; teeth triangular-lanceolate, ca. 5 mm, apex linear-acuminate. Corolla purple-red, ca. 3.3 cm, densely stellate puberulent and glandular pilose; tube ca. 2 mm wide, apical half gradually dilated to ca. 8 mm at throat; upper lip erect, oblong, ca. 9 × 5.5 mm; lower lip ca. 11 × 8 mm, middle lobe circular, ca. 6.5 × 6.5 mm, margin irregularly undulate; lateral lobes ovate, ca. 6.5 × 4.5 mm. Nutlets oblong, triquetrous, ca. 4.5 × 3 mm, somewhat tawny, sparsely stellate villous on apical half. Fl. Jun-Aug, fr. Aug-Feb.

• Grassy slopes, sparse forests, fully exposed stony crevices; 1300–2100 m. Yunnan.

12. *Gomphostemma callicarpoides* (Yamamoto) Masamune, Trans. Nat. Hist. Soc. Taiwan 32: 4. 1942.

紫珠状锥花 zi zhu zhuang zhui hua

Taitonia callicarpoides Yamamoto, J. Soc. Trop. Agric. 10: 278. 1938; ? *Gomphostemma formosana* Masamune.

Shrubs. Stems 60–75 cm tall, suberect or ascending, stellate hirsute. Petiole 1–3 cm; leaf blade elliptic, 4.5–11 × 2–5 cm, adaxially sparsely stellate hirsute, abaxially gray stellate tomentose, base obtuse or cuneate, margin very shallowly serrate with teeth less than 1 mm, apex acute. Cymes short pedunculate, axillary, crowded into a capitulum, stellate hirsute; outer bracts oblong to linear-lanceolate, 1.5–2 × 3–6 mm, margin 2- or 3- aristate-serrate, apex acute; inner bracts linear, 10 × 1.5 mm, margin entire. Calyx obconic-campanulate, leathery, stellate hirsute, 5 main veins conspicuously elevated, tube 4–5 × 3 mm; teeth linear-lanceolate, ca. 6–7 × 1.5 mm, with glandular sinuses. Corolla

ca. 3 × as long as calyx tube, abaxially pubescent, base ca. 2.5 mm in diam., gradually dilated to 6 mm in diam. at throat; upper lip galeate, undulate, 2-lobed; lower lip spreading, middle lobe rounded, lateral lobes triangular, undulate. Fl. Jul.

• Forests; 1200 m. Taiwan.

Huang & Cheng (Fl. Taiwan 4: 465. 1978) stated that *Gomphostemma formosana* differs from *G. callicarpoides* only by leaf margin with coarsely serrate teeth 2–5 mm and that they may prove to be inseparable from each other. The illustration labeled *G. formosana* in that work is *Leucosceptum stellipilum* (Miquel) Kitamura & Murata var. *formosana* (Ohwi) Kitamura & Murata.

13. *Gomphostemma sulcatum* C. Y. Wu, Acta Phytotax. Sin. 10: 149. 1965.

槽茎锥花 cao jing zhui hua

Herbs perennial. Stems ca. 1 m tall, deeply grooved, densely appressed, tawny stellate tomentose. Petiole 3–6 cm, narrowly winged; leaf blade broadly ovate-elliptic, 18–30 × 7–15 cm, adaxially corrugate and sparsely minutely hispid, abaxially densely gray stellate tomentose, base cuneate-attenuate, decurrent, margin irregularly shallow dentate, apex acuminate. Cymes axillary, dense, many flowered, ca. 5 cm; peduncle 2–5 mm; bracts ovate, 2–2.8 × 0.7–1.4 cm, apically acuminate; bracteoles linear, 1–2.3 cm. Calyx narrowly campanulate, ca. 13 × 4.5 mm, densely gray stellate tomentose; teeth triangular, ca. 1/2 as long as calyx, apically linear, ciliate inside. Corolla yellow, ca. 4.6 cm, puberulent; tube ca. 2 mm in diam., abruptly dilated from apical 1/3 to 1.1–1.3 cm wide at throat; upper lip straight, 6–9 × ca. 8 mm, lower lip ca. 1.3 × 1.3 cm. Fl. Aug.

• Valleys; 1100 m. Yunnan.

14. *Gomphostemma chinense* Oliver, Hooker's Icon. Pl. 15: 54. 1884.

中华锥花 zhong hua zhui hua

Herbs rhizomatous. Stems 24–80 cm tall, densely stellate tomentose. Petiole 2–6 cm, concave-convex, densely stellate tomentose; leaf blade elliptic to ovate-elliptic, 4–13 × 2–7 cm, herbaceous, adaxially stellate villous and sparsely appressed hispidulous, abaxially dense gray stellate tomentose, base obtuse to rounded, margin irregularly coarse serrate to subentire, apex obtuse. Cyme inserted at stem base or leaf axils, 4- to many flowered, 2.5–10 cm; peduncle to ca. 2.2 cm; bracts elliptic to lanceolate, 11–16 × 5–7 mm, margin coarsely serrate or entire on apical half; bracteoles linear, shorter than bracts. Calyx narrowly campanulate in flower, 12–13 × 5–6 mm, densely gray stellate tomentose outside, sparsely hirtellous or subglabrous inside except on teeth; teeth lanceolate to narrowly lanceolate, 6–7 mm, apically acuminate. Corolla yellowish to white, ca. 5.2 cm, sparsely puberulent outside, glabrous inside; tube ca. 3 mm wide, abruptly dilated from apical 1/3 to 9 mm wide at throat; upper lip erect, ca. 6 × 8 mm, apex rounded and emarginate; lower lip 1–1.4 × 1.3–1.9 cm, middle lobe obovate-subcircular, 7–8 × 6–7 mm; lateral lobes ovate, ca. 5 × 5 mm. Stamens almost as long as upper lip of corolla; filaments complanate, margin puberulent. Style shorter than stamens, slightly thicker on apical 2/3, apically unequally 2-cleft. Nutlets 4 per flower at maturity, obovoid, triquetrous, ca. 4 × 2.8 mm, brown, bullate, hairy. Fl. Jul-Aug, fr. Oct-Dec.

Moist, densely forested valleys; 500–700 m. Fujian, Guangdong, Guangxi, Hainan, Jiangxi [Vietnam].

- 1a. Leaf blade adaxially densely stellate villous and sparsely appressed hispidulous; inflorescences inserted at stem base 14a. var. *chinense*
1b. Leaf blade adaxially sparsely hispidulous with a few stellate hairs; inflorescences inserted mostly at leaf axils along stem 14b. var. *cauliflorum*

14a. Gomphostemma chinense var. *chinense*

中华锥花 *zhong hua zhui hua*

Leaf blade adaxially densely stellate villous and sparsely appressed hispidulous. Inflorescences at stem base.

Moist, densely forested valleys; 500–700 m. Fujian, Guangdong, Guangxi, Jiangxi [Vietnam].

14b. Gomphostemma chinense var. *cauliflorum* C. Y. Wu, Acta Phytotax. Sin. 10: 149. 1965.

茎花变种 *jing hua bian zhong*

Leaf blade adaxially sparsely minutely hispid and barely stellate hairy. Inflorescences mostly in leaf axils along stem.

- Forests; 700 m. Hainan.

15. Gomphostemma pedunculatum Benth. ex J. D. Hooker, Fl. Brit. India 4: 696. 1885.

抽葶锥花 *chou ting zhui hua*

Herbs perennial. Stems 0.3–2.7 m tall, trailing, apically flaccid, densely stellate tomentose and long stipitate stellate lanate. Petiole 2.5–7 cm; leaf blade ovate to elliptic, 12–27.5 × 7–19 cm, adaxially stellate tomentose and strigose, abaxially tawny or gray, densely stellate tomentose, base broadly cuneate to subtruncate, margin serrate-crenulate, apex acute to obtuse. Inflorescences thyrses at stem base, 6–10 cm including peduncle 2.5–7 cm; cymes 2- or 3-flowered; bracts purple-red, ovate to subcircular, 1.4–2 × 1.3–1.5 cm, margin remotely serrulate; bracteoles subcircular to spatulate, unequal, shorter than bracts. Calyx campanulate, 11–13 × 6–8 mm; teeth ovate-oblong, 4–4.5 mm, apically acute, ± gray stellate tomentose. Corolla yellow, ca. 3.6 cm, puberulent, ca. 2 mm wide at base, apical half of tube abruptly dilated to 9 mm wide at throat; upper lip erect, oblong, ca. 11 × 8 mm, apex rounded and mucronate; lower lip ca. 1.3 × 1.2 cm, middle lobe circular, ca. 6 × 6 mm; lateral lobes ovate, ca. 3.5 × 3.5 mm. Nutlets orange when fresh, purple-brown when dry, 2–4, oblong, triquetrous, 4.5–5 × ca. 3 mm, adaxially ribbed, abaxially rounded, Fl. and fr. Sep-Feb.

Thickets, densely forested valleys, hilly slopes; 700–2700 m. Yunnan [India].

10. BOSTRYCHANThERA Benth. Gen. Pl. 2: 1216. 1876.

毛药花属 *mao yao hua shu*

Herbs prostrate to erect. Leaves subsessile to short petiolate; leaf blade long lanceolate to ovate, margin serrate. Cymes axillary, dichotomous with helicoid branches, pedunculate. Flowers pedicellate, declinate after anthesis. Calyx campanulate, inconspicuously 10-veined, slightly dilated in fruit; teeth 5, subequal or posterior tooth smaller. Corolla purplish red or white, long exserted, dilated above middle, not hairy annulate inside, 2-lipped; upper lip straight, apex rounded; lower lip larger, 3-lobed, middle lobe largest. Stamens 4, anterior 2 longest, all ascending, underlying upper lip of corolla; anthers subglobose, 2-celled, cells apically tufted hairy or on both ends. Ovary glabrous. Style filiform, apically equally 2-cleft. Nutlets black, 1(–3), drupelike, subglobose; exocarp fleshy, thickened, cuticular when dry.

Two species: endemic to China.

- 1a. Stems densely retrorse hirtellous; posterior calyx tooth smallest; corolla purplish red 1. *B. deflexa*
1b. Stems densely hirsute; calyx teeth subequal; corolla white 2. *B. yaoshanensis*

1. Bostrychanthera deflexa Benth. Gen. Pl. 2: 1216. 1876.

毛药花 *mao yao hua*

Chelonopsis benthamiana Hemsley; *C. deflexa* (Benth.) Diels; *C. deflexa* var. *matsudae* Kudô.

Herbs erect. Stems densely retrorse hirtellous. Leaves subsessile; leaf blade long lanceolate, 8–22 × (0.8–)1.5–5 cm, base attenuate-cuneate to shallowly cordate, margin coarsely to shallowly serrate, apex acuminate to caudate-acuminate. Cymes (5–)7–11-flowered, ca. 2.5 × 3 cm including 6–12 mm peduncle, densely, retrorse hirtellous; bracts and bracteoles linear, 1–2 mm. Pedicel 4–6 mm. Calyx ca. 4.5 × 3.5 mm, posterior tooth smallest. Corolla purplish red, ca. 3.3 cm, sparsely hirsute; upper lip ca. 3.5 × 4.5 mm, apex rounded; middle lobe of lower lip broadly ovate, ca. 6.5 × 9 mm. Fl. Jul-Sep, fr. Sep-Nov.

• Wet areas in dense forests, thickets, open slopes; 500–1200 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Jiangxi, Sichuan, Taiwan.

2. Bostrychanthera yaoshanensis S. L. Mo & F. N. Wei, Guihaia 3: 307. 1983.

瑶山毛药花 *yao shan mao yao hua*

Herbs prostrate to suberect. Stems densely gray hirsute. Petiole 1–1.5 cm; leaf blade elliptic to ovate, 5–9 × 2.5–4 cm, base narrowly cuneate, margin remotely serrate, apex obtuse, gray hirsute. Cymes 4- or 5-flowered, 1.5–2.5 cm including peduncle. Pedicel 0.8–1.5 cm. Calyx campanulate, 5–6 mm, teeth subequal. Corolla white, ca. 5 cm, glabrous; upper lip ca. 3.5 mm, apex obtuse; middle lobe of lower lip oblong, ca. 7 × 4 mm. Fl. and fr. Oct-Nov.

- Forests. Guangxi (Dayao Shan).

11. SCUTELLARIA Linnaeus, Sp. Pl. 2: 598. 1753.

黄芩属 *huang qin shu*

Herbs or subshrubs, rarely shrubs, not aromatic. Leaves entire to pinnatifid. Inflorescences terminal or axillary racemes or spikes; floral leaves usually bractlike apically. Flowers axillary, opposite or sometimes alternate apically. Calyx short tubular, dorsiventrally flattened, 2-lipped; lips entire, closed and ultimately divided to base along sutures in fruit; upper lip deciduous, with a transverse, rounded, concave, scalelike scutellum (shield) or without and abaxially conspicuously saccate; lower lip persistent. Corolla 2-lipped; tube exerted, arcuate or suberect, gradually widening to throat, base bent and saccate or spurred, usually puberulent annulate outside; upper lip erect, galeate; lower lip 3-lobed, middle lobe broad, flattened, entire, lateral lobes ± joined to upper lip and sometimes spreading. Stamens 4, didynamous, anterior 2 longest, underlying upper lip; anthers close together in pairs, bearded on cell aperture; posterior pair conspicuously 2-celled, ± apically acute, anterior pair 1-celled by abortion. Style subulate, apically unequally 2-cleft. Nutlets oblate, globose, to ovoid.

About 350 species: worldwide, but only a few in tropical Africa; 98 species in China.

A very isolated genus with unsatisfactory traditional divisions. Paton (Kew Bull. 45: 399–450. 1990) has proposed a revised classification of *Scutellaria* but did not deal with a large number of the Chinese taxa, and it is not possible to utilize his divisions in detail.

- 1a. Inflorescences crowded 4-sided spikes; flowers opposite and decussate, subtended by specialized, membranous or submembranous, sessile, hoodlike bracts *Key 7*
- 1b. Inflorescences 1-sided or rarely partly spiral, often poorly defined; flowers subtended by leaves or leaflike bracts.
 - 2a. Upper lip of calyx convex, lacking a scutellum; nutlets gray-black, with hairs longer than 0.5 mm 98. *S. kingiana*
 - 2b. Upper lip of calyx with a sail-like scutellum; nutlets of various colors, glabrous or with hairs shorter than 0.5 mm.
 - 3a. Apical flowers often ± spiral; nutlets with acuminate papillae terminating in a ring of hooks; inflorescences terminal, often ± scapose; bracts minute, herbaceous 1. *S. discolor*
 - 3b. Flowers erect, opposite; nutlets variously ornamented, mostly lacking hooked papillae; inflorescences robust and/or lateral, never scapose; bracts leaflike.
 - 4a. Flowers in terminal racemes or spikes ± sharply differentiated from the vegetative part of the stem, mostly subtended by reduced bractlike leaves.
 - 5a. Stem leaves conspicuously petiolate, almost 2 × as long as wide, mostly obscurely dentate or rarely entire; bracts entire, short petiolate, unlike stem leaves; plants subshrubs or erect or rarely ascending herbs lacking enlarged rhizomes *Key 1*
 - 5b. Stem leaves subsessile or short petiolate, more than 2 × as long as wide, dentate-serrate, crenate, to entire; bracts ± similar to stem leaves, gradually reduced toward stem apex; plants erect or ascending-erect perennial herbs with an enlarged and often woody rootstock/rhizome *Key 4*
 - 4b. Flowers in axillary racemes or, if terminal, most flowers subtended by normal leaves and with a gradual transition from these to bracts.
 - 6a. Flowers mainly in axillary racemes or on lateral branches; plants much branched herbs *Key 5*
 - 6b. Flowers axillary, secund, mostly on main axis; plants perennial, mostly erect herbs.
 - 7a. Nutlets inconspicuously differentiated into adaxial and abaxial sides, tuberculate *Key 6*
 - 7b. Nutlets conspicuously differentiated into adaxial and abaxial sides, abaxially tuberculate, adaxially spiny or smooth, with or without a membranous wing on equatorial plane.
 - 8a. Nutlets tuberculate abaxially, adaxially smooth and conical, with an apical umbo; rhizomes with long leafless stolons at nodes; stems densely spreading pilose 96. *S. tuberifera*
 - 8b. Nutlets tuberculate abaxially, adaxially densely spiny around a cylindrical central umbo; rhizomes without stolons; stems glabrous to sparsely pilose apically 97. *S. guilielmii*

Key 1

- 1a. Corolla less than 1 cm.
 - 2a. Leaves herbaceous, triangular, 0.7–1.7 × 0.8–1.8 cm, sparsely strigose, densely strigose along midvein abaxially 44. *S. tienchueanensis*
 - 2b. Leaves membranous, narrowly triangular-ovate to oblong, 1.3–3 × 0.8–3.2 cm, sparsely white pilose 45. *S. tenera*
- 1b. Corolla more than 1 cm.
 - 3a. Corolla tube straight, not zigzag.
 - 4a. Stem leaves membranous to papery, margin conspicuously dentate; corolla 1.4–2 cm *Key 3*
 - 4b. Stem leaves ± leathery, rarely papery, shallowly undulate-serrate to subentire on apical 2/3; corolla (1.5–)2–3 cm.
 - 5a. Leaves less than 2 cm, adaxially corrugate; plants prostrate herbs on rocks 8. *S. playfairii*
 - 5b. Leaves to more than 2 cm, not corrugate; plants tall herbs or subshrubs *Key 2*
 - 3b. Corolla tube zigzag.
 - 6a. Plants with dense, spreading or upwardly curved gray to yellowish hirsute hairs 40. *S. mairei*
 - 6b. Plant with different types of hairs.
 - 7a. Stem leaves 1.5–3 × 1.1–2.4 cm, triangular to triangular-ovate, shallowly dentate to incised-dentate 41. *S. tenax*
 - 7b. Stem leaves to more than 3 × 2.4 cm, ovate to ovate-cordate, regularly crenulate.
 - 8a. Stems and leaves white pubescent; corolla rose, to 2.3 cm 43. *S. tapintzeensis*
 - 8b. Stems and leaves white pilose; corolla blue-purple, 1.2–1.5 cm 42. *S. teniana*

Key 2

- 1a. Rachis and pedicels of inflorescence subglabrous or finely pubescent.
 - 2a. Blade ovate to elliptic-lanceolate, apex acuminate to caudate-acuminate; corolla dark purple or blue.
 - 3a. Herbs to 1 m tall; leaves (4-)6-8-undulate-dentate; corolla dark purple, to 3.1 cm 2. *S. javanica*
 - 3b. Herbs ca. 30 cm or more tall; leaves 3- or 4-undulate-serrate; corolla blue, ca. 2.5 cm 4. *S. formosana*
 - 2b. Blade ovate to subcircular, apex acute to obtuse; corolla cream-white or white tinged with purple.
 - 4a. Inflorescences many flowered, to 13 cm; bracts narrowly oblong to narrowly lanceolate, 0.5-1 mm wide 7. *S. luzonica*
 - 4b. Inflorescences few flowered, ca. 6 cm at anthesis; bracts ovate-lanceolate to lanceolate, more than 2.5 mm wide.
 - 5a. Blade broadly ovate to subcircular, 2.5-5 × 1.8-4.3 cm, adaxially sparsely puberulent, abaxially densely puberulent, 4-6-undulate-crenate, lateral veins 3-paired; inflorescences many flowered; flowers crowded ca. 2 cm; calyx ca. 2.8 mm 3. *S. hainanensis*
 - 5b. Blade ovate, 2-3.8 × 1-2.2 cm, subglabrous, 3- or 4-crenate, lateral veins 2-paired; inflorescences few flowered; flowers widely spaced, ca. 1.6 cm; calyx to 5 mm 6. *S. oligophlebia*
- 1b. Rachis and pedicels of inflorescence glandular.
 - 6a. Petiole of stem leaf 0-4 mm 5. *S. tsinyunensis*
 - 6b. Petiole of stem leaf more than 7 mm.
 - 7a. Leaves elliptic-ovate to obovate or subcircular, apically rounded to acute, basally cuneate to rounded, conspicuously 3-veined 9. *S. obtusifolia*
 - 7b. Leaves elliptic to obovate-elliptic, apically acute to acuminate, basally cuneate, rarely roundish, not 3-veined.
 - 8a. Stems and petioles reddish 10. *S. yunnanensis*
 - 8b. Stems and petioles not reddish.
 - 9a. Leaf venation conspicuously elevated 13. *S. reticulata*
 - 9b. Leaf venation inconspicuously elevated.
 - 10a. Stem leaf blade abaxially densely puberulent; bracts linear, shorter than pedicels; corolla 2.6-2.9 cm, lateral lobes of lower lip ovate; gynophore ca. 0.5 mm 11. *S. mollifolia*
 - 10b. Stem leaf blade abaxially glabrous; bracts elliptic, longer than pedicels; corolla ca. 2.2 cm, lateral lobes of lower lip triangular; gynophore inconspicuous 12. *S. sichourensis*

Key 3

- 1a. Plants low, ascending or diffuse herbs.
 - 2a. Leaves cordate-ovate or circular-ovate to elliptic, apex obtuse to rounded, margin regularly crenate.
 - 3a. Plants stoloniferous, ± scapose; leaves initially in a rosette, becoming decussate after elongation of internodes 30. *S. tayloriana*
 - 3b. Plants rhizomatous; stem leaves conspicuous.
 - 4a. Leaf blade glabrous except along veins abaxially 31. *S. laeteviolacea*
 - 4b. Leaf blade hairy.
 - 5a. Middle stem leaves 4-6 × 4-6 cm, densely floccose-pilose, regularly undulate-crenate; terminal inflorescences to 16 cm 32. *S. lutescens*
 - 5b. Middle stem leaves 2-2.6 × 2-2.6 cm, densely puberulent, strigose, or spreading villous, crenulate; terminal inflorescences 4-8(-12) cm 33. *S. indica*
 - 2b. Leaves triangular-ovate to rhombic-ovate, apex acute to obtuse, margin dentate to dentate-serrate.
 - 6a. Stems and petioles spreading hirtellous 34. *S. taiwanensis*
 - 6b. Stems and petioles with upwardly curved pubescence or puberulent.
 - 7a. Leaves 5-10 × 3-7 cm, membranous, sparsely appressed pubescent, remotely coarse dentate 39. *S. megaphylla*
 - 7b. Leaves 1.1-3.2(-5.5) × 0.8-3.5 cm, herbaceous to ± papery, if membranous then subglabrous, denticulate to dentate-serrate.
 - 8a. Corolla 1-1.4 cm.
 - 9a. Leaves triangular-ovate to ovate, 1.2-2.4 cm wide, apex acute to obtuse, base subtruncate, roundish or sometimes shallowly cordate 35. *S. pseudotenax*
 - 9b. Leaves narrowly ovate to narrowly triangular-ovate, 0.8-1.4 cm wide, apex acute, base widely cuneate to subtruncate 36. *S. yingtakensis*
 - 8b. Corolla 1.8-2.2(-2.5) cm.
 - 10a. Leaves ovate to rhombic-ovate, base cuneate to subrounded, margin obtusely dentate to coarsely crenate on apical 2/3 37. *S. inghokensis*
 - 10b. Leaves ovate to triangular-ovate, base truncate to truncate-cuneate, margin obtusely dentate to incised-dentate 38. *S. pekinensis*
 - 1b. Plants moderate to tall, erect or prostrate herbs.
 - 11a. Stems subglabrous, finely pubescent, or puberulent.
 - 12a. Leaf blade abaxially blackish or dark purple-black when dry, midvein strigillose.
 - 13a. Blade of middle stem leaves ovate, 6-7 × 3.2-3.5 cm, apex acute, base broadly cuneate;

- corolla ca. 2.3 cm 14. *S. nigricans*
- 13b. Blade of middle stem leaves cordate, 3–5.5 × 2.7–3.8 cm, apex obtuse, base cordate; corolla 1.4–1.6 cm 15. *S. nigrocardia*
- 12b. Leaf blade abaxially green or purplish when dry, midvein glabrous or subglabrous.
- 14a. Leaf blade broadly cuneate to roundish at base, shallowly dentate to dentate-serrate at margin; corolla yellowish white to purple-blue.
- 15a. Corolla yellowish white to white; calyx pubescent; stems retrorse pubescent along angles and nodes 19. *S. anhweiensis*
- 15b. Corolla purple-blue; calyx veins and margin sparsely pubescent; stems subglabrous basally, with appressed hairs apically, angles and nodes with hooked retrorse pubescence 20. *S. chekiangensis*
- 14b. Leaf blade ± cordate at base, regularly crenate at margin; corolla red to purplish.
- 16a. Corolla ca. 2.7 cm, inconspicuously saccate at base of tube; calyx sparsely pubescent; rachis of inflorescence finely pubescent 17. *S. wenshanensis*
- 16b. Corolla 2–2.3 cm, conspicuously saccate at base of tube; calyx pubescent or glandular puberulent; rachis of inflorescence densely glandular puberulent.
- 17a. Corolla ca. 2.3 cm; stems densely puberulent; leaves membranous, petiole 1.5–3.5 cm, densely puberulent 16. *S. chihshuiensis*
- 17b. Corolla ca. 2 cm; stems subglabrous to glabrous; leaves papery, petiole 0.2–2 cm or more, subglabrous or glabrous 18. *S. violacea*
- 11b. Stems with ± dense, simple or septate hairs.
- 18a. Corolla spurred in front at base, spur ca. 2.5 mm, decurrent 29. *S. calcarata*
- 18b. Corolla conspicuously or inconspicuously saccate in front at base.
- 19a. Leaf base rounded, sometimes shallowly cordate.
- 20a. Leaves broadly ovate, 4–7.5 cm, coarsely or sometimes double crenate to coarsely crenate-serrate.
- 21a. Leaf blade obtuse at apex, rounded to shallowly cordate at base, coarsely or sometimes double crenate at margin, adaxially sparsely pilose, abaxially densely pilose; petiole densely spreading pilose 21. *S. grossecrenata*
- 21b. Leaf blade acute at apex, broadly cuneate to roundish at base, coarsely mucronate crenate-serrate at margin, densely hirtellous along veins otherwise sparsely hirtellous; petiole densely puberulent 22. *S. yangbiense*
- 20b. Leaves lanceolate-oblong to ovate, 1.7–6 cm, irregularly nearly double serrate to regularly crenate.
- 22a. Leaves lanceolate-oblong to lanceolate-ovate, 3–6 × 1–2 cm, irregularly nearly double serrate; corolla ca. 1.5 cm 23. *S. laxa*
- 22b. Leaves ovate, 1.7–4 × 0.8–2.5 cm, regularly crenate; corolla (2–) 2.6–2.9 cm 24. *S. macrosiphon*
- 19b. Leaf base conspicuously cordate.
- 23a. Stems with dense, upwardly curved pubescence 25. *S. meehanioides*
- 23b. Stems with ± dense, spreading hairs.
- 24a. Corolla 1–1.2 cm; leaves ovate to oblong-ovate; fascicled fibrous rootlets slightly swollen at middle 26. *S. microviolacea*
- 24b. Corolla 1.6–1.8 cm; leaves cordate or triangular-ovate; fascicled fibrous rootlets not swollen.
- 25a. Leaves triangular-ovate, middle stem leaves to 6 × 4 cm, apex acute, base cordate to subtruncate, crenate-serrate or sometimes double crenate-serrate, densely puberulent; plants densely puberulent and glandular hairy throughout 27. *S. caryopteroides*
- 25b. Leaves cordate, 1–2.5 × 1–3 cm, apex acute, base cordate, regularly crenate, densely strigose; plants spreading white hirtellous throughout 28. *S. purpureocardia*

Key 4

- 1a. Stem leaves conspicuously, remotely dentate-serrate.
- 2a. Leaves membranous, oblong, 3–5.5 × 1.3–2 cm, base shallowly truncate-cordate, sparsely white hirsute adaxially and along veins abaxially to subglabrous or glabrous 46. *S. sciaphila*
- 2b. Leaves papery, oblong-ovate to narrowly lanceolate, 2–4 × 0.8–1.4 cm, base roundish to truncate, puberulent 47. *S. macrodonta*
- 1b. Stem leaves crenate to subentire or entire.
- 3a. Stem leaves ± crenate to crenate-serrate.
- 4a. Corolla yellow-white, yellow, to green-yellow, with tinged purplish spots or lines 48. *S. likiangensis*
- 4b. Corolla purple or purple-blue.
- 5a. Corolla less than 2 cm 49. *S. chungtienensis*
- 5b. Corolla more than 2 cm.
- 6a. Stems and leaves very densely white pilose; leaves broadly ovate to oblong, conspicuously crenate-serrate; corolla 2–3.7 cm 50. *S. forrestii*
- 6b. Stems and leaves subglabrous with recurved or nearly patent puberulent or pilose hairs; leaves oblong, folded, inconspicuously crenate to entire above base; corolla 2.4–3 cm 51. *S. amoena*
- 3b. Stem leaves entire or subentire.

- 7a. Stem leaves of two kinds, lower stem leaves crowded, ovate-lanceolate to ovate, upper stem leaves widely spaced, linear 57. *S. orthocalyx*
- 7b. Stem leaves homomorphic, upper leaves gradually reduced.
- 8a. Stems with dense or sparse, recurved or sometimes nearly patent glandular pubescence; leaf surfaces with many yellow glands 53. *S. viscidula*
- 8b. Stems without glandular pubescence, subglabrous or with variable pubescence; leaves without glands or glandular only abaxially.
- 9a. Abaxial leaf surface with impressed glands.
- 10a. Plants (15–)30–120 cm tall; stems subglabrous or with upwardly curved or spreading pubescence; stem leaves lanceolate to linear-lanceolate, 1.5–4.5 × (0.2–)0.5–1.2 cm; racemes terminal on stems and branches so that all racemes form a terminal panicle 52. *S. baicalensis*
- 10b. Plants 10–30 cm tall; stems sparsely spreading, white pilose along angles and bearded on nodes otherwise subglabrous; stem leaves ovate or apical ones sometimes oblong, 2–3.4 × 0.7–1.4 cm; racemes terminal on stems, not forming a panicle on apical part of plant 55. *S. hypericifolia*
- 9b. Abaxial leaf surface without impressed glands.
- 11a. Stems glabrous; leaves 4–5 cm; corolla yellowish white 56. *S. spectabilis*
- 11b. Stems hairy, at least on angles, hairs spreading or recurved; leaves 1.4–4 cm; corolla rose, purple, to purple-blue 54. *S. rehderiana*

Key 5

- 1a. Flowers in axils of mid and upper stem leaves, forming axillary racemes; floral leaves inconspicuous, bractlike, minute.
- 2a. Leaf blade broadly cuneate to rounded at base, undulate or remotely denticulate at margin, glabrous; corolla creamy yellow 78. *S. delavayi*
- 2b. Leaf blade cordate to obliquely so at base, inconspicuously and remotely crenate at margin, at least adaxially ± hairy; corolla purplish to purple-red.
- 3a. Leaves sessile or subsessile, blade ovate, 1.9–3.5 × 0.9–2 cm 76. *S. sessilifolia*
- 3b. Leaves with petiole 4–7 mm, blade ovate-oblong to oblong-lanceolate, 5–8 × 2–3.5 cm 77. *S. caudifolia*
- 1b. Flowers in axils of stem leaves and floral leaves of axillary fertile branches, inconspicuously crowded into axillary racemes; floral leaves similar to stem leaves, gradually reduced to bracts.
- 4a. Plants much branched, all branches fertile; leaves ovate-lanceolate to linear-lanceolate.
- 5a. Corolla ca. 2 cm; leaves subrhomboid- to ovate-lanceolate, incised-serrate on apical 2/3 58. *S. incisa*
- 5b. Corolla ca. 1.3 cm; leaves linear-lanceolate, inconspicuously 1- or 2-undulate-crenate apically 59. *S. subintegra*
- 4b. Plants few branched, some branches fertile; leaves ovate.
- 6a. Fertile branches much elongated; flowers inserted in leaf axils; floral leaves similar to stem leaves, reduced.
- 7a. Leaves subglabrous or very sparsely pubescent.
- 8a. Leaves 1.2–2.5 × 0.7–2.1 cm, pubescent and yellow glandular, margin coarsely 1–3-crenate; flowers purple or purple-blue, inserted on abbreviated fertile branches 60. *S. axilliflora*
- 8b. Leaves to 6.2 × ca. 3 cm, subglabrous, abaxially with scattered scarlet glands, margin remotely undulate-crenate; flowers yellowish, inserted on elongated fertile branches 61. *S. lotienensis*
- 7b. Leaves hirtellous, strigose, or pilose.
- 9a. Stems with spreading, slightly flaccid, white hirsute hairs.
- 10a. Plants few branched herbs; leaf base cordate, blade not corrugate; racemes 4–11 cm; scutellum on upper lip of calyx inconspicuously enlarged in fruit, obovate, ca. 2.5 × 4 mm; corolla tube hairy inside 62. *S. pingbienensis*
- 10b. Plants much branched subshrubs; leaf base broadly cuneate to roundish, blade slightly corrugate; racemes 7–27 cm; scutellum on upper lip of calyx conspicuously enlarged in fruit, subcircular, ca. 5 × 5 mm; corolla tube glabrous inside 63. *S. shweliensis*
- 9b. Stems with upwardly or downwardly curved puberulent, pubescent, or hirtellous hairs.
- 11a. Leaves 0.9–2.2 × 0.4–1.4 cm, 2- or 3-crenate 64. *S. wongkei*
- 11b. Leaves 2–7 × (1.3–)1.5–4.6 cm, with many crenations.
- 12a. Fertile branches less than 10 cm, inflorescences terminal and lateral; leaves triangular-ovate, coarsely dentate or sometimes double dentate 65. *S. hunanensis*
- 12b. Fertile branches more than 10 cm; inflorescences terminal; leaves ovate, regularly crenate.
- 13a. Stem leaves 2–5 × 1.5–3 cm, rounded to truncate at base, sparsely finely strigose; stems sparsely puberulent 66. *S. bambusetorum*
- 13b. Stem leaves 6.5–7 × 4–4.6 cm, cordate at base, densely pilose; stems densely, retrorsely yellowish pubescent 67. *S. chimenensis*
- 6b. Fertile branches short; flowers of basal fertile branches inserted only toward apex; flowers of upper fertile branches inserted along entire length; floral leaves reduced to bracts.
- 14a. Middle lobe of lower corolla lip equally 4-lobed.
- 15a. Stems conspicuously winged, glabrous except at nodes; leaves ca. 1.5 × 1.2 cm 70. *S. weishanensis*
- 15b. Stems not winged, white puberulent or white pilose; middle stem leaves ca. 4 × 2.6 cm

- 71. *S. quadrilobulata*
- 14b. Middle lobe of lower corolla lip subentire or emarginate.
- 16a. Leaves entire to 3- or 4-dentate at base, apex entire.
- 17a. Leaves 1.5–3(–4.5) × 1–2(–2.5) cm, apex acuminate to caudate-acuminate, margin 3- or 4-dentate, base and apex entire; corolla to 2.5 cm, tube ca. 1.5 mm wide at middle, gradually dilated apically, to 5 mm wide at throat 68. *S. franchetiana*
- 17b. Leaves 2–3.5 × 1.2–1.5 cm, apex acute to subacute, margin ± entire or inconspicuously crenate; corolla 1.8–2 cm, tube ca. 0.7 mm wide, gradually dilated apically, to ca. 4 mm at throat 69. *S. stenosphon*
- 16b. Leaves conspicuously crenate to coarsely double serrate.
- 18a. Stems subglabrous or densely appressed, white pilose on angles, otherwise glabrous; leaves crenate to coarsely double serrate 74. *S. omeiensis*
- 18b. Stems densely puberulent or floccose-pilose with upwardly curved hairs; leaves regularly crenate-serrate to acute-serrate.
- 19a. Stems densely floccose-pilose 72. *S. tenuiflora*
- 19b. Stems with dense, upwardly curved puberulent hairs.
- 20a. Leaves lanceolate-ovate, acute-serrate, abaxially densely purple-red glandular 73. *S. honanensis*
- 20b. Leaves ovate, serrate, abaxially without glands 75. *S. scandens*
- Key 6**
- 1a. Rhizomes moniliform, with enlarged tuberlike internodes; flowers ca. 3.2 cm 88. *S. moniliorrhiza*
- 1b. Rhizomes not moniliform; flowers less than 2.5 cm.
- 2a. Leaves ± hastate.
- 3a. Flowers to 1.3 cm; floral leaves bractlike, unlike stem leaves 84. *S. barbata*
- 3b. Flowers less than 1 cm; floral and stem leaves similar but reduced.
- 4a. Leaves cordate, pilose; calyx pilose, scutellum ca. 0.3 mm; corolla 9–10 mm 83. *S. shansiensis*
- 4b. Leaves ovate-triangular to triangular, adaxial surface and abaxial veins puberulent, margin ciliolate; calyx veins and margin ciliolate, scutellum ca. 1 mm; corolla 5–6.5 mm 82. *S. dependens*
- 2b. Leaves not hastate.
- 5a. Leaves less than 7 mm wide.
- 6a. Flowers to 2.5 cm; leaves densely hairy, adaxially glabrous, or with scattered fine strigose hairs, abaxially glandular except the finely pubescent veins and margin 80. *S. regeliana*
- 6b. Flowers 2–2.2 cm; leaves subglabrous or abaxially sparsely and finely pubescent along veins, minutely yellow glandular 81. *S. linarioides*
- 5b. Leaves more than 7 mm wide.
- 7a. Flowers less than 2 cm; leaf blade abaxially without glands 79. *S. galericulata*
- 7b. Flowers more than 2 cm; leaf blade abaxially glandular.
- 8a. Leaves glabrous, sparsely puberulent, appressed pubescent, or villous 85. *S. scordifolia*
- 8b. Leaves densely hirsute or strigose.
- 9a. Stems with spreading branches from base; leaves usually elliptic, rarely ovate to oblong, apex obtuse to rounded, shallowly dentate to subentire, sometimes serrate, densely hairy; plants of beaches 86. *S. strigillosa*
- 9b. Stems unbranched or few branched; leaves ovate to oblong-ovate, apex acute to subobtuse, acute-serrate, densely hairy; plants of inland areas 87. *S. tuminensis*
- Key 7**
- 1a. Leaf blade abaxially white or gray tomentose.
- 2a. Leaves pinnatipartite 90. *S. przewalskii*
- 2b. Leaves pinnately lobed, margin incised-serrate 89. *S. sieversii*
- 1b. Leaf blade abaxially green or gray-green, sparsely or densely erect or floccose-pubescent, sometimes with intermixed glandular hairs.
- 3a. Leaf serrations conspicuous, spreading.
- 4a. Corolla yellow, without purple spots 91. *S. supina*
- 4b. Corolla yellowish, with conspicuous purple spots 92. *S. prostrata*
- 3b. Leaf serrations inconspicuous, always coalescent.
- 5a. Bracts pubescent and glandular along veins and margin, otherwise subglabrous 94. *S. altaica*
- 5b. Bracts spreading pilose and glandular along veins and margin.
- 6a. Stems densely spreading pilose and pubescent throughout; petiole 0.5–1.7 cm; lower floral leaves serrate 95. *S. orthotricha*
- 6b. Stems ± spreading pilose and glandular apically; petiole 0.2–0.5 cm; lower floral leaves entire 93. *S. oligodonta*

Herbs perennial, rhizomatous. Stems ascending to erect, 5.5–38 cm tall, densely puberulent, reddish, unbranched, apically leafless. Stem leaves in 2–4(–7) pairs; petiole 0.5–2.2(–4.8) cm; leaf blade elliptic-ovate to broadly elliptic, 1.5–7.4 × 1–4.8 cm, papery, pubescent or hirsute especially on veins, adaxially densely puberulent to hirsute, abaxially green or purplish, base cordate to shallowly cordate, margin undulate-crenate, apex rounded to obtuse. Racemes secund, 5–24 cm; peduncle 2.5–4 cm, densely puberulent; floral leaves sessile to short petiolate, ovate to elliptic, 0.7–2.5 × 0.5–1.5 cm, base rounded-truncate, apex obtuse; bracts ovate, 1.5–3 × ca. 1 mm, pubescent, margin entire. Flowers alternate or opposite. Pedicel purplish, 2.5–3 mm, densely pubescent. Calyx ca. 2 mm, pubescent outside, glandular pubescent; scutellum spreading, semicircular, 0.5–0.8 mm, reflexed, almost as long as calyx in fruit. Corolla purple, glandular pubescent outside, 0.9–1.2 cm; tube 7–10 mm, base bent, gradually dilated to 3 mm wide at throat; limb ca. 3 mm, puberulent or pubescent inside; middle lobe of lower lip ovate-orbicular; lateral lobes ovate to oblong-ovate. Nutlets brown, ovoid-ellipsoid, ca. 1 mm in diam., with acuminate tubercles tipped by a whorl of hooks. Fl. Jun–Nov, fr. Jul–Dec.

Forested hillsides, streamsides, grassy slopes, roadsides; 0–2000 m. Guangxi, Guizhou, Sichuan, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

- 1a. Leaf blade adaxially densely puberulent and pubescent, abaxially pubescent; apical flowers alternate; corolla tube puberulent inside on front at base, otherwise glabrous
.....1a. var. *discolor*
- 1b. Leaf blade densely hirsute especially on abaxial veins; flowers opposite; corolla tube conspicuously puberulent annulate inside 1b. var. *hirta*

1a. *Scutellaria discolor* var. *discolor*

异色黄芩 yi se huang qin

Scutellaria salvia H. Léveillé.

Stem leaf blade adaxially densely puberulent, pubescent, abaxially sometimes purplish, pubescent especially on veins. Flowers alternate near apex of inflorescence. Corolla tube puberulent to pubescent inside on front at base, otherwise glabrous.

• Forested hillsides, streamsides, grassy slopes; 0–1800 m. Guangxi, Guizhou, Yunnan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

Used as a folk remedy for colds, fevers, sore throats, and enteritis.

1b. *Scutellaria discolor* var. *hirta* Handel-Mazzetti, Acta Horti Gothob. 13: 341. 1939.

地盆草 di pen cao

Leaves densely hirsute especially on veins of abaxial surface. Flowers opposite. Corolla tube conspicuously puberulent annulate inside.

• Sunny, grassy slopes, roadsides; 2000 m. Sichuan, Yunnan.

2. *Scutellaria javanica* Junghuhn, Java 1: 621. 1853.

爪哇黄芩 zhao wa huang qin

Herbs perennial, erect, to 1 m tall. Stems finely puberulent or subglabrous. Petiole 0.8–1.2 cm; leaf blade

ovate-lanceolate to elliptic-lanceolate, 4–9.5 × 1.5–4 cm, reduced toward stem apex, ± leathery, adaxially glabrous, abaxially finely puberulent along veins otherwise glandular, lateral veins not extending to margin, base broadly cuneate, margin (4–)6–8-undulate-dentate, apex caudate-acuminate. Racemes secund, terminal, 7–14 cm; bracts lanceolate, 3–6 × 1–1.25 mm, ciliate, apex acute. Pedicel 5–6 mm, finely puberulent. Calyx 3–3.5 mm, finely puberulent, ciliate; scutellum semicircular, 2–2.5 mm, ca. 4.5 mm in fruit. Corolla dark purple, to 3.1 cm; tube ca. 2.5 cm, bent at base, gradually dilated above middle to 8 mm wide at throat, puberulent outside, villous on basal 1/4 inside; limb glabrous inside, upper lip erect, broadly triangular-ovate, ca. 9 mm wide, base abruptly constricted; lower lip spreading, ovate-orbicular; lateral lobes triangular, ca. 2.5 mm wide. Nutlets unknown. Fl. Apr–May.

• Grasslands near forests; 1200 m. Hainan [Indonesia, Philippines].

3. *Scutellaria hainanensis* C. Y. Wu, Fl. Hainan. 4: 532. 1977.

海南黄芩 hai nan huang qin

Herbs perennial, puberulent, with woody rhizomes and stem bases. Stems ca. 60 cm tall, with adventitious roots at base, ascending, 1- or 2-branched, densely puberulent, basal internodes longer than leaves. Petiole 6–9 mm; leaf blade broadly ovate to subcircular, 2.5–5 × 1.8–4.3 cm, ± leathery, adaxially sparsely puberulent, abaxially purplish and densely puberulent, base broadly cuneate to shallowly cordate, margin 4–6-undulate-crenate or entire, apex obtuse to acute. Racemes terminal, ca. 6 cm; bracts sessile, ovate-lanceolate, 3–5 mm, densely pubescent, apex acute. Pedicel ca. 4 mm, densely pubescent. Calyx ca. 2.8 mm, densely puberulent; scutellum spreading, semicircular, ca. 2.2 mm. Corolla cream-white, ca. 2 cm; tube ca. 1.6 cm, bent at base, gradually dilated above middle to 7 mm wide at throat, puberulent outside, villous on basal 1/4 inside; upper lip erect, broadly triangular-ovate, ca. 5.5 mm wide, base slightly constricted, apex obtuse; middle lobe of lower lip spreading, ovate-orbicular, base ca. 5 mm wide, emarginate; lateral lobes ovate, ca. 3 mm wide. Nutlets unknown. Fl. Oct.

• Rocky mountainous areas. Hainan.

4. *Scutellaria formosana* N. E. Brown, Gard. Chron., ser. 3, 16: 212. 1894.

蓝花黄芩 lan hua huang qin

Herbs perennial. Rhizomes ± woody. Stems ca. 30 cm tall, ascending, rooting at basal nodes, few branched or simple, subglabrous or densely pubescent, purplish. Petiole 0.8–1.2 cm, subglabrous, glandular; leaf blade ovate to ovate-lanceolate, 3–8 × 1.5–3.3 cm, ± leathery, adaxially shiny, abaxially sometimes tinged purple, glabrous to sometimes densely pubescent especially abaxially, dotted, base broadly cuneate, margin 3- or 4-undulate-serrate, apex obtuse to acuminate. Racemes opposite, terminal, 7–17 cm; bracts narrowly rhombic, ca. 2 mm, pubescent. Pedicel ca. 4 mm, densely pubescent. Calyx ca. 3 mm, ca. 4 mm. in fruit, pubescent outside, glandular; scutellum spreading, semicircular, to 2 mm. Corolla blue, ca. 2.5 cm, glandular puberulent outside; tube ca. 2 cm, base bent, throat to 6 mm wide, villous near base inside; upper lip triangular-ovate, ca. 8 mm wide; middle lobe of lower lip subcircular, ca. 4.5 mm in

diam., emarginate; lateral lobes ovate, ca. 3 mm wide. Nutlets tuberculate. Fl. Aug-Sep, fr. Oct-Nov.

• Shady areas in forests; 500–900 m. Fujian, Guangdong, Guangxi, Hainan, Jiangxi, Yunnan.

- 1a. Stems and leaves subglabrous 4a. var. *formosana*
1b. Stems and leaves, especially abaxially, densely pubescent 4b. var. *pubescens*

4a. *Scutellaria formosana* var. *formosana*

蓝花黄芩 lan hua huang qin

Stems subglabrous. Leaves glabrous, dotted or sometimes sparsely pubescent along veins abaxially.

• Shady areas in forests; 500–900 m. Fujian, Guangdong, Hainan, Jiangxi, Yunnan.

4b. *Scutellaria formosana* var. *pubescens* C. Y. Wu & H. W. Li, Fl. Hainan. 4: 532. 1977.

多毛变种 duo mao bian zhong

Stems pubescent. Leaves densely pubescent especially abaxially.

• Forests. Guangxi, Hainan.

5. *Scutellaria tsinyunensis* C. Y. Wu & S. Chow, Fl. Reipubl. Popularis Sin. 65(2): 577. 1977.

缙云黄芩 jin yun huang qin

Scutellaria yunnanensis H. Léveillé var. *subsessilifolia* Sun ex C. H. Hu.

Herbs perennial. Rhizomes trailing, rooting from internodes. Stems dark purple, erect, 30–60 cm tall, with antrorse pubescent hairs on angles, otherwise subglabrous. Petiole 1–4 mm; leaf blade of basal leaves circular to ovate, base subcordate, apex acute; blade of upper leaves ovate-lanceolate to lanceolate, 4–8 × 1.5–3.5 cm papery, glabrous, finely pubescent along veins, base roundish to shallowly cordate, margin remotely undulate-denticulate, apex caudate to caudate-acuminate, abaxially sometimes slightly purplish, veins finely pubescent. Racemes secund, terminal, 8–10 cm; peduncle 2–3 cm; bracts sessile, narrowly lanceolate, 1–1.5 mm, glabrous, deciduous. Pedicel ca. 3 mm, densely pubescent, glandular puberulent. Calyx ca. 2.5 mm, densely pubescent, glandular puberulent; scutellum spreading, ca. 1.7 mm. Corolla white with red to purple on limb, 1.7–1.9 cm, puberulent outside; tube bent at base, to 5 mm wide at throat, sparsely pilose at bent base inside; middle lobe of lower lip triangular-ovate, base ca. 4 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets unknown. Fl. Apr-May.

• Shady areas in forests; 700–800 m. Sichuan (Ba Xian).

6. *Scutellaria oligophlebia* Merrill & Chun ex H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 577. 1977.

少脉黄芩 shao mai huang qin

Herbs perennial. Stems ca. 34 cm tall, erect, leafless basally, rooting from basal nodes, branched apically; branches finely pubescent. Petiole 3.5–6 mm, finely pubescent; leaf blade ovate, 2–3.8 × 1–2.2 cm, ± leathery, densely finely pubescent, soon subglabrous, base cuneate, margin remotely 3- or 4-crenate, apex acute. Racemes terminal, 4–6.5 cm; bracts sessile, lanceolate, 6.5–8 × 2.5–3.5 mm, pubescent or subglabrous, margin entire. Pedicel 3–4 mm, densely

pubescent. Calyx to 5 mm, pubescent outside; scutellum spreading, semicircular, ca. 2 mm. Corolla white purplish, to 1.6 cm, densely puberulent outside; tube ca. 1.3 cm, suberect, slightly saccate at base; middle lobe of lower lip ovate, base ca. 3.5 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets unknown. Fl. Apr.

• Open roadsides. Guangdong (Raoping Xian).

7. *Scutellaria luzonica* Rolfe var. *lotungensis* C. Y. Wu & C. Chen, Fl. Hainan. 4: 532. 1977.

乐东黄芩 le dong huang qin

Herbs perennial. Stems to 35 cm tall, erect, subterete, base ca. 1.5 mm in diam., densely antrorse puberulent, long branched. Petiole 4–10 mm; leaf blade ovate, 1.2–3.2 × 0.8–2 cm, papery, pubescent, base truncate-cuneate to subrotund, margin remotely 2–4-dentate, with antrorse ciliate hairs, apex obtuse. Racemes terminal, 2.5–9(–13) cm, subsessile, often ± grouped into panicles; bracts subsessile, narrowly oblong to narrowly lanceolate, 2–3 × 0.5–1 mm, pubescent, basally attenuate, margin entire, apically obtuse. Pedicel ca. 4 mm, densely puberulent. Calyx ca. 1.8 mm, ca. 4 mm in fruit, pubescent; scutellum ca. 1.5 mm. Corolla unknown. Nutlets dark blackish brown, ovoid, ca. 1 × 0.8 mm, tuberculate, adaxially concave, umbonate. Fr. Jul-Dec.

• Shady areas in dense forests. Hainan (Ledong Xian).

8. *Scutellaria playfairii* Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 254. 1929.

伏黄芩 fu huang qin

Herbs perennial. Stems trailing, 15–30 cm tall, 1–2 mm in diam., densely antrorse pubescent, very rarely subglabrous, branches flexuous. Petiole 2–4 mm; leaf blade ovate to subcircular, 0.9–1.6 × 0.7–1.5 cm, ± leathery, base shallowly cordate to subtruncate, apex rounded. Racemes terminal, 4–6.5(–20) cm, glandular hairy; bracts elliptic to broadly ovate, 2–3 mm, base attenuate, margin entire to shallowly serrate, apex obtuse. Pedicel 2–3 mm, hairy. Calyx ca. 2 mm, to 3 mm in fruit; scutellum ca. 0.5 mm, to 2.5 mm in fruit, glandular hairy. Corolla 2–2.6 cm, puberulent outside, pubescent on lower lip inside; tube slightly bent, ca. 2.5 mm wide at throat; middle lobe of lower lip circular-ovate, slightly constricted at sides, apex rounded; lateral lobes oblong, ca. 1/2 as long as middle lobe. Nutlets ovoid, ca. 1 × less than 1 mm, tuberculate, adaxially concave, umbonate on central part. Fl. and fr. Oct.

• Rocky areas. Taiwan.

- 1a. Leaf blade adaxially strigose-hirsute; abaxially densely yellowish puberulent 8a. var. *playfairii*
1b. Leaf blade adaxially glabrous; abaxially with sparse, appressed hairs 8b. var. *procumbens*

8a. *Scutellaria playfairii* var. *playfairii*

伏黄芩 fu huang qin

Scutellaria procumbens Ohwi var. *tomentosa* Ohwi.

Leaf blade adaxially strigose-hirsute, abaxially densely yellowish puberulent.

• Rocky areas. Taiwan.

8b. *Scutellaria playfairii* var. *procumbens* (Ohwi) C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 146. 1977.

少毛变种 shao mao bian zhong

Scutellaria procumbens Ohwi, Repert. Spec. Nov. Regni Veg. 36: 52. 1934.

Leaf blade adaxially glabrous, veins sparsely appressed pilose abaxially.

- Taiwan.

9. *Scutellaria obtusifolia* Hemsley, J. Linn. Soc., Bot. 26: 296. 1890.

钝叶黄芩 dun ye huang qin

Herbs perennial, rhizomatous. Stems 20–60 cm tall, ascending, ± woody and leafless at base, unbranched, densely pubescent. Leaves elliptic to obovate or subcircular, 2–8 × 1.3–3.5 cm, ± leathery, adaxially glabrous or very sparsely pubescent, abaxially densely gray pubescent, 3-veined at base, whitish along veins abaxially, base cuneate-attenuate to rounded, margin entire to inconspicuously few crenate or 4–8-undulate-dentate, apex obtuse to acuminate. Racemes terminal, 4–18 cm; bracts rhombic-obovate, to slightly longer than pedicel, puberulent. Pedicel 4 mm, glandular puberulent. Calyx ca. 2.5 mm, ca. 4 mm in fruit, glandular puberulent; scutellum open, semicircular, ca. 1.8 mm, to 5 mm in fruit, conspicuously veined. Corolla purple or purple-blue, 2–3 cm, sparsely puberulent; tube 2–2.3 cm, bent at base, throat to 7 mm wide; upper lip ovate, ca. 5 mm wide; middle lobe of lower lip subcircular, ca. 4.5 mm in diam., apex emarginate; lateral lobes ovate, ca. 3 mm wide. Nutlets tuberculate. Fl. May-Jun, fr. Jun-Jul.

• Forests, thickets, rice paddy margins, streamsides; 600–2500 m. Guangxi, Guizhou, Hubei, Sichuan.

- 1a. Leaves 2–5.5 cm, apex obtuse to rounded, base cuneate to rounded, entire to inconspicuously crenate; corolla 2.6–3 cm 9a. var. *obtusifolia*
- 1b. Leaves 3–8 cm, apex acute, base cuneate-attenuate, remotely undulate-dentate; corolla 2–2.5 cm 9b. var. *trinervata*

9a. *Scutellaria obtusifolia* var. *obtusifolia*

钝叶黄芩 dun ye huang qin

Leaves elliptic-ovate to obovate, sometimes subcircular, 2–5.5 cm, base cuneate to rounded, margin entire to inconspicuously crenate, apex obtuse to rounded. Corolla 2.6–3 cm.

• Forests, thickets, rice paddy margins. Guizhou, Hubei, Sichuan.

Used medicinally for bacterial dysentery and colds.

9b. *Scutellaria obtusifolia* var. *trinervata* (Vaniot) C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 147. 1977.

三脉变种 san mai bian zhong

Scutellaria trinervata Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 189. 1904; *S. vaniotiana* H. Léveillé ex Dunn.

Leaves elliptic to rhombic-elliptic, 3–8 cm, base cuneate-attenuate, margin remotely undulate-dentate, apex acute. Corolla 2–2.5(–3) cm.

- Streamsides; 600–2500 m. Guangxi, Guizhou.

10. *Scutellaria yunnanensis* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 221. 1911.

红茎黄芩 hong jing huang qin

Herbs perennial, rhizomatous. Stems 25–50 cm tall, erect, 1.2–2 mm in diam., reddish, subglabrous or slightly pubescent, few branched. Leaves 4-paired; petiole 7–12 mm, reddish, glandular pubescent; leaf blade dark reddish green abaxially, narrowly oblong to ovate, 3–11 × 1–4.5 cm, glabrous, abaxially with dense, small, impressed glands, base cuneate to rounded, margin sparsely denticulate to subentire or shallowly 2–6-serrate, apex acuminate to short acuminate. Racemes terminal, axillary, 9–15 cm; peduncle 2.5–3.5 cm; bracts reduced. Pedicel 2–2.5 mm, densely puberulent and glandular pubescent. Calyx purple-red, ca. 2 mm, to 3 mm in fruit, puberulent; scutellum spreading, semicircular, ca. 1.5 mm, to 4 mm in fruit. Corolla limb purple-red, 1.5–1.7 cm, puberulent outside; tube reddish or white, 1–1.2 cm, base bent, to 4 mm wide at throat; lateral lobes of lower lip ovate, ca. 3 mm wide, apically emarginate. Nutlets triquetrous, ovoid, ca. 0.75 × 0.5 mm, dark brown, tuberculate, adaxially elevated, umbonate on central part. Fl. Apr, fr. May.

• Forested hillsides, thickets; 500–1600 m. Guizhou, Sichuan, Yunnan.

- 1a. Leaves ovate to elliptic-ovate, 2–4.5 cm wide.
 - 2a. Leaves inconspicuously denticulate to subentire, base rounded 10a. var. *yunnanensis*
 - 2b. Leaves sometimes shallowly 2–6-serrate, base cuneate 10b. var. *cuneata*
- 1b. Leaves oblong to lanceolate, 1–1.6 cm wide 10c. var. *salicifolia*

10a. *Scutellaria yunnanensis* var. *yunnanensis*

红茎黄芩 hong jing huang qin

Leaves ovate to elliptic-ovate, 2–4.5 cm, base rounded, margin inconspicuously denticulate to subentire.

• Forested hillsides; 900–1200 m. Sichuan, Yunnan.

Used medicinally for fever and nebula.

10b. *Scutellaria yunnanensis* var. *cuneata* C. Y. Wu & W. T. Wang, Fl. Yunnan. 1: 543. 1977.

楔叶变种 xie ye bian zhong

Leaves ovate to elliptic-ovate, 2–4.5 cm wide, base cuneate, margin sometimes shallowly 2–6-serrate.

• Broad-leaved hillside forests; 1000 m. Yunnan.

10c. *Scutellaria yunnanensis* var. *salicifolia* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 43. 1966.

柳叶变种 liu ye bian zhong

Leaves narrowly oblong to lanceolate, 1–1.6 cm wide, base cuneate, margin entire to shallowly 2–4-serrate.

• Hillsides, thickets; 500–1600 m. Guizhou, Sichuan.

11. *Scutellaria mollifolia* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 578. 1977.

毛叶黄芩 mao ye huang qin

Herbs perennial, rhizomatous. Stems 35–45(–60) cm tall, erect, unbranched, ca. 3 mm in diam., densely pubescent apically. Leaves ca. 5-paired; petiole 1.5–3 cm; leaf blade

obovate-elliptic, 7–11 × 3.5–5.2 cm, pubescent, densely so and gray-green abaxially, base cuneate, margin inconspicuously undulate-serrate to entire, apex acute. Racemes terminal, 10–16 cm; bracts linear, 3–4 mm, pubescent. Pedicel 4–5 mm, densely pubescent. Calyx ca. 3 mm, puberulent; scutellum spreading, ca. 2.2 mm. Corolla reddish; tube 2.1–2.3 cm, base bent, throat to 8 mm wide; lower lip with red spots, 2.6–2.9 cm, puberulent outside; middle lobe triangular ovate, base ca. 3.5 mm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide. Nutlets unknown. Fl. May-Jun.

- Shady areas in forests; 1200 m. Sichuan (Emei Shan).

12. *Scutellaria sichouensis* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 543. 1977.

西畴黄芩 xi chou huang qin

Herbs perennial, rhizomatous. Stems 40–80 cm tall, ascending, ca. 2 mm in diam., rust pubescent, glandular, sometimes subglabrous, corky toward base. Petiole 1–1.6 cm; leaf blade elliptic to obovate-elliptic, 5–9 × 2.5–4 cm, yellowish glandular, adaxially sparsely pubescent, densely so along margin, abaxially gray or purplish and glabrous, base cuneate, margin undulate-crenate, apex acute. Racemes terminal, 4.5–7.5 cm; peduncle ca. 1.4 cm; bracts sessile, elliptic, 4–4.5(–7) mm, margin entire to sparsely serrate above middle, glandular, ciliate. Pedicel ca. 3 mm, densely glandular pubescent. Calyx ca. 2 mm, glandular outside, margin ciliate; scutellum spreading, ca. 1 mm. Corolla purplish or purple-red, ca. 2.2 cm, sparsely puberulent, glandular; tube ca. 1.6 cm, base bent, throat to 6 mm wide; middle lobe of lower lip oblate, ca. 5 mm wide, apex emarginate; lateral lobes triangular, ca. 2.5 mm wide. Nutlets unknown. Fl. Apr.

- Wet broad-leaved forests on limestone; 1400–1700 m. Yunnan (Xichou Xian).

13. *Scutellaria reticulata* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 578. 1977.

显脉黄芩 xian mai huang qin

Subshrubs. Stems semiterete, ca. 2 mm in diam., glabrous. Petiole 3–10 mm; leaf blade oblong, 6.5–18 × 2.6–8.2 cm, glabrous, minor veins conspicuously netted, base cuneate, margin entire to 1- or 2-undulate-denticulate above middle, apex acuminate to subcaudate-acuminate. Racemes ca. 16 cm; peduncle ca. 1.5 cm; bracts sessile, elliptic, ca. 2 mm, ciliate, apically acuminate, deciduous. Pedicel 1–1.5 mm, spreading glandular puberulent. Calyx ca. 2 mm, sparsely glandular puberulent, ciliate; scutellum spreading, ca. 2 mm. Corolla purple, ca. 1.5 cm, sparsely puberulent outside, base bent, throat to 5 mm wide, glabrous inside; middle lobe of lower lip triangular-ovate, base ca. 2.5 mm wide, apex emarginate; lateral lobes ovate, ca. 1.5 mm wide. Nutlets unknown. Fl. May.

- Forests. Guangxi.

14. *Scutellaria nigricans* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 578. 1977.

变黑黄芩 bian hei huang qin

Herbs rhizomatous. Stems 15–40 cm tall, erect-ascending, glabrous, base purplish. Mid stem leaves petiolate; petiole 0.5–3.5 cm; leaf blade ovate, 6–7 × 3.2–3.5 cm, basal blades blackish when dry, ca. 1/2 as large, herbaceous,

adaxially finely strigose on midrib otherwise sparsely strigose, abaxially glabrous, base broadly cuneate, margin remotely 6–8-callose-dentate, apex acute. Racemes terminal, ca. 11 cm; bracts rhombic, 2–3 mm, glabrous, margin entire. Pedicel ca. 2.5 mm, densely glandular puberulent. Calyx ca. 2.5 mm, densely glandular puberulent outside; scutellum ca. 0.75 mm. Corolla purple or purplish blue, ca. 2.3 cm, pubescent outside, glabrous inside; tube straight, base slightly saccate, throat to 4 mm in diam.; middle lobe of lower lip spreading, triangular, to 6.5 mm wide, base abruptly constricted, margin undulate; lateral lobes ovate, ca. 2.5 mm wide. Nutlets unknown. Fl. Apr-Jun.

- Forests; 700 m. Sichuan (Nanchuan Xian).

15. *Scutellaria nigrocardia* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 578. 1977.

黑心黄芩 hei xin huang qin

Herbs rhizomatous. Stems 28–35 cm tall, erect, glabrous except for pubescent angles, purple-black when dry. Petiole of mid stem leaves 1.5–4 cm; leaf blade dark purple-black abaxially, cordate, 3–5.5 × 2.7–3.8 cm, herbaceous, sparsely white strigose, abaxially light colored and glabrous, veins finely pubescent, base cordate, margin crenate, apex obtuse. Racemes terminal and axillary, 4.5–12 cm; bracts oblanceolate, slightly longer than pedicel, sparsely ciliate. Pedicel 1.5–2.5 mm, densely pubescent. Calyx ca. 2 mm, glandular puberulent; scutellum ca. 1 mm. Corolla 1.4–1.6 cm, puberulent outside, tube straight, base slightly saccate, throat to 4 mm wide; middle lobe of lower lip spreading, triangular-ovate, ca. 3 mm wide, margin entire; lateral lobes oblong, ca. 2 mm wide. Nutlets unknown. Fl. Apr.

- Guangdong (Yingde Xian).

16. *Scutellaria chihshuiensis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 579. 1977.

赤水黄芩 chi shui huang qin

Herbs rhizomatous. Stems 35–50 cm tall, erect, densely white puberulent, purple-brown. Petiole 1.5–3.5 cm; leaf blade ovate to ovate-oblong, 4–6.5 × 2.5–4 cm, membranous, densely strigose, base shallowly cordate, margin coarsely crenate, apex obtuse to acute. Racemes terminal and axillary 4.5–13 cm; bracts obovate, ca. 4 × 3 mm, sparsely white puberulent, basally cuneate, margin entire, apically rounded. Pedicel ca. 4 mm, densely white glandular puberulent. Calyx ca. 1.5 mm, ca. 3 mm in fruit, glandular puberulent outside; scutellum ca. 2 mm, to 5 mm in fruit. Corolla ca. 2.3 cm, puberulent outside; tube straight, base slightly saccate, throat to 5 mm wide; middle lobe of lower lip spreading, ca. 7 mm wide, purple spotted inside, semicircular, apex emarginate; lateral lobes oblong, ca. 3.5 mm wide. Nutlets unknown. Fl. May.

- Forests. Guizhou (Chihshui Xian).

17. *Scutellaria wenshanensis* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 543. 1977.

文山黄芩 wen shan huang qin

Herbs rhizomatous. Stems ca. 30 cm tall, erect-ascending, purplish, finely pubescent, unbranched. Petiole ca. 1 cm; leaf blade ovate, 1.8–3.5 × 1.2–2 cm, herbaceous or papery, very sparsely fine strigose, abaxially sometimes

purplish, veins densely whitish pubescent, base shallowly cordate, apex acute. Racemes terminal, ca. 8 cm; bracts short petiolate, ovate, ca. 6 mm, margin entire. Pedicel purplish, ca. 3 mm, finely pubescent. Calyx ca. 4 mm, very sparsely pubescent outside, slightly dilated after flowering; scutellum ca. 2.5 mm, to 4 mm in fruit. Corolla purplish, ca. 2.7 cm, glandular puberulent outside, tube base inconspicuously saccate, throat to ca. 4 mm wide; middle lobe of lower lip triangular-oblate, ca. 6 × 8 mm, apex emarginate, purple spotted; lateral lobes ovate, ca. 4.5 mm wide, apex emarginate. Nutlets unknown. Fl. May.

• Ravines in broad-leaved evergreen forests; 1900 m. Yunnan (Wenshan Xian).

18. *Scutellaria violacea* Heyne ex Benth var. *sikkimensis* J. D. Hooker, Fl. Brit. India 4: 668. 1885.

紫苏叶黄芩 *zi su ye huang qin*

Scutellaria coleifolia H. Léveillé.

Herbs perennial. Stems 25–60 cm tall, erect, glabrous to subglabrous, purplish, mostly branched; mid stem internodes ca. 1.5 × as long as leaves, shortened apically. Petiole 0.4–2 cm; leaf blade ovate, to 3.8(–6) × 2.3(–3) cm, papery, glabrous or subglabrous, abaxially with purple spots, base cordate to subcordate, margin subequally 6–10-crenate, apex acute to short acuminate. Racemes terminal, often on lateral branches, 5–11 cm; bracts leaflike basally, ovate apically, ca. 5 mm. Pedicel ca. 3 mm, purplish, densely glandular puberulent. Calyx ca. 2 mm, ca. 4 mm in fruit, puberulent outside; scutellum spreading, semicircular, ca. 2 × 2 mm, purple-red and ca. 5.5 × 4.8 mm in fruit. Corolla red, ca. 2 cm, sparsely pubescent, finely scaly on lobes of lower lip; tube sparsely puberulent below lower lip, conspicuously saccate, base bent, throat ca. 4.5 mm wide; middle lobe of lower lip trapeziform, spreading, to 7 mm wide, apex emarginate; lateral lobes oblong, ca. 2.5 mm wide. Nutlets reniform, ca. 1.7 mm, black, tuberculate, adaxially umbonate at middle. Fl. Jun-Jul, fr. Ju1-Aug.

• Pine forests, grassy slopes; 1900–3200 m. Sichuan, Yunnan [India (Sikkim)].

19. *Scutellaria anhweiensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 579. 1977.

安徽黄芩 *an hui huang qin*

Scutellaria huangshanensis X. W. Wang & Z. W. Xue.

Herbs perennial. Stems ca. 60 cm tall, base ca. 3 mm in diam., retrorsely pubescent on angles and nodes, few branched apically. Petiole 0.5–2 cm; leaf blade ovate, 4.8–6.8 × 2.5–4 cm, papery, pubescent with scattered golden yellow glands at least on abaxial surface, base broadly cuneate, margin shallowly dentate to crenate-serrate, apex acute. Racemes terminal, to 16 cm; bracts sessile, narrowly ovate, ca. 7 mm apically, margin entire. Pedicel 2–2.5 mm, retrorsely pubescent. Calyx ca. 3.5 mm, retrorsely pubescent; scutellum ca. 2 mm. Corolla yellowish white or white, 2.7–3.5 cm, pubescent; tube 2.2–2.9 cm, base bent, throat to 6 mm wide; middle lobe of lower lip triangular-ovate, ca. 5 mm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide. Nutlets unknown. Fl. Jun.

• Hilly areas; 900 m. Anhui.

20. *Scutellaria chekiangensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 579. 1977.

浙江黄芩 *zhe jiang huang qin*

Herbs perennial, rhizomatous. Stems 20–55 cm tall, erect, base ca. 2 mm wide, dark purple when dry, subglabrous below middle, sparsely antrorse hooked pubescent on angles and nodes. Petiole 5–12 mm; leaf blade ovate to elliptic-ovate, 6–7.2(–8) × 2.5–4 cm, densely golden glandular, adaxially glabrous to very sparsely pubescent, abaxially sparsely pubescent on midrib and veins, base rounded to broadly cuneate, margin shallowly dentate, apex acute. Racemes terminal, (6–)8–11.5(–16) cm; bracts sessile, basal ones oblong, 1.2–2 cm, margin few denticulate, apical ones ca. 1 cm, narrower, margin entire. Pedicel ca. 2.5 cm. Calyx ca. 4 mm, to 7 mm in fruit, veins and margin pubescent; scutellum ca. 2.5 mm, to ca. 5 mm in fruit. Corolla purple-blue, 2.5–2.7 cm, glandular pubescent; tube ca. 1.8 cm, base bent, throat to 5.5 mm wide; middle lobe of lower lip triangular ovate, ca. 5 mm wide; lateral lobes ovate, ca. 2.5 mm wide. Nutlets brown, ovoid-ellipsoid, ca. 1.5 × 1.25 mm, tuberculate, adaxially umbonate at middle. Fl. May, fr. Jun.

• Shady areas in broad-leaved evergreen forests. Sichuan, Zhejiang.

21. *Scutellaria grossecrenata* Merrill & Chun ex H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 579. 1977.

粗齿黄芩 *cu chi huang qin*

Herbs erect, rhizomatous. Stems ca. 55 cm tall, ascending, base ca. 2.5 mm wide, densely white pilose, sometimes with short leafy branchlets. Petiole 1–1.8 cm; leaf blade broadly ovate, 5–7 × 2.5–4.5 cm, papery, adaxially sparsely pilose, abaxially pilose and with purple-black glands, veins whitish, base rounded to shallowly cordate, margin coarsely crenate to double crenate, apex obtuse. Racemes terminal or axillary; bracts deciduous. Pedicel ca. 2 mm, densely pilose. Calyx ca. 2 mm, to 3 mm in fruit, densely pilose; scutellum ca. 1.5 mm in fruit. Corolla purple-red, 1.6–1.9 cm, sparsely puberulent outside, sparsely pilose at middle inside, base bent, throat to 4 mm wide; middle lobe of lower lip broadly ovate, ca. 3.5 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets unknown. Fl. May.

• Forests. Guangdong (Ruyuan Yao Xian).

22. *Scutellaria yangbiense* H. W. Li, Novon 3: 157. 1993.

荨麻叶黄芩 *qian ma ye huang qin*

Scutellaria urticifolia C. Y. Wu & H. W. Li, Fl. Yunnan 1: 545. 1977, non Juzepczuk & Vvedensky (1954).

Herbs rhizomatous. Stems ca. 60 cm tall, erect, sparsely white pubescent. Petiole 1–2 cm; leaf blade ovate, 4–7.5 × 3–4.5 cm, papery, sparsely white hirtellous, densely so along midrib and veins, base broadly cuneate to rounded, rarely cordate, margin coarsely crenate-dentate, apex acute. Racemes terminal or subterminal, 12–20 cm; bracts sessile, rhombic-ovate, 2–5 mm, puberulent. Pedicel to 4 mm, densely white glandular puberulent. Calyx ca. 2 mm, to 5 mm in fruit, glandular pubescent; scutellum ca. 2 mm, to 5 mm in fruit. Corolla purple, 1.5–2 cm, glandular puberulent outside, glabrous inside, base bent; middle lobe of lower lip triangular-ovate, to 4.5 mm wide, base abruptly constricted, apex emarginate; lateral lobes ca. 2 mm wide. Nutlets dark brown,

ovoid, ca. 1 mm in diam., tuberculate, adaxially umbonate at middle. Fl. Jul, fr. Aug.

- Pine forests, thickets; 1100–2100 m. Yunnan (Yangbi Xian).

23. *Scutellaria laxa* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 166. 1913.

散黄芩 san huang qin

Herbs rhizomatous. Stems decumbent, flexuous ascending, densely pubescent except for angles. Petiole 1–1.5 cm; leaf blade lanceolate-oblong to lanceolate-ovate, 3–6 × 1–2 cm, herbaceous, sparsely strigose, base subrounded, margin irregularly double serrate, apex acuminate. Racemes terminal, 6–17 cm; bracts sublanceolate-ovate, as long as pedicels. Pedicel ca. 3 mm, densely glandular pubescent. Calyx ca. 2 mm, ca. 3.5 mm in fruit; scutellum semicircular, ca. 1.5 mm, to 3 mm and conspicuously reflexed in fruit. Corolla purplish, ca. 1.5 cm, initially finely pubescent outside, soon becoming subglabrous; tube bent at base, ca. 4 mm wide at throat; middle lobe of lower lip subcircular, base constricted, apex emarginate; lateral lobes ovate. Nutlets unknown. Fl. Mar–Apr.

- Evergreen forests; 2000–2600 m. Yunnan.

24. *Scutellaria macrosiphon* C. Y. Wu, Fl. Yunnan. 1: 547. 1977.

长管黄芩 chang guan huang qin

Herbs perennial, rhizomatous. Adventitious roots slightly swollen. Stems to 60 cm tall, ascending-erect, sparsely hirtellous, purplish, much branched. Petiole 0.7–1.5 cm; leaf blade ovate, 1.7–4 × 0.8–2.5 cm, herbaceous, sparsely strigose, base rounded, margin 6–9-crenate-serrate, apex acute. Racemes terminal, 5–13 cm; bracts ± leaflike, rhombic-ovate, 0.6–1.5 cm including petiole, margin 1- or 2-crenate-serrate, apically acute. Pedicel to 4.5–5(–6) mm, hairs glandular. Calyx ca. 3.5 mm, to 4 mm in fruit, densely glandular puberulent; scutellum ca. 2 mm, to 4 mm in fruit. Corolla rose to purplish, (2–)2.6–2.9 cm, glandular puberulent outside, glabrous except for sparsely puberulent throat inside; tube nearly straight, base slightly bent, throat to 5 mm wide; middle lobe of lower lip triangular-ovate, to 6 mm wide, base constricted, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide. Nutlets unknown. Fl. May–Dec.

- Evergreen forests; 1800–2200 m. Yunnan (Jinping Xian).

25. *Scutellaria meehanioides* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 579. 1977.

龙头黄芩 long tou huang qin

Herbs perennial. Stems erect, ca. 2 mm wide, densely antrorse pubescent, internodes much longer than leaves. Petiole 7–10 mm; leaf blade ± triangular, 1.7–3.3 × 2–2.5 cm, ± papery, appressed pubescent, base shallowly cordate, margin 5–9-crenate-dentate, apex obtuse. Racemes terminal, to 9.5 cm; bracts petiolate, lanceolate, 3–4 mm, basally sessile, linear, ca. 2 cm, densely pubescent. Pedicel ca. 2 mm, densely glandular puberulent. Calyx ca. 4 mm, densely glandular puberulent outside; scutellum spreading, ca. 2 mm. Corolla purple, 2.3–2.7 cm, sparsely glandular puberulent outside, glabrous inside; tube straight, base slightly bent, throat to 5 mm wide; middle lobe of lower lip broadly triangular-ovate, to 7 mm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide. Fl. Jun.

- Slopes, roadsides; 500–1500 m. Gansu, Hubei, Shanxi.

1a. Leaves narrowly triangular to triangular-ovate, 7–9-crenate-serrate; corolla to 2.7 cm

..... 25a. var. *meehanioides*

1b. Leaves triangular to triangular-lanceolate, coarsely 5–7-incised-dentate; corolla ca. 2.3 cm

..... 25b. var. *paucidentata*

25a. *Scutellaria meehanioides* var. *meehanioides*

龙头黄芩 long tou huang qin

Leaves narrowly triangular to triangular-ovate, margin 7–9-crenate-serrate. Corolla to 2.7 cm.

- Slopes, roadsides; 500–1200 m. Hubei, Shanxi.

25b. *Scutellaria meehanioides* var. *paucidentata* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 580. 1977.

少齿变种 shao chi bian zhong

Leaves triangular to triangular-lanceolate, margin coarsely 4- or 5-incised-dentate. Corolla ca. 2.3 cm.

- Slopes; 1500 m. Gansu (Hui Xian).

26. *Scutellaria microviolacea* C. Y. Wu, Fl. Yunnan. 1: 548. 1977.

小紫黄芩 xiao zi huang qin

Herbs. Adventitious roots slightly swollen at middle. Stems ca. 45 cm tall, erect, densely pubescent, sometimes also pilose, leafless basally; branched apically. Petiole 1–3 cm; leaf blade circular to oblong-ovate, 2.5–6.5 × 1.7–4 cm, ± papery, sparsely villous, midrib and veins pubescent, base shallowly cordate to truncate, margin crenate, apex acute. Racemes terminal or subterminal 10–12 cm; bracts linear, ca. 2.5 mm, pubescent. Pedicel ca. 3 mm, densely glandular puberulent. Corolla red-purple, 1–1.2 cm, glandular puberulent outside, finely puberulent at throat inside, tube saccate geniculate at base, throat to 2.5 mm wide; middle lobe of lower lip triangular-ovate, ca. 3 mm wide, constricted on both sides, apex emarginate; lateral lobes ovate, ca. 1 mm wide. Nutlets unknown. Fl. Aug.

- *Cunninghamia* forests; 1400–1500 m. Yunnan (Xichou Xian).

27. *Scutellaria caryopteroides* Handel-Mazzetti, Oester. Bot. Z. 85: 219. 1936.

蕨状黄芩 you zhuang huang qin

Herbs perennial. Stems robust, 80–100 cm tall, erect, to 4 mm in diam., apically densely glandular puberulent. Mid stem leaves petiolate; petiole 0.5–3.5 cm; leaf blade triangular-ovate, to 6 × 4 cm, ± papery, densely puberulent especially on midrib and lateral veins abaxially, base cordate to subtruncate, margin crenate-serrate to double crenate-serrate, apex acute. Racemes terminal, 6–15 cm. Pedicel 2–3 mm, densely glandular puberulent. Calyx ca. 2 mm in flower; scutellum ca. 1 mm. Corolla dark purple, ca. 1.6 cm, sparsely glandular puberulent outside, glabrous inside, base bent, saccate, throat to 4 mm wide; middle lobe of lower lip triangular-ovate, ca. 4 mm wide, apex emarginate; lateral lobes ovate, ca. 1.5 mm wide. Nutlets unknown. Fl. Jun–Jul, fr. Jun–Aug.

- Riverbanks, open grassy slopes; 800–1500 m. Henan, Hubei, Shaanxi.

28. *Scutellaria purpureocardia* C. Y. Wu, Fl. Yunnan. 1: 548. 1977.

紫心黄芩 *zi xin huang qin*

Herbs perennial, rhizomatous. Stems 30–80 cm tall, erect, subterete and subglabrous basally, densely white hirtellous and much branched apically. Petiole 0.5–1.5 cm; leaf blade cordate, 1–2.5 × 1–3 cm, herbaceous to ± papery, sparsely strigose, densely so along veins, abaxially with red glands, base cordate, margin 4–7-crenate, apex acute to obtuse. Racemes terminal, 6–12 cm; bracts narrowly ovate, 2.5–4 mm, lower ones to 1.5 cm. Pedicel to 4 mm, densely glandular white hirtellous. Calyx ca. 3 mm, ca. 4 mm in fruit, white hirtellous outside; scutellum ca. 1.5 mm, ca. 3.5 mm, netted in fruit. Corolla purple-blue, ca. 1.8 cm, sparsely puberulent outside, glabrous inside; tube base slightly saccate geniculate, throat to 4 mm wide; middle lobe of lower lip subcircular, base abruptly constricted, apex emarginate, spotted on middle; lateral lobes ovate. Nutlets unknown. Fl. Jun.

- Forests; 600–2100 m. Yunnan (Fengqing Xian).

29. *Scutellaria calcarata* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 550. 1977.

囊距黄芩 *nang ju huang qin*

Herbs rhizomatous. Stems to 30 cm tall, erect, ca. 1.5 mm wide, densely white puberulent, branched basally. Petiole 1.5–2.5 cm; leaf blade cordate, 2.3–4 × 1.8–3.5 cm, herbaceous, sparsely fine strigose, base cordate, margin 4–7-callose-crenate, apex acute. Racemes terminal, 5–14 cm; bracts sessile, ovate to rhombic-ovate, ca. 3 mm, leaflike basally. Pedicel ca. 2.5 mm, densely white glandular puberulent. Calyx ca. 2.5 mm, to 4 mm in fruit, densely white puberulent outside; scutellum ca. 1 mm, to 3.5 mm in fruit. Corolla purple-red, ca. 2 cm, densely white glandular puberulent outside, glabrous inside; tube bent, straight, base with a spur ca. 2.5 mm, throat to ca. 5 mm; middle lobe of lower lip triangular-ovate, to 6.5 mm wide, base constricted, apex emarginate; lateral lobes ovate, ca. 3 mm wide. Nutlets unknown. Fl. Sep.

- Streamsides, evergreen forest margins; 2700 m. Yunnan (Dayao Xian).

30. *Scutellaria tayloriana* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 166. 1913.

偏花黄芩 *pian hua huang qin*

Scutellaria tayloriana Dunn var. *polytricha* Handel-Mazzetti.

Herbs perennial, sometimes with trailing rhizomes. Stems 8–30 cm tall, erect to ascending, 1.2–2.5 mm in diam., white villous, base ± woody. Leaves in 3 or 4 pairs, in a rosette initially; mid stem leaves petiole 1–5 cm; leaf blade elliptic to ovate-elliptic, 4.5–5.5 × 3.8–4.5 cm, papery, orange glandular, white strigose especially on veins, base cordate to rounded, margin shallowly undulate-crenate, apex rounded to obtuse. Racemes terminal, secund, 7–15 cm; peduncle 1–4.5 cm; bracts sessile, gradually narrowed toward inflorescence apex, ovate, ca. 4 × 2 mm, margin entire. Pedicel ca. 2 mm, villous. Calyx ca. 2.5 mm, densely pubescent. Corolla purplish to purple-blue, (1.5–)1.8–2.5(–3) cm, bent at base, to 6 mm wide at throat, sparsely puberulent outside, partly glabrous inside; middle lobe of lower lip semicircular; lateral lobes ovate. Nutlets unknown. Fl. Mar-May.

- Thickets, forests, open areas. Guangdong, Guangxi, Guizhou, Hunan.

Used medicinally for coughs, hemoptysis, and dysentery.

31. *Scutellaria laeteviolacea* Koidzumi, Fl. Austro-Higo, 50. 1931.

光紫黄芩 *guang zi huang qin*

Scutellaria indica Linnaeus var. *japonica* (Morren & Decaisne) Franchet & P. A. L. Savatier f. *humilis* Makino; *S. simplex* Migo; *S. ussuriensis* Kudô var. *typica* f. *humilis* Kudô.

Herbs rhizomatous perennials. Stems purplish 9–20(–30) cm tall, erect to ascending, ca. 1.5 mm in diam., finely antrorse pubescent, unbranched or branched basally. Leaves in 3 or 4 pairs, ± apically crowded, basal ones deciduous; petiole 1–2 cm, longest basally, short to almost absent apically; leaf blade triangular-ovate to circular-ovate, to 4 × 3 cm, papery, adaxially glabrous, abaxially purplish, glabrous, without glands, veins finely pubescent, base rounded, broadly cuneate to shallowly cordate, margin crenate, apex rounded. Racemes terminal, 3.5–9 cm; bracts purplish, narrowly rhombic to ovate, 2–3.5 mm. Pedicel ca. 1.5 mm, densely glandular puberulent. Calyx ca. 2.5 mm, dilated and to 5 mm in fruit, densely glandular puberulent; scutellum ca. 1.5 mm, to 3 mm in fruit. Corolla red-purple or purple, 1.5–2 cm, sparsely puberulent outside, bent at base, pilose, to 5 mm wide at throat; middle lobe of lower lip ovate, apex emarginate, purple spotted; lateral lobes oblong. Nutlets dark chestnut brown, ovoid, ca. 0.7 mm, tuberculate, adaxially umbonate near base. Fl. Mar-Apr, fr. Apr-May.

- Grassy slopes, thickets. Anhui, Jiangsu [Japan].

32. *Scutellaria lutescens* C. Y. Wu, Fl. Yunnan. 1: 550. 1977.

淡黄黄芩 *dan huang huang qin*

Herbs perennial. Stems to 55 cm tall, erect, base to 2.5 mm in diam., densely white floccose-pilose, unbranched or apical axils with short fertile branches, internodes longer than leaves. Leaves 4-paired, basal leaves smaller; petiole 0.8–2.5 cm; leaf blade triangular to ovate, mostly 2.2–6 × 1.7–6 cm, ± membranous to herbaceous, densely white floccose-pilose, abaxially intermixed with yellowish glands, base shallowly cordate to truncate, margin coarsely undulate-crenate, apex rounded to subacute. Racemes terminal, 3–16 cm; bracts sessile, oblong, 4–6 × 1.5–2 mm, base attenuate, apex obtuse, ciliate. Pedicel ca. 2.5 mm, densely white pilose. Calyx ca. 2.5 mm, to 5 mm in fruit, sparsely fine pilose; scutellum semicircular, spreading, ca. 2 mm, erect, to 5 mm in fruit. Corolla yellowish when dry, 1.4–1.6 cm, sparsely glandular puberulent outside, subglabrous inside; tube straight, bent at base, to 3.5 mm wide at throat; middle lobe of lower lip triangular-ovate, to 5 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets brownish, ovoid, ca. 0.75 × 0.5 mm, tuberculate, adaxially umbonate at middle.

- Rocky, mountainous areas; 2700 m. Yunnan.

33. *Scutellaria indica* Linnaeus, Sp. Pl. 2: 600. 1753.

韩信草 *han xin cao*

Shrubs perennial. Stems dark purple, 1 to few, 8–28 cm tall, ascending-erect, ca. 1–1.2 mm in diam., hairy especially on angles and apex. Petiole 0.4–1.4(–2.8) cm; leaf blade 0.8–2.6(–3) × 0.8–2.3 cm, base truncate to cuneate, margin crenate, apex rounded to acute. Racemes terminal, 2–8(–12) cm; bracts sessile, 3–6 × 1–2.5 mm, margin entire, basal ones

leaflike, ovate, to 1.7 cm, puberulent, margin crenate. Pedicel 2.5–3 mm, puberulent. Calyx ca. 2.5 mm, hirsute, puberulent; scutellum ca. 1.5 mm, erect, dilated to 3 mm in fruit. Corolla blue-purple, 1–1.8 cm, sparsely puberulent outside, pubescent on lips inside, to ca. 4.5 mm wide at throat; middle lobe of lower lip dark purple spotted, circular-ovate, slightly constricted at middle, apex emarginate; lateral lobes ovate. Nutlets chestnut to dark brown, ovoid, ca. 1 × less than 1 mm, tuberculate, tubercles acuminate with a minute apical whorl of hooks, adaxially umbonate near base. Fl. and fr. Feb–Jun.

Hillsides, grasslands, open rocky areas, roadsides, sparse forests; to 1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Thailand, Vietnam].

- 1a. Stems, petioles, and leaves densely white pilose 33d. var. *elliptica*
1b. Stems, petioles, and leaves puberulent or strigose.
2a. Internodes short; leaves crowded apically, circular-ovate to triangular-ovate; inflorescences 2–3.5(–6) cm 33c. var. *subacaulis*
2b. Internodes elongated; leaves cordate-ovate to elliptic; inflorescences 4–8(–12) cm.
3a. Leaves cordate-ovate to elliptic, 1.5–2.6(–3) × 1.2–2.3 cm; corolla 1.4–1.8 cm 33a. var. *indica*
3b. Leaves cordate-ovate to ovate, 0.8–1.5 × 0.8–1 cm; corolla 1–1.5 cm 33b. var. *parvifolia*

33a. *Scutellaria indica* var. *indica*

韩信草 han xin cao

Scutellaria indica Linnaeus var. *indica* f. *ramosa* C. Y. Wu & C. Chen; *S. leucodasy* Miquel; *S. tashiroi* Hayata.

Stems 12–28 cm tall, puberulent especially on angles and apex. Leaves cordate-ovate to elliptic, 1.5–2.6(–3) × 1.2–2.3 cm, base rounded to cordate, apex obtuse to rounded, puberulent or strigose, densely so abaxially. Racemes 4–8(–12) cm. Corolla 1.4–1.8 cm.

• Hillsides, grasslands, open areas, roadsides, sparse forests; to 1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Thailand, Vietnam].

Used as a folk remedy for traumatic injuries.

33b. *Scutellaria indica* var. *parvifolia* Makino, Somoku-Dzusetsu, ed. 3, 3: 846. 1912.

小叶变种 xiao ye bian zhong

Scutellaria indica Linnaeus var. *typica* Kudô; *S. parvifolia* Koidzumi; *S. parvifolia* Koidzumi var. *vulgaris* H. Hara; *S. microflora* Metcalf.

Stems 8–16(–20) cm tall, much branched, puberulent especially on angles and apex. Leaves cordate-ovate to ovate, 0.8–1.5 × 0.8–1 cm, base truncate to cuneate, apex acute. Racemes 4–8(–12) cm. Corolla 1–1.5 cm.

• Roadsides, grassy slopes, sparse forests. Anhui, Guangdong, Guangxi, Hunan, Taiwan, Yunnan [Japan].

33c. *Scutellaria indica* var. *subacaulis* (Sun ex C. H. Hu) C. Y. Wu & C. Chen, Fl. Yunnan. 1: 553. 1977.

缩茎变种 suo jing bian zhong

Scutellaria indica Linnaeus f. *subacaulis* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 40. 1966.

Stems 8–10 cm tall, strigose. Leaves crowded apically, circular-ovate to triangular-ovate, 1.6–4(–5.2) × 1.2–4(–4.4) cm, base cordate, apex obtuse, strigose. Racemes crowded, 2–3.5(–6) cm. Corolla 1.4–1.8 cm.

• Rocky areas; to 1500 m. Fujian, Guangdong, Henan, Hunan, Jiangsu, Jiangxi, Yunnan, Zhejiang [Japan].

33d. *Scutellaria indica* var. *elliptica* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 40. 1966.

长毛变种 chang mao bian zhong

Stems 8–16 cm tall, densely white pilose. Leaves elliptic to elliptic-ovate, 1–2.5 × 0.8–1.8 cm, base rounded to truncate, apex acute, densely white pilose. Racemes 4–8(–12) cm. Corolla 1.4–1.8 cm.

• Slopes, roadsides, grasslands; to 900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Zhejiang.

34. *Scutellaria taiwanensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 580. 1977.

台湾黄芩 tai wan huang qin

Herbs perennial. Stems 10–24 cm tall, base 1–1.5 mm in diam., hirtellous, unbranched to few branched. Petiole 4–8.5 mm; leaf blade abaxially yellowish green or purplish, rhombic-ovate to ovate, 1.5–3.5 × 0.9–1.5 cm, herbaceous, adaxially sparsely strigose, abaxially glabrous, finely strigose along veins and margin, base cuneate-truncate, margin shallowly 2–4-serrate, apex acute to obtuse. Racemes terminal or subterminal, 1.5–2.7 cm; bracts ovate to rhombic-ovate, 4–7 mm, base cuneate to rounded, margin entire and ciliate, apex acute. Pedicel 2.5–3 mm, densely glandular hirtellous. Calyx ca. 2.5 mm, to 3.5 mm in fruit, densely glandular hirtellous; scutellum spreading, semicircular, ca. 2 mm, dilated to 3.5 mm in fruit. Corolla 1.7–2 cm, puberulent outside, sparsely puberulent on lower lip inside, base saccate-geniculate in front, erect, throat to 3 mm wide; middle lobe of lower lip triangular-ovate, ca. 3 × 4.5 mm, base abruptly constricted, apex emarginate; lateral lobes ovate, ca. 1.5 mm wide, apex obtuse. Nutlets ovoid, ca. 1 × 0.6 mm, tuberculate, adaxially umbonate near base. Fl. and fr. Mar–Apr.

• Forests. Taiwan (Ali Shan).

35. *Scutellaria pseudotenax* C. Y. Wu, Fl. Yunnan. 1: 553. 1977.

假芩黄芩 jia ren huang qin

Scutellaria pseudotenax f. *brevipelta* C. Y. Wu & C. Chen.

Herbs perennial. Stems 9–27 cm tall, 0.8–1.2 mm in diam., densely antrorse pubescent. Petiole 5–14 mm; leaf blade triangular-ovate to ovate, 1.5–3.2 × 1.2–2.4 cm, membranous to papery, sparsely fine pilose, densely pilose along veins abaxially, sometimes glabrous adaxially, base subtruncate, rounded, or shallowly cordate, margin remotely 4–6-dentate-serrate, apex acute to obtuse. Racemes terminal, 4–9 cm; bracts sessile to short petiolate, ovate to rhombic, 2–2.5 mm, margin entire to few dentate, apex obtuse. Pedicel 2–3 mm, densely glandular pubescent. Calyx ca. 2 mm, 3–4(–6) mm in fruit, pubescent outside; scutellum ca. 1 mm, to 3 mm in fruit. Corolla blue, 1.2–1.4 cm, sparsely

puberulent or glandular puberulent outside, sparsely pubescent inside; tube base slightly bent, throat to 2.2 mm wide; middle lobe of lower lip spreading, suboblong, sides constricted, apex emarginate; lateral lobes ovate. Nutlet chestnut brown, ellipsoid-ovoid to triquetrous ovoid, ca. 1 mm, tuberculate, adaxially umbonate at middle. Fl. Jul-Aug, fr. Aug.

- Thickets, slopes; 1600–1900 m. Yunnan.

36. *Scutellaria yingtakensis* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 42. 1966.

英德黄芩 ying de huang qin

Herbs perennial. Stems ca. 35 cm tall, ascending, base trailing, rooting from nodes, sparsely antrorse pubescent, leafless basally; branches suberect. Petiole 5–14 mm; leaf blade narrowly ovate to narrowly triangular-ovate, 1.3–3 × 0.8–1.4 cm, herbaceous, adaxially sparsely pilose and midrib hirtellous, abaxially sometimes purplish, glabrous except hirtellous midrib and veins, base broadly cuneate to subtruncate, margin shallowly 4–6-serrate, apex acute. Racemes terminal, to 7 cm; bracts sessile, oblong, ca. 3 mm, base attenuate, margin entire, apex obtuse, lower bracts to 8 mm and margin shallowly 1- or 2-dentate. Pedicel ca. 2.5 mm, pubescent. Calyx ca. 2 mm, glandular puberulent outside; scutellum ca. 1.5 mm. Corolla reddish to purple-red, 1–1.2 cm, puberulent outside, base saccate-geniculate, white bearded, to 2.5 mm wide at throat; middle lobe of lower lip circular-ovate, ca. 3 mm wide; lateral lobes narrowly oblong, ca. 1.2 mm wide, apex rounded. Nutlets unknown. Fl. Apr-May.

- Hilly areas; 500–2200 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan.

37. *Scutellaria inghokensis* Metcalf, Lingnan Sci. J. 12: 593. 1933.

永泰黄芩 yong tai huang qin

Herbs perennial. Rhizomes slightly enlarged. Stems 1 or 2, 11–25(–36) cm tall, 1–1.2(–2) mm in diam. at base, antrorsely pubescent, densely so apically. Petiole 0.5–2 cm; leaf blade ovate to rhombic-ovate, 1.1–3(–5.5) × 0.7–1.7(–3.5) cm, membranous, adaxially sparsely strigose or subglabrous, abaxially glabrous, with orange glands, veins antrorsely pubescent, base cuneate to subrounded, margin with apical 2/3 obtusely dentate to coarsely crenate, apex acute to obtuse. Racemes terminal, 2–4 cm; bracts sessile, narrowly elliptic, 2–3 mm, margin entire and ciliolate. Pedicel 2–2.5 mm. Calyx ca. 2 mm, pubescent outside; scutellum ca. 1 mm. Corolla white to purplish, ca. 2.1 cm, sparsely puberulent outside, glabrous inside; tube ca. 1.8 cm, base bent, throat to 5 mm wide; middle lobe of lower lip triangular, ca. 5 mm wide, base constricted, apex emarginate; lateral lobes triangular, ca. 1.5 mm wide, apex obtuse. Nutlets unknown. Fl. Apr-May, fr. Aug.

- Rocky crevices; 500 m. Fujian.

38. *Scutellaria pekinensis* Maximowicz, Prim. Fl. Amur. 476. 1859.

京黄芩 jing huang qin

Herbs annual. Stems 24–40 cm tall, erect, 0.8–1.5 mm in diam., base purplish, subglabrous to densely pubescent. Petiole (0.3–)0.5–2 cm, base purplish; leaf blade ovate

to triangular-ovate, 1.4–1.7 × 1.2–3.5 cm, herbaceous to membranous, base truncate to subrounded, margin shallowly obtuse dentate to incised dentate, apex acute to rounded. Racemes terminal, 4.5–11.5 cm; bracts minute, narrowly lanceolate, 3–7 × 1–2 mm, margin entire; lower bracts leaflike, longer, sparsely pubescent. Pedicel ca. 2.5 mm, densely antrorse white pubescent. Calyx ca. 3 mm, to 4 mm in fruit, pilose along veins or spreading glandular pubescent or densely pubescent; scutellum ca. 1.5 mm, to 4 mm in fruit. Corolla blue-purple, (1–)1.7–2.5 cm, glandular pubescent outside, glabrous inside, base slightly bent in front, throat to 5 mm wide; middle lobe of lower lip broadly ovate, slightly constricted at middle, apex emarginate; lateral lobes ovate. Nutlets chestnut or dark brown, ovoid, ca. 1 mm in diam., tuberculate, adaxially umbonate at base. Fl. Jun-Aug, fr. Jul-Oct.

- Stony and grassy slopes, wet valleys, forests, wet forested meadows; 100–2600 m. Anhui, Fujian, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Nei Mongol, Shaanxi, Shandong, Sichuan, Zhejiang [Japan, Korea, Russia].

- 1a. Stems and petioles subglabrous or sparsely pubescent.
- 2a. Leaves membranous, glabrous or strigose adaxially, sparsely villous on veins abaxially; calyx veins pilose 38b. var. *ussuriensis*
- 2b. Leaves herbaceous, sparsely strigose or veins, finely pubescent abaxially; calyx glandular pubescent 38c. var. *transitra*
- 1b. Stems and petioles pubescent.
- 3a. Stems and petioles densely pubescent, purplish throughout; leaves villous, veins densely pubescent abaxially 38d. var. *purpureicaulis*
- 3b. Stems and petioles sparsely antrorse white pubescent, purplish only at base; leaves sparsely appressed puberulent, densely so on abaxial veins.
- 4a. Corolla less than 2 cm; calyx densely pubescent; leaves shallowly obtuse dentate, without glands 38a. var. *pekinensis*
- 4b. Corolla to 2.5 cm; calyx glandular pilose and pubescent; leaves incised-dentate, conspicuously dark glandular 38e. var. *grandiflora*

38a. *Scutellaria pekinensis* var. ***pekinensis***

京黄芩 jing huang qin

Scutellaria indica Linnaeus var. *pekinensis* Franchet; *S. planipes* Nakai & Kitagawa.

Stems green, base purplish, antrorsely white pubescent, sparsely so near base. Petiole sparsely antrorse pubescent; leaf blade herbaceous, sparsely appressed puberulent, densely so on abaxial veins. Calyx densely pubescent. Corolla 1.7–1.8 cm.

- Stony slopes, wet valleys, forests; 600–1800 m. Hebei, Henan, Jilin, Shaanxi, Shandong, Zhejiang.

38b. *Scutellaria pekinensis* var. ***ussuriensis*** (Regel) Handel-Mazzetti, Acta Horti Gothob. 13: 339. 1939.

黑龙江变种 hei long jiang bian zhong

Scutellaria japonica Morren & Decaisne var. *ussuriensis* Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg 4: 118. 1861; *S. dentata* H. Léveillé; *S. transitra* Makino var. *ussuriensis*

(Regel) H. Hara; *S. ussuriensis* (Regel) Kudô; *S. ussuriensis* var. *typica* Nakai.

Stems green, base purplish, subglabrous or sparsely pubescent. Leaves membranous, adaxially glabrous or strigose, abaxially sparsely villous on veins. Calyx veins sparsely villous. Corolla 1.7–2.2 cm.

• Forested slopes, wet forested meadows; 500–1500 m. Heilongjiang, Jilin, Nei Mongol [Japan, Korea, Russia].

38c. *Scutellaria pekinensis* var. *transitra* (Makino) H. Hara ex H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 182. 1977.

短促变种 duan cu bian zhong

Scutellaria transitra Makino, Bot. Mag. (Tokyo) 18: 70. 1904; *S. ussuriensis* (Regel) Kudô var. *transitra* (Makino) Nakai.

Stems green, subglabrous or sparsely pubescent. Leaves sparsely strigose, sometimes finely pubescent on abaxial veins. Calyx glandular pubescent. Corolla 1.7–2.2 cm.

• Shaded areas in forests; 100–1300 m. Anhui, Fujian, Hunan, Jiangsu, Jiangxi, Zhejiang [Japan, Korea].

38d. *Scutellaria pekinensis* var. *purpureicaulis* (Migo) C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 183. 1977.

紫茎变种 zi jing bian zhong

Scutellaria japonica Morren & Decaisne var. *purpureicaulis* Migo, J. Shanghai Sci. Inst. 3: 97. 1935.

Stems purplish throughout, densely pubescent. Leaves sparsely villous, densely pubescent along veins abaxially. Calyx glandular pubescent. Corolla 1.7–2.2 cm.

• Hills; 200–2200 m. Anhui, Fujian, Hubei, Jiangsu, Shandong, Zhejiang.

38e. *Scutellaria pekinensis* var. *grandiflora* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 580. 1977.

大花变种 da hua bian zhong

Stems green, pubescent. Leaves with conspicuous purple-black glands, incised dentate. Calyx glandular pilose and pubescent outside. Corolla to 2.5 cm.

• Grassy slopes; 2600 m. Sichuan (Wuxi Xian).

39. *Scutellaria megaphylla* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 580. 1977.

大叶黄芩 da ye huang qin

Herbs annual. Stems erect, ca. 3 mm in diam., sparsely antrorse pubescent. Petiole 1–3 cm, narrowly winged, densely antrorse pubescent; leaf blade ovate, 5–10 × 3–7 cm, membranous, sparsely appressed pubescent, base shallowly cordate, margin remotely coarse dentate, apex acute. Racemes terminal, to 7.5 cm; bracts sessile, linear-lanceolate, 4–7 × 1–1.5 mm, densely white pubescent, margin entire, apex acute. Pedicel ca. 2 mm, densely white spreading glandular pubescent. Calyx ca. 2.5 mm, densely glandular pubescent outside; scutellum ca. 1 mm. Corolla purple, ca. 1.9 cm, glandular pubescent outside, glabrous inside, base slightly saccate, straight, abruptly dilated above middle to 4.5 mm wide at throat; middle lobe of lower lip triangular-oblate, to 6 mm wide, apex emarginate; lateral lobes ovate, ca. 1.5 mm wide. Nutlets unknown.

• Coastal hills. Shandong (Lao Shan).

40. *Scutellaria mairei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 298. 1912.

毛茎黄芩 mao jing huang qin

Scutellaria hebeclada W. Smith.

Perennial herbs. Stems 16–22 cm tall, suberect, base ca. 1.5 mm in diam., densely and subpatent to antrorsely curved gray to yellowish hirsute. Leaves gradually larger upward; petiole 1.5–3 mm; basal leaf blade circular-ovate, ca. 5 × 5 mm, papery, densely gray to yellowish hirsute, base ± rounded, margin denticulate to dentate, apex rounded; mid stem and upper leaves triangular-ovate, ca. 1.5 × 1.2 cm. Racemes terminal, to 5 cm; bracts ± ovate, 3–7 mm, margin entire. Pedicel ca. 2.5 mm, densely gray to yellowish hirsute. Calyx purplish, ca. 3 mm, densely hirsute; scutellum ca. 1 mm. Corolla limb rose, tube white, ca. 1.6 cm, glandular puberulent outside, puberulent annulate inside, base bent, slightly dilated, zigzag upward, throat to 4 mm wide; middle lobe of lower lip broadly ovate, ca. 6 mm wide, slightly constricted at middle, apex emarginate; lateral lobes oblong-ovate, ca. 2 mm wide, apex acute. Nutlets unknown. Fl. May–Jun.

• Dry limestone mountains; 2600 m. Yunnan.

41. *Scutellaria tenax* W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 222. 1920.

韧黄芩 ren huang qin

Herbs perennial, rhizomatous. Stems ca. 36 cm tall, erect, base ca. 1.5 mm in diam., usually branched upward. Petiole 0.5–1.8 cm; leaf blade triangular to triangular-ovate, 1.5–3 × 1.1–2.4 cm, membranous to herbaceous, base truncate-cuneate, margin incised-dentate to shallowly dentate, apex acute. Racemes terminal, 5–9 cm; bracts ovate, rhombic, or spatulate, 3–4 mm, sparsely pubescent, margin ciliate. Pedicel 2–3 mm, densely glandular puberulent, pubescent. Calyx ca. 2 mm, to 4 mm in fruit, glandular puberulent outside, pubescent; scutellum ca. 1 mm, to 2 mm in fruit. Corolla blue, 1.2–1.3 cm, sparsely puberulent outside, glabrous inside; tube zigzag, ca. 5–6 mm, base bent, throat ca. 4 mm wide; middle lobe of lower lip broadly oblong-ovate, to 7 mm wide, apex emarginate; lateral lobes triangular, ca. 3 mm wide. Nutlets chestnut brown, ovoid, ca. 1 × 0.7 mm, tuberculate, adaxially umbonate near base. Fl. Aug, fr. Sep–Oct.

• Streamsides, grasslands, thickets, forests; 1500–2600 m. Sichuan, Yunnan.

- 1a. Stems, petioles, leaf veins abaxially, and inflorescences densely white pilose; leaf blades finely white bristly 41b. var. *patentipilosa*
- 1b. Stems, petioles, leaf veins abaxially, and inflorescences pubescent or puberulent; leaf blades pubescent 41a. var. *tenax*

41a. *Scutellaria tenax* var. *tenax*

韧黄芩 ren huang qin

Stems retrorsely pubescent especially on angles. Leaf blade adaxially glabrous except for pubescent midrib and margin, abaxially sparsely pubescent.

• Streamsides, grasslands, thickets, forests; 1500–2600 m. Sichuan, Yunnan.

41b. *Scutellaria tenax* var. *patentipilosa* (Handel-Mazzetti) C. Y. Wu, Fl. Yunnan. 1: 556. 1977.

展毛变种 zhan mao bian zhong

Scutellaria veronicifolia H. Léveillé var. *patentipilosa* Handel-Mazzetti, Acta Horti Gothob. 13: 342. 1939.

Stems densely white pilose. Petiole densely white pilose; leaf blade finely white bristly, veins of abaxial surface densely white pilose. Inflorescences densely white pilose.

• Thickets, grassy slopes; 1600 m. Sichuan, Yunnan.

42. *Scutellaria teniana* Handel-Mazzetti, Acta Horti Gothob. 13: 342. 1939.

大姚黄芩 da yao huang qin

Scutellaria indica Linnaeus var. *ambigua* Handel-Mazzetti.

Herbs perennial, rhizomatous. Stems 14–24 cm tall, erect to ascending, unbranched, base 1–2.2 mm in diam., very densely spreading, glandular, white pilose. Leaves in 3 or 4 widely spaced pairs; blades of mid stem leaves largest, subcircular to triangular-ovate, 1.1–4.3 × 1.4–3.5 cm, papery, densely glandular pilose, with numerous glands abaxially, basal blades subcircular and less than 1 cm, base rounded or cuneate to shallowly cordate, margin crenulate, apex rounded to subacute. Racemes terminal, 3.5–9 cm; bracts ovate to lanceolate, minute, 1.5–3 mm, margin entire; basal bracts short petiolate, 0.7–2 cm, margin dentate. Pedicel 2–3 mm, glandular puberulent. Corolla blue-purple, 1.2–1.5 cm, glandular puberulent outside, pubescent annulate inside; tube as long as limb, base bent, gradually dilated upward, zigzag, to 5 mm wide at throat; middle lobe of lower lip broadly obcordate, dark purple spotted, apex erose-dentate; lateral lobes oblanceolate. Nutlets unknown. Fl. Jun.

• Gravelly soils in forests; 2000–2100 m. Yunnan.

43. *Scutellaria tapintzeensis* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 556. 1977.

大坪子黄芩 da ping zi huang qin

Herbs rhizomatous. Stems to 60 cm tall, erect, densely spreading glandular white pubescent. Petiole 1–2 cm; leaf blade ovate to ovate-cordate, 2–5 × 1.5–3.5 cm, abaxially densely white pubescent, sometimes also strigose, base shallowly cordate, margin crenulate, apex obtuse. Racemes terminal, 6–17 cm, glandular pubescent; bracts sessile, elliptic, ca. 6 mm, margin entire, lower 1 or 2 pairs 1.3–2.5 cm, margin crenulate. Pedicel ca. 4 mm. Calyx ca. 3.5 mm, to 5 mm in fruit, densely glandular pilose; scutellum ca. 1.5 mm, purplish, to 3 mm in fruit. Corolla rose, ca. 2.3 cm, glandular puberulent outside, sparsely pilose just below middle lobe of lower lip inside; tube ca. 2 × as long as limb, base slightly bent, zigzag, throat to 7 mm wide; middle lobe of lower lip spreading, circular-ovate, to 1 cm wide, base abruptly constricted, apex emarginate; lateral lobes broadly ovate, to 5 mm wide, apex obtuse. Fl. Aug.

• Mixed oak-pine forests; 2500 m. Yunnan.

44. *Scutellaria tienchueanensis* C. Y. Wu & C. Chen, Fl. Reipubl. Popularis Sin. 65(2): 581. 1977.

天全黄芩 tian quan huang qin

Herbs rhizomatous perennials. Stems 15–25 cm tall, ca. 1.5 mm in diam. at base, much branched basally, densely upward curved to finely subpatent-pilose. Petiole 2.7–7 mm, densely and finely antrorse pilose; leaf blade triangular, 0.7–1.7 × 0.8–1.8 cm, herbaceous, adaxially sparsely strigose, abaxially very sparsely so, ciliolate, base broadly cuneate to subtruncate, margin shallowly 4- or 5-crenate, apex obtuse to acute. Racemes terminal, 2.5–10 cm; peduncle 1–2 cm; bracts sessile, rhombic-ovate, ca. 2 × 1.5 mm, finely pilose, glandular, deciduous. Pedicel ca. 2.5 mm, glandular pilose. Calyx ca. 1.5 mm, to 3 mm in fruit, finely glandular pilose; scutellum ca. 0.5 mm, to 1 mm in fruit. Corolla rose to blue, base whitish, ca. 8 mm, glandular puberulent outside, subglabrous inside; tube slightly saccate at base, to 1.5 mm wide at throat; middle lobe of lower lip circular-ovate, to 5 mm wide, apex emarginate; lateral lobes ovate, ca. 0.8 mm wide. Nutlets brown, ellipsoid-ovoid, ca. 1.5 × 1 mm, tuberculate, adaxially umbonate at middle. Fl. May, fr. Jun-Sep.

• Dry grassy slopes; 1700–2800 m. Sichuan.

45. *Scutellaria tenera* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 581. 1977.

柔弱黄芩 rou ruo huang qin

Herbs rhizomatous. Stems to 20 cm tall, ascending-erect, densely spreading white pilose, branched, internodes much longer than leaves. Petiole 0.2–2.5 cm; leaf blade narrowly triangular-ovate to oblong, 1.3–3 × 0.8–2.2 cm, membranous, sparsely pilose, base shallowly cordate, margin undulate-crenate, apex acute. Racemes terminal, 3.5–8 cm; bracts sessile, elliptic, all but lower bracts minute, 1.5–5 mm, membranous, margin entire, finely pilose. Pedicel ca. 2 mm, glandular puberulent. Calyx ca. 2 mm, to 3 mm in fruit, glandular puberulent; scutellum ca. 0.75 mm, to 2 mm in fruit. Corolla purple, ca. 8 mm, pubescent outside, glabrous inside; tube ca. 6.5 mm, base saccate, throat to 3 mm wide; upper lip straight; middle lobe of lower lip constricted at base, apex emarginate; lateral lobes ovate, ca. 1.5 mm wide. Nutlets unknown.

• Hills; 300 m. Hunan, Jiangxi, Zhejiang.

46. *Scutellaria sciaphila* S. Moore, J. Bot. 13: 228. 1875.

喜荫黄芩 xi yin huang qin

Herbs erect, rhizomatous. Stems 40–70 cm tall, including inflorescence, glabrous or sparsely puberulent except for white hirsute nodes, unbranched to branched above middle, base leafless. Petiole 3–7 mm, sparsely white hirsute; leaf blade membranous, oblong, 3–5.5 × 1.3–2 cm, adaxially sparsely white hirsute to subglabrous, abaxially glabrous except for sparsely white hirsute midrib and veins, base shallowly cordate, apex acute. Racemes terminal, 7–9 cm, densely glandular puberulent; bracts sessile, triangular-ovate, 3–15 mm, reduced upward, margin subentire. Pedicel ca. 2 mm. Calyx ca. 4.5 mm; scutellum ca. 1 mm. Corolla ca. 1.8 cm, glabrous except sparsely white pilose on middle lobe of lower lip inside; tube ca. 1.5 cm, base slightly saccate, bent, gradually widened to 5 mm wide at throat; middle lobe of lower lip triangular-ovate, to 5 mm wide, apex emarginate; lateral lobes ovate, ca. 1.75 mm wide. Nutlets unknown. Fl. May.

• Fields. Jiangsu, Jiangxi, Shandong.

47. *Scutellaria macrodonta* Handel-Mazzetti, Oesterr. Bot. Z. 85: 218. 1936.

大齿黄芩 da chi huang qin

Herbs perennial. Rhizomes woody, with deciduous bark. Stems numerous, erect, 30–35 cm tall, base subterete, sparsely retrorse white pubescent, branched apically. Leaves oblong-ovate to narrowly lanceolate, 2–4 × 0.8–1.4 cm, papery, ± densely pubescent, base rounded to subtruncate, margin remotely 5-dentate-serrate, apex acute. Racemes terminal, 4–8 cm, mostly densely spreading glandular puberulent. Pedicel ca. 2.5 mm. Calyx ca. 3 mm, to 4.5 mm in fruit; scutellum ca. 1.25 mm, enlarged in fruit. Corolla purple-red, ca. 2.7 cm, glabrous inside; tube saccate-geniculate at base, to 7 mm wide at throat; middle lobe of lower lip ovate, ca. 6.5 mm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide. Nutlets tuberculate. Fl. Jun, fr. Jul-Aug.

- Near springs, valleys; 400–1200 m. Hebei, Henan.

48. *Scutellaria likiangensis* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 239. 1912.

丽江黄芩 li jiang huang qin

Herbs perennial. Rhizomes 2–12 mm in diam., yellow inside. Stems 20–36 cm tall, erect, numerous, brown-purple, finely retrorse pilose, unbranched. Petiole 0–1.5 mm; basal leaf blade elliptic-ovate to oblong, 1.3–3 × 0.6–1.5 cm, papery, adaxially sparsely fine appressed pilose or subglabrous, abaxially densely impressed glandular, veins sparsely fine pilose, base rounded, margin crenate-serrate to subentire, apex rounded to emarginate. Racemes terminal, 6.5–12 cm, densely spreading glandular puberulent; basal bracts similar to stem leaves but narrower and 1.2–1.6 cm, apical ones ± ovate, 3.5–10 mm, margin entire. Pedicel 2–3 mm. Calyx purplish, ca. 3 mm, ca. 5.5 mm in fruit, glabrous inside; scutellum semicircular, spreading, ca. 1.5 mm, to 3 mm and reflexed in fruit. Corolla yellow-white, or yellow to green-yellow, with purplish spots or lines, rarely purplish, 2.6–3 cm, glabrous inside; tube saccate, base ± bent at a right angle, throat ca. 6 mm wide; middle lobe of lower lip subcircular, to 9 mm wide; lateral lobes ovate, ca. 2.5 mm wide. Nutlets black-brown, ovoid, ca. 1.75 × 1.25 mm, tuberculate, adaxially umbonate at middle. Fl. Jun-Aug, fr. Aug-Sep.

- Grassy slopes, dry hillside thickets; 2500–3100 m. Yunnan.

Forms with purple flowers are found ± sympatrically with the normal yellow-flowered plants and are difficult to distinguish from *Scutellaria amoena*.

Used medicinally as a febrifuge, for relieving fever, and diminishing inflammation.

49. *Scutellaria chungtienensis* C. Y. Wu, Fl. Yunnan. 1: 557. 1977.

中甸黄芩 zhong dian huang qin

Herbs perennial. Rootstocks brownish, to 8 mm in diam., apically forked. Stems purplish, numerous, erect, (9–)15–30 cm tall, ca. 1 mm in diam., subglabrous except for densely fine retrorse-pilose angles, branched. Petiole 1–1.5 mm; leaf blade ovate to elliptic-ovate, (0.9–)1.5–3 × (0.4–)0.9–1.2 cm, papery, sparsely fine pilose, base rounded to shallowly cordate, margin undulate-crenulate, apex acute. Racemes terminal, (3–)6–12 cm, mostly white glandular pilose; bracts sessile to short petiolate, narrowly elliptic to oblong, 3–

8 × 1.5–3.5 mm, base cuneate, all but lowermost ones entire, ciliate, apex acute. Pedicel 1.8–3 mm. Calyx ca. 2.5 mm, ca. 5 mm in fruit; scutellum semicircular, spreading, ca. 1 mm, to 2.5 mm in fruit. Corolla purple or dark blue, 1.8–2 cm, densely and finely white glandular pilose outside, glabrous inside; tube saccate, sharply bent, throat to 3.5 mm wide; middle lobe of lower lip subcircular, ca. 4.5 mm in diam.; lateral lobes ovate, ca. 1.5 mm wide. Nutlets unknown. Fl. Jun-Jul, fr. Jul-Aug.

- Grassy slopes; 3000–3300 m. Yunnan (Zhongdian Xian).

50. *Scutellaria forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 239. 1912.

灰岩黄芩 hui yan huang qin

Scutellaria forrestii var. *intermedia* C. Y. Wu & H. W. Li; *S. forrestii* var. *muliensis* C. Y. Wu.

Herbs perennial. Rootstocks to 1.5 cm in diam. Stems erect, 15–20(–25) cm tall, ca. 2 mm in diam. basally, densely spreading white pilose. Petiole 2–3 mm; lower leaf blade abaxially purplish or violet, subcircular, ca. 1 × 1 cm, upper leaf blades broadly ovate to oblong and 1.6–2.5(–3.5) × (1.1–)1.5–2.5 cm, herbaceous, sparsely pilose, base shallowly cordate, margin crenate-serrate, apex obtuse to rounded. Racemes terminal, 4.5–8 cm, mostly pilose; bracts reduced upward, petiolate, ± ovate, margin entire. Pedicel ca. 3 mm. Calyx ca. 3 mm, densely pilose outside; scutellum ca. 1 mm. Corolla dark blue, (2–)3–3.5(–3.7) cm, densely fine glandular pilose outside, glabrous inside; tube base saccate-geniculate, ca. 5 mm wide at middle, throat to 7 mm wide; middle lobe of lower lip circular-ovate, to 1.2 cm wide near base; lateral lobes ovate, ca. 3 mm wide. Nutlets unknown. Fl. Jul.

- Oak, pine, and larch forests, grassy slopes; 2100–3400 m. Sichuan, Yunnan.

51. *Scutellaria amoena* C. H. Wright, Bull. Misc. Inform. 1896: 164. 1896.

滇黄芩 dian huang qin

Herbs perennial. Rootstocks at least 1.1 cm in diam., forked. Stems purplish, numerous, erect, 12–26(–35) cm tall, retrorsely to spreading puberulent to pilose along angles. Petiole 1–2 mm; leaf blade oblong-ovate to oblong, 1.4–3.3 × 0.7–1.4 cm at mid and upper parts of stem, smaller basally, folded, herbaceous, sparsely puberulent to subglabrous, base rounded to shallowly cordate, margin inconspicuously crenate to entire, apex rounded to obtuse. Racemes terminal, 5–14 cm, mostly glandular puberulent; bracts reduced upward, lanceolate-oblong, 5–10 mm, base cuneate, apex acute to obtuse. Pedicel 3–4 mm. Calyx purplish, ca. 3 mm, to 5 mm in fruit; scutellum ca. 1 mm, to 3 mm in fruit. Corolla purple or blue-purple, 2.4–3 cm, glabrous inside; tube base slightly saccate, conspicuously bent, throat to 7 mm wide; middle lobe of lower lip subcircular, to 1 cm wide, margin subentire; lateral lobes triangular, ca. 3 cm wide. Nutlets black, ovoid, ca. 1.25 × 1 mm, tuberculate, adaxially umbonate near base. Fl. May-Sep, fr. Jul-Oct.

- Grasslands, pine forests; 1300–3000 m. Guizhou, Sichuan, Yunnan.

- 1a. Plants sparsely puberulent or pilose to subglabrous 51a. var. *amoena*
- 1b. Plants, except corolla, densely gray or grayish

yellow hirsute 51b. var. *cinerea*

51a. *Scutellaria amoena* var. *amoena*

滇黄芩 dian huang qin

Scutellaria purpureocoerulea Pax & K. Hoffmann.

Plants sparsely puberulent or pilose to subglabrous.

• Grasslands, pine forests; 1300–3000 m. Guizhou, Sichuan, Yunnan.

Used medicinally for fever.

51b. *Scutellaria amoena* var. *cinerea* Handel-Mazzetti, Symb. Sin. 7: 915. 1936.

灰毛变种 hui mao bian zhong

Plants, except corolla, very densely gray or grayish yellow hirsute.

• Pine forests, sunny grassy slopes; 1300–2700 m. Sichuan, Yunnan.

52. *Scutellaria baicalensis* Georgi, Bemerck. Reise Russ. Reichs 1: 223. 1775.

黄芩 huang qin

Scutellaria lanceolaria Miquel; *S. macrantha* Fischer.

Herbs perennial. Rhizomes fleshy, to 2 cm in diam., branched. Stems ascending, (15–)30–120 cm tall, much branched, subglabrous or antrorsely to spreading puberulent. Petiole ca. 2 mm, puberulent; leaf blade lanceolate to linear-lanceolate, 1.5–4.5 × (0.3–)0.5–1.2 cm, papery, glabrous or sparsely puberulent, abaxially densely impressed glandular, base rounded, margin entire, apex obtuse. Racemes terminal, 7–15 cm; basal bracts similar to stem leaves, upper ones ovate-lanceolate to lanceolate, 4–11 mm, subglabrous. Pedicel ca. 3 mm, puberulent. Calyx ca. 4 mm, ca. 5 mm in fruit, densely puberulent outside, margin ciliate, glabrous inside; scutellum ca. 1.5 mm, ca. 4 mm in fruit. Corolla purple-red to blue, 2.3–3 cm, densely glandular pubescent outside, pubescent on saccate part inside; tube conspicuously bent near base, throat to 6 mm wide; middle lobe of lower lip triangular-ovate, ca. 7.5 mm wide. Nutlets black-brown, ovoid, ca. 1.5 × 1 mm, tuberculate, adaxially umbonate near base. Fl. Jul-Aug, fr. Aug-Sep.

• Sunny grassy slopes, waste and cultivated areas; 100–2000 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Japan, Korea, Mongolia, Russia].

Traditionally used as a febrifuge, for relieving fever, and diminishing inflammation. This is one of the most commonly collected species in China.

53. *Scutellaria viscidula* Bunge, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 2: 126. 1833.

粘毛黄芩 nian mao huang qin

Herbs perennial. Rootstocks 2.5–4(–18) mm in diam. Stems erect to ascending, 8–24 cm tall, ± densely retrorse pubescent, sometimes spreading glandular pubescent, much branched. Petiole 0–2 mm; leaf blade lanceolate to linear, 1.5–3.2 × 2.5–8 mm, adaxially sparsely appressed pubescent or subglabrous, abaxially ± pubescent, densely yellow glandular, base truncate to broadly cuneate, margin entire and

densely ciliolate, apex obtuse. Racemes terminal, 4–7 cm, most parts glandular pilose/pubescent; lower bracts similar to stem leaves, upper ones elliptic to elliptic-ovate, 4–5 mm. Pedicel ca. 3 mm. Calyx ca. 3 mm, to 6 mm in fruit; scutellum 1–1.5 mm, ca. 4 mm in fruit. Corolla yellow-white or white, 2.2–2.5 cm, ± densely glandular pubescent outside, pilose on saccate part inside, conspicuously bent near base, throat to 7 mm wide; middle lobe of lower lip subcircular, ca. 1.3 cm in diam.; lateral lobes ovate, ca. 3 mm wide. Nutlets black, ovoid, tuberculate, adaxially umbonate near base. Fl. May-Aug, fr. Jul-Aug.

• Gravelly waste places, grasslands; 700–1400 m. Hebei, Nei Mongol, Shandong, Shanxi.

54. *Scutellaria rehderiana* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 10: 889. 1930.

甘肃黄芩 gan su huang qin

Scutellaria kansuensis Handel-Mazzetti.

Herbs perennial. Rootstocks 1.5–13 mm wide. Stems erect, 12–35 cm tall, subglabrous or ± spreading to retrorsely white puberulent except retrorsely pubescent on angles, rarely short branched. Petiole 2.8–9(–12) mm; leaf blade narrowly triangular-ovate to ovate, 1.4–4 × 0.6–1.7 cm, herbaceous, adaxially very sparsely strigose to sparsely puberulent, abaxially sparsely glandular, veins sparsely puberulent to pilose and densely ciliolate, base broadly cuneate to subtruncate or subrounded, margin entire to irregularly, remotely 2–5-shallow-dentate, apex rounded to acute. Racemes terminal, 3–10 cm; bracts purplish, ovate to elliptic, sometimes obovate, 3–8 mm, base cuneate, apex acute, ciliate. Pedicel ca. 2 mm, densely glandular pubescent. Calyx ca. 2.5 mm, densely glandular pubescent outside; scutellum ca. 1 mm. Corolla reddish to purple-blue, 1.8–2.2 cm, glandular pubescent outside, glabrous inside; tube bent near base, gradually dilated upward; middle lobe of lower lip triangular-ovate, ca. 1.1 cm wide, apex emarginate; lateral lobes ovate. Fl. May-Aug.

• Sunny grassy slopes; 1300–3200 m. Gansu, Shaanxi, Shanxi.

55. *Scutellaria hypericifolia* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 221. 1911.

连翘叶黄芩 lian qiao ye huang qin

Herbs perennial. Rootstocks to 2 cm in diam., many headed. Stems purplish, suberect, 10–30 cm tall, subglabrous except for spreading white pilose angles and bearded nodes, usually unbranched. Petiole 1–2 mm; leaf blade abaxially purplish except for whitish veins, mostly ovate, sometimes oblong, 2–3.4 × 0.7–1.4 cm, herbaceous, base rounded to cuneate, margin entire to undulate, rarely shallowly few serrate, apex rounded to obtuse or rarely acute. Racemes terminal, 6–15 cm; bracts ovate, 0.7–1.5 cm, margin entire and ciliate, apex acute. Pedicel 2.5–3 mm, pilose. Calyx purplish, ca. 3 mm, to 6 mm in fruit, pilose outside, yellow glandular; scutellum ca. 1 mm, to 3 mm in fruit. Corolla white, greenish white to purple or purple-blue, 2.5–2.8 cm, sparsely pubescent outside, pubescent at base inside; tube 1.8–2.1 cm, base bent, throat to 6 mm wide; middle lobe of lower lip triangular-ovate, to 9 mm wide, apex emarginate; lateral lobes adnate to upper lip, ca. 2.5 mm wide. Nutlets black, ovoid, ca. 2 × 1.5 mm, papillate, adaxially umbonate near base. Fl. Jun-Aug, fr. Aug-Sep.

• Grassy slopes, forest margins; 900–4000 m. Sichuan.

- 1a. Stems subglabrous except for sparsely white-pilose angles; leaves sparsely pilose
 55a. var. *hypericifolia*
 1b. Stems and leaves densely spreading white pilose
 55b. var. *pilosa*

55a. *Scutellaria hypericifolia* var. *hypericifolia*

连翘叶黄芩 *lian qiao ye huang qin*

Scutellaria pachyrrhiza Pax & K. Hoffmann.

Stems subglabrous except sparsely white pilose on angles. Leaves adaxially sparsely pilose, abaxially sparsely pilose mainly along veins.

- Grassy slopes, margins of *Quercus rehderiana* forests; 900–4000 m. Sichuan.

55b. *Scutellaria hypericifolia* var. *pilosa* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 582. 1977.

多毛变种 *duo mao bian zhong*

Stems densely white pilose. Leaves densely white pilose.

- Grassy slopes. Sichuan.

56. *Scutellaria spectabilis* Pax & K. Hoffmann ex Limpricht, Repert. Spec. Nov. Regni Veg. Beih. 12: 476. 1922.

白花黄芩 *bai hua huang qin*

Stems prostrate, glabrous, sterile ones 20–30 cm tall, fertile 4–8 cm tall; branches erect. Petiole obsolete to 5 mm; leaf blade narrowly ovate, 4–5 × 1–2 cm, smaller on fertile branches, 3–5-veined, glabrous, base rounded and constricted into a very short petiole, margin entire, apex slightly acuminate. Racemes crowded, secund; bracts reduced apically, glandular hairy, as long as or slightly longer than pedicels. Flowers opposite. Pedicel ca. 2 mm, glandular hairy. Calyx ca. 3 × 4 mm; scutellum slightly dilated. Corolla white to yellowish, ca. 2.5 cm, glandular hairy outside; tube ca. 1.5 cm, base conspicuously saccate; limb ca. 1 cm. Nutlets unknown.

- Grassy slopes; 800 m. Sichuan.

57. *Scutellaria orthocalyx* Handel-Mazzetti, Acta Horti Gothob. 9: 75. 1934.

直萼黄芩 *zhi e huang qin*

Herbs perennial. Rhizomes prostrate, 1–1.5 mm in diam., much branched. Stems numerous, erect, 6–25 cm tall, antrorsely pubescent on angles, sometimes subglabrous, mostly unbranched. Petiole less than 1 mm; leaf blade ovate-lanceolate basally, linear upward, 1–2.1 × 2.2–5.5(–7) mm, herbaceous, sparsely puberulent, impressed glandular abaxially, base rounded to broadly cuneate, margin entire and slightly involute, apex obtuse to rounded. Racemes terminal, 3–19 cm; bracts linear, gradually reduced upward. Pedicel 1.2–2.5 mm, glandular pubescent. Calyx purplish, 1.5–2.5 mm, to 4 mm in fruit, glandular pubescent outside; scutellum circular, ca. 1 mm, to 2.5 mm in fruit. Corolla purple to blue-purple, 1.2–1.7 cm, glandular pubescent outside, mostly glabrous inside, limb partly white pilose; tube bent near base; middle lobe of lower lip ovate, apex emarginate; lateral lobes triangular-ovate, margin revolute. Nutlets black-brown, subglobose, ca. 1.8 mm in diam., tuberculate, adaxially umbonate near base. Fl. Apr–Oct, fr. Jun–Oct.

- Grassy slopes, pine forests; 1200–3300 m. Sichuan, Yunnan.

Used medicinally.

58. *Scutellaria incisa* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 39. 1966.

裂叶黄芩 *lie ye huang qin*

Herbs pyramidal, erect. Stems purple-red when dry, ca. 40 cm tall, smooth, glabrous, many branched. Petiole ca. 1 cm at mid stem; leaf blade subrhombic to ovate-lanceolate, ca. 4.8 × 2 cm and largest at mid stem, herbaceous, glabrous, base cuneate-decurrent, margin incised-serrate, apex caudate-acuminate. Racemes poorly defined, terminal, 5–10 cm, all forming a panicle; bracts entire, as long as or shorter than flowers, foliaceous basally, lanceolate upward. Pedicel 2–3 mm, purple-red, finely puberulent or subglabrous. Calyx ca. 2 mm, glabrous, sparsely glandular; scutellum inconspicuous, ca. 0.5 mm. Corolla purplish, ca. 2 cm, sparsely puberulent outside, glabrous inside; tube slightly saccate, throat to 4 mm wide; middle lobe of lower lip triangular-ovate, to 4 mm wide, margin entire; lateral lobes narrowly triangular-ovate. Nutlets unknown. Fl. Jun.

- Stony riverbeds; 600 m. Jiangxi, Zhejiang.

59. *Scutellaria subintegra* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 582. 1977.

两广黄芩 *liang guang huang qin*

Herbs pyramidal, perennial. Stems purplish-red when dry, erect, puberulent, angles narrowly winged, much branched. Petiole 4–7 mm; leaf blade linear-lanceolate, 1.2–3.6 cm × 3.5–9 mm, herbaceous, adaxially appressed puberulent, abaxially glabrous, midrib and veins sparsely puberulent, base cuneate-decurrent, margin remotely 1- or 2-undulate-crenate, apex obtuse. Racemes terminal, 1.5–5 cm; bracts entire, longer than calyx. Pedicel 2.5–3 mm, densely puberulent. Calyx ca. 2 mm, puberulent; scutellum ca. 0.75 mm. Corolla purple, to 1.3 cm, puberulent outside, glabrous inside; tube base saccate, throat to 3 mm wide; middle lobe of lower lip subcircular, ca. 3 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Fl. Aug–Oct, fr. Nov.

- Slopes. Guangdong, Guangxi.

60. *Scutellaria axilliflora* Handel-Mazzetti, Acta Horti Gothob. 13: 337. 1939.

腋花黄芩 *ye hua huang qin*

Herbs perennial, rhizomatous. Stems ascending to erect, 30–40(–60) cm tall, finely antrorse hairy especially on angles. Petiole 4–13 mm, densely pubescent; leaf blade ovate to triangular-ovate, 1.2–2.5 × 0.7–2.1 cm, herbaceous, adaxially sparsely fine pubescent, abaxially subglabrous or pubescent, veins pilose, base broadly-cuneate to subtruncate, margin coarsely 1–3-dentate, apex obtuse; apical blades bractlike, margin entire or 1- or 2-crenate. Flowers solitary, axillary, obliquely spreading, secund. Pedicel 1.8–3 mm, pubescent. Calyx 2–3 mm, ca. 4 × 3 mm in fruit, sparsely pubescent, ciliolate, glandular; scutellum ca. 1 mm, ca. 2 mm in fruit. Corolla purple or purplish blue, 1.6–3.5 cm, pubescent outside, glabrous except for villous base inside; tube base bent, slightly dilated, throat ca. 4 mm wide; middle lobe of lower lip projected, trapeziform, ca. 2.5 × 3 mm, apex emarginate; lateral lobes ovate, to 1/2 as long as lower lip;

ovary bullate hairy at juncture with disc. Nutlets dark brown, ovoid, ca. 1 × less than 1 mm, tuberculate, adaxially swollen, umbonate near base. Fl. Apr-Jun, fr. Jun-Jul.

• Rocky shaded areas in forests, thickets; 900 m. Fujian, Zhejiang.

1a. Corolla 1.6–2 cm 60a. var. *axilliflora*
1b. Corolla 2.4–3.5 cm 60b. var. *medullifera*

60a. *Scutellaria axilliflora* var. *axilliflora*

腋花黄芩 *ye hua huang qin*

Corolla 1.6–2 cm.

• Rocky, shaded areas in forests; 900 m. Fujian.

60b. *Scutellaria axilliflora* var. *medullifera* (Sun ex C. H. Hu) C. Y. Wu & H. W. Li, Fl. Republ. Popularis Sin. 65(2): 205. 1977.

大花变种 *da hua bian zhong*

Scutellaria medullifera Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 40. 1966.

Corolla 2.4–3.5 cm.

• Thickets. Zhejiang.

61. *Scutellaria lotienensis* C. Y. Wu & S. Chow, Fl. Reipubl. Popularis Sin. 65(2): 583. 1977.

罗甸黄芩 *luo dian huang qin*

Herbs procumbent, much branched. Stems subglabrous. Petiole ca. 1.2 cm at mid stem, sparsely puberulent; leaf blade ovate-lanceolate, ca. 6.2 × 3 cm at mid stem, herbaceous, subglabrous, base cordate, margin remotely undulate-crenate, apex obtusely caudate-attenuate. Racemes lax; floral leaves reduced upward; bracts ovate, margin 1- or 2-undulate-crenate. Flowers axillary. Pedicel ca. 2 mm, puberulent. Calyx ca. 2 mm, puberulent outside, scarlet glandular; scutellum ca. 2.2 mm, to 4 mm in fruit. Corolla yellowish, ca. 2 cm, puberulent outside, apically red glandular, glabrous inside; tube straight, base saccate-geniculate, throat ca. 5 mm wide; middle lobe of lower lip spreading, ovate, ca. 6 mm, sides reflexed; lateral lobes oblong, ca. 4 × 2.5 mm. Nutlets unknown. Fl. Mar-Apr.

• Shaded hillside thickets; 400–800 m. Guizhou.

62. *Scutellaria pingbienensis* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 548. 1977.

屏边黄芩 *ping bian huang qin*

Herbs perennial. Stems purplish when dry, ascending, ca. 30 cm tall, subterete, base ca. 1.5 mm in diam., few branched, densely antrorse white hirsute. Petiole 2–10 mm; leaf blade broadly triangular-ovate, 1.5–4 × 1–4 cm, papery, white strigose, base cordate, rarely rounded, margin irregularly crenate-serrate, apex acute to slightly obtuse. Racemes poorly defined, terminal, 4–11 cm; bracts rhombic-ovate, margin entire. Pedicel 2–2.5 mm, glandular hirsute. Calyx 2–3 mm, to 4 mm in fruit, densely glandular hirsute outside; scutellum ca. 1 mm, ca. 2.5 × 4 mm, oblate, reflexed, and conspicuously netted in fruit. Corolla reddish with purple spots, 1.4–1.5 cm, glandular pilose outside, finely pilose on lower lip, inconspicuously annulate inside; tube ca. 9 mm, slightly curved, base slightly saccate, throat ca. 3 mm wide; upper lip ca. 2 mm; middle lobe of lower lip spreading, revolute, oblate,

to 8 mm wide; lateral lobes adnate to upper lip, ovate, ca. 2 mm wide, revolute. Nutlets unknown. Fl. Jan-Apr.

• Sunny dry grassy slopes; 700–1400 m. Yunnan.

63. *Scutellaria shweliensis* W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 66. 1917.

瑞丽黄芩 *rui li huang qin*

Subshrubs 30–60 cm tall. Stems erect, terete, densely spreading white hirsute. Petiole 1.5–4 mm; leaf blade ovate, 1.5–3.8 × 0.8–2.5 cm, papery, yellowish hirtellous, occasionally sparsely yellow glandular, adaxially slightly wrinkled, base broadly cuneate to roundish, margin shallowly crenate to entire, apex acute to subobtusate. Racemes poorly defined, terminal, leafy, 7–27 cm. Pedicel to 5 mm, densely, spreading, white hirsute. Calyx 2–3 mm, glandular hirsute outside, to 4 mm in fruit; scutellum ca. 3 mm, subcircular, ca. 5 × 5 mm, reflexed, conspicuously netted in fruit. Corolla purple, 1.5–1.7 cm, finely glandular pilose outside, glabrous inside; tube to ca. 8 mm, suberect, base slightly saccate, throat ca. 3 mm wide; upper lip ca. 4.5 mm; middle lobe of lower lip subcircular, ca. 6.5 mm in diam., revolute, apex emarginate; lateral lobes adnate to upper lip, ca. 2.5 × 1 mm, revolute. Nutlets black, ellipsoid, ca. 1.25 × 0.75 mm, adaxially appressed, white puberulent, white umbonate near base.

• Sunny roadsides, savannalike slopes; 600–1600 m. Yunnan.

64. *Scutellaria wongkei* Dunn, Bull. Misc. Inform. 1914: 329. 1914.

南粤黄芩 *nan yue huang qin*

Stems ± woody, suberect, ca. 50 cm tall, much branched, densely antrorse hirtellous, hairs with many long branches. Petiole 2–5 mm; leaf blade ovate, 0.9–2.2 cm × 4–14 mm, papery, densely hirtellous, glandular, base broadly cuneate to roundish, margin 2- or 3-crenate, apex obtuse. Flowers solitary, axillary, on branchlets; pedicel ca. 3.5 mm, densely hirtellous. Calyx ca. 1.5 mm, ca. 3.5 mm in fruit, densely hirtellous outside; scutellum ca. 0.5 mm. Corolla bluish, 1.1–1.4 cm, glandular pilose outside, sparsely pilose on limb inside; tube suberect, base slightly saccate, throat to 2.5 mm wide. Fl. and fr. Jun.

• Grassy areas. Guangdong.

65. *Scutellaria hunanensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 583. 1977.

湖南黄芩 *hu nan huang qin*

Herbs erect. Stems sparsely antrorse appressed hairy, densely so on angles, with many long branches. Petiole (0.4–)1–3 cm, densely pubescent; leaf blade triangular-ovate, (2–)2.5–5.5 × (1.3–)1.5–4 cm, papery, adaxially sparsely strigose, glandular, densely pubescent on midrib, veins, and margin, abaxially glabrous and veins pubescent, base broadly cuneate to shallowly cordate, margin coarsely crenate to double crenate, apex obtuse. Racemes terminal, 2–5.5 cm; bracts petiolate, elliptic, ca. 3 mm, margin entire, sparsely pubescent. Fruiting pedicel ca. 2 mm, pubescent. Fruiting calyx ca. 4 mm, sparsely pubescent along veins otherwise glandular; scutellum ca. 4 mm. Corolla and nutlets not seen.

• Hunan.

66. *Scutellaria bambusetorum* C. Y. Wu, Fl. Yunnan 1: 563. 1977.

竹林黄芩 zhu lin huang qin

Herbs perennial. Stems erect, ca. 50 cm tall, sparsely puberulent, much branched. Petiole 1.5–2.5 cm; leaf blade ovate to ovate-lanceolate, 2–5 × 1.5–3 cm, membranous, sparsely strigose, base broadly cuneate to truncate, margin shallowly 5–7-crenate, apex acute. Bracts similar to stem leaves, minute. Flowers solitary in upper leaf axils; pedicel ca. 3 mm, puberulent, to 5 mm after anthesis. Calyx ca. 3.5 mm, sparsely glandular puberulent outside; scutellum ca. 1 mm. Corolla ca. 9 mm, densely puberulent outside, glabrous inside; tube straight, base slightly saccate; upper lip ca. 1 mm; middle lobe of lower lip ovate, ca. 2.5 mm wide, apex emarginate; lateral lobes narrowly ovate, ca. 1.25 mm wide. Nutlets unknown. Fl. Dec.

- Bamboo forests; 2000 m. Yunnan (Jinping Xian).

67. *Scutellaria chimenensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 583. 1977.

祁门黄芩 qi men huang qin

Stems ± flexuous, ca. 30 cm tall, densely retrorse yellowish pubescent, much branched. Petiole to 4 cm, spreading yellowish pilose; leaf blade ovate, 6.5–7 × 4–4.6 cm on stem, 1.5–2.5 × 1.2–1.7 cm on branches, herbaceous, densely pilose, base cordate, margin crenate, apex acute. Racemes terminal on lateral branches, to 15 cm. Pedicel ca. 3 mm, spreading, glandular pilose. Fruiting calyx ca. 4 mm, glandular pilose; scutellum ca. 3.5 mm. Corolla and nutlets not seen. Fr. Aug.

- Streamsides in forests; 100 m. Anhui (Qimen Xian).

68. *Scutellaria franchetiana* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 221. 1911.

岩霍香 yan huo xiang

Scutellaria angulosa Bentham var. *franchetiana* (H. Léveillé) Kudô.

Herbs perennial. Rhizomes horizontal, stoloniferous. Stems purplish, ascending, 30–70 cm tall, antrorsely puberulent, especially along angles, leafless on basal 1/3. Petiole 3–10 mm; leaf blade ovate to ovate-lanceolate, 1.5–3(–4.5) × 1–2(–2.5) cm, herbaceous, adaxially sparsely puberulent especially on margin, abaxially glabrous, midrib and veins puberulent, base broadly cuneate or subtruncate to cordate, margin 3- or 4-dentate, apex acuminate. Racemes terminal on apical branches, (1–)2–9 cm; bracts petiolate, leaflike, longer than pedicels. Pedicel 2–3 mm, puberulent or glandular pubescent. Calyx ca. 2.5 mm, to 4 mm in fruit, puberulent to glandular pubescent outside; scutellum ca. 1.5 mm, to 3 mm in fruit. Corolla purple, to 2.5 cm, glandular pubescent outside, glabrous inside, base slightly saccate-geniculate, throat to 4 mm wide; middle lobe of lower lip triangular-ovate, to 4 mm wide, margin subentire; lateral lobes ovate, ca. 3 mm wide, apex emarginate. Nutlets black, ovoid, ca. 0.5 mm in diam., tuberculate, adaxially umbonate at base. Fl. Jun-Jul.

- Wet slopes; 800–2300 m. Guizhou, Hubei, Shaanxi, Sichuan.

Used in treatment of traumatic swelling, coughs.

69. *Scutellaria stenosphon* Hemsley, J. Linn. Soc., Bot. 26: 297. 1890.

狭管黄芩 xia guan huang qin

Stems with several, short, ascending flowering branches, 4-angled/narrowly winged, glabrescent. Petiole to 6 mm; leaf blade ovate or broadly lanceolate, 2–3.5 × 1.2–1.5 cm, papery, glabrous, adaxially sparsely glandular, abaxially densely yellow glandular, base cuneate, margin narrowly revolute, ± entire, or inconspicuously crenate, apex acute to subacute. Racemes to 10 cm, terminal on short leafy lateral branches; rachis very minutely antrorse pubescent; lower floral leaves longer than pedicels, mostly sessile, ovate, to 3 mm, margin entire and ciliate; bracteoles ± subulate, ca. 0.3 mm, inserted about halfway along pedicel. Pedicel to 3.5 mm, puberulent. Scutellum ca. 1 mm. Corolla lilac, 1.8–2 cm, glandular pubescent outside; tube ca. 0.7 mm wide, only slightly enlarged at base, gradually dilated to ca. 4 mm at throat.

- Guangdong (Luofu Shan).

This species is similar to *Scutellaria franchetiana* H. Léveillé and differs by its smaller, thicker, ± entire or inconspicuously crenate, and apically obtuse leaves, axillary racemes, small, few, leaflike bracts, longer pedicel, and smaller corolla with a very slender tube.

70. *Scutellaria weishanensis* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 563. 1977.

巍山黄芩 wei shan huang qin

Herbs perennial. Stems purplish, erect, acutely 4-winged/angled, wings ca. 0.25 mm wide, glabrous, white barbate at nodes. Petiole purple, 3–5 mm; leaf blade triangular-ovate, 1.5–3 × 1.2–1.8 cm, very sparsely white pubescent, base cuneate to cordate, margin irregularly 3–5-serrate, apex acute. Racemes terminal, lax, poorly defined, 3–7 cm; bracts leaflike, 5–7 mm, 1-crenate, short petiolate. Pedicel ca. 3 mm, pubescent. Calyx ca. 4 mm, pubescent on veins and margin outside; scutellum ca. 2 mm. Corolla purple-red, to 2 cm, densely white glandular pubescent outside; tube short, erect, base slightly saccate, throat to 6 mm wide, apex of upper lip 2-lobulate; middle lobe of lower lip to 6 mm wide, apex 4-lobulate.

- Evergreen broad-leaved forests; 2000–2200 m. Yunnan.

71. *Scutellaria quadrilobulata* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 41. 1966.

四裂花黄芩 si lie hua huang qin

Herbs perennial, rhizomatous, stoloniferous, pubescent or pilose. Stems erect, (30–)45–60 cm tall, pubescent, branched above middle. Petiole to 2 cm, pubescent; leaf blade ovate, ca. 4 × 2.6 cm, largest at mid stem, adaxially sparsely pubescent or pilose, abaxially sometimes purplish and subglabrous or sparsely pilose, base truncate to roundish and slightly decurrent, margin 5–8-double crenate, apex obtuse to acute. Racemes terminal, to 10 cm; lower bracts similar to stem leaves, smaller upward, ovate to ovate-lanceolate, margin entire to ± inconspicuously crenate and ciliate. Pedicel ca. 3 mm, pubescent. Calyx purple, ca. 2.2 mm, glabrous outside, veins and margin pubescent, oblate, ca. 3.5 × 4.5 mm in fruit; scutellum ca. 1.5 × 1.5 mm. Corolla yellow with purple lines, ca. 2 cm, densely glandular pubescent outside, glabrous inside; tube ca. 1.7 cm, base slightly saccate-geniculate; upper lip oblate, concave, ca. 2.2 mm wide, apex emarginate; middle lobe of lower lip trapeziform, equally 4-lobed, ca. 4.5 mm wide; lateral lobes subcircular, subequal to upper lip. Nutlets unknown. Fl. Jun-Aug.

• Forested and grassy slopes; 2000–3000 m. Guizhou, Hubei, Sichuan, Yunnan.

- 1a. Plants pubescent; leaves adaxially sparsely pubescent, abaxially subglabrous, veins only slightly elevated; racemes lax, bracts entire 71a. var. *quadrilobulata*
1b. Plants pilose; leaves sparsely pilose, veins conspicuously elevated abaxially; racemes compact, bracts inconspicuously crenate 71b. var. *pilosa*

71a. *Scutellaria quadrilobulata* var. *quadrilobulata*

四裂花黄芩 si lie hua huang qin

Plants pubescent. Leaves sparsely pubescent adaxially, subglabrous and with slightly elevated veins abaxially. Racemes lax; bracts entire.

• Forested and grassy slopes; 2000–3000 m. Hubei, Sichuan, Yunnan.

Used medicinally as a diaphoretic.

71b. *Scutellaria quadrilobulata* var. *pilosa* C. Y. Wu & S. Chow, Fl. Reipubl. Popularis Sin. 65(2): 583. 1977.

硬毛变种 ying mao bian zhong

Plants pilose. Leaves sparsely pilose, veins conspicuously elevated abaxially. Racemes compact; bracts ± inconspicuously crenate.

• Slopes; 2000 m. Guizhou, Yunnan.

72. *Scutellaria tenuiflora* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 584. 1977.

细花黄芩 xi hua huang qin

Herbs rhizomatous. Stems erect, densely floccose-pilose, unbranched, leafy apically. Petiole 0.8–2.3(–3) cm, white floccose-pilose; leaf blade ovate, 3–7 × 1.5–4.5 cm, thin, papery, adaxially sparsely pilose, abaxially densely pilose, base obliquely cordate, margin coarsely crenate-serrate, apex acute. Racemes terminal, axillary, 2.5–7 cm, all above mid stem; bracts petiolate, linear, ca. 2 mm, pilose. Pedicel ca. 3 mm, densely glandular pilose. Fruiting calyx ca. 4 mm, glandular pilose outside; scutellum ca. 2 mm. Corolla not seen. Nutlets black, ca. 2 × 0.5 mm, tuberculate, adaxially umbonate near base. Fr. Jul–Aug.

• Valleys; 1500 m. Shaanxi.

73. *Scutellaria honanensis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 584. 1977.

河南黄芩 he nan huang qin

Herbs perennial, rhizomatous. Stems erect, ca. 70 cm tall, densely antrorse puberulent, unbranched, internodes slightly longer than leaves, ca. 6.5 cm at mid stem. Leaves deciduous basally; petiole ca. 1.5 cm at mid stem; leaf blade lanceolate-ovate, 4–5.5 × 2–5.5 cm, adaxially sparsely puberulent, abaxially very densely purple glandular, veins densely pubescent, base shallowly cordate, margin irregularly serrate, apex acuminate to caudate-acuminate. Racemes terminal and axillary, to 6 cm, few flowered, axillary racemes each with a basal pair of leaves; bracts lanceolate to linear, 0.4–1.3 cm × 1–4 mm, margin remotely dentate to entire. Pedicel to 3 mm, densely glandular puberulent. Calyx ca. 4 mm, densely glandular puberulent outside; scutellum ca. 1.5 mm. Corolla purple, ca. 1.3 cm, glandular pubescent outside,

glabrous inside; tube erect, slightly saccate; middle lobe of lower lip ovate, ca. 4 mm wide, margin subentire; lateral lobes ovate, ca. 1.5 mm wide. Fl. May.

• Hillsides; 500 m. Henan, Hubei.

74. *Scutellaria omeiensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 584. 1977.

峨眉黄芩 e mei huang qin

Herbs perennial, rhizomatous, stoloniferous. Stems erect, 50–100 cm tall, rooting at basal nodes. Petiole to 1.7 cm at mid stem; leaf blade ovate, 2.5–5 × 1.5–3.6 cm, largest at mid stem, papery, sparsely and finely white pilose adaxially and along veins abaxially, base truncate and decurrent, apex acuminate. Racemes terminal and axillary, 3.5–9 cm, few flowered, axillary racemes with a basal pair of leaves; rachis densely puberulent; bracts mostly sessile, ovate, sparsely white puberulent, 4–7 mm, short petiolate basally. Pedicel ca. 3 mm, densely glandular puberulent. Calyx ca. 2.5 mm, ca. 4 mm in fruit, glandular puberulent outside, margin pilose; scutellum well developed, ca. 2.2 mm, erect, obovate, to 5 mm in fruit. Corolla yellow to purple red, 2.2–2.5 cm, glandular pubescent outside, glabrous inside, base slightly bent; upper lip semicircular, ca. 2.8 mm wide; middle lobe of lower lip triangular-ovate, base ca. 4.5 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets unknown. Fl. Jun–Jul, fr. Jul–Aug.

• Subtropical, evergreen broad-leaved forests; 1500–3000 m. Guizhou, Hubei, Sichuan.

- 1a. Stems obtusely 4-angled, subglabrous except densely appressed white pilose on angles, green; leaves crenate 74a. var. *omeiensis*
1b. Stems acutely 4-angled, slightly winged along angles, subglabrous, purple; leaves coarsely acutely serrate or sometimes acutely double serrate 74b. var. *serratifolia*

74a. *Scutellaria omeiensis* var. *omeiensis*

峨眉黄芩 e mei huang qin

Stems obtusely 4-angled, subglabrous except densely appressed white pilose on angles, green. Leaves crenate.

• Subtropical, evergreen broad-leaved forests; 1600–3000 m. Sichuan.

74b. *Scutellaria omeiensis* var. *serratifolia* C. Y. Wu & S. Chow, Fl. Reipubl. Popularis Sin. 65(2): 584. 1977.

锯叶变种 ju ye bian zhong

Stems acutely 4-angled, slightly winged on angles, subglabrous, purple. Leaves coarsely serrate or sometimes double serrate.

• Subtropical broad-leaved forests; 1500–2500 m. Guizhou, Hubei, Sichuan.

Used medicinally.

75. *Scutellaria scandens* D. Don, Prodr. Fl. Nepal. 110. 1825.

棱茎黄芩 leng jing huang qin

Scutellaria angulosa Benth; *S. celtidifolia* A. Hamilton.

Herbs erect. Stems obtusely winged, subglabrous except for pubescent nodes, much branched, nearly finely patent pilose. Petiole 0.4–1 cm, densely fine retrorse pilose; leaf blade ovate, 2.5–5 × 0.5–3 cm, herbaceous, adaxially sparsely strigose, abaxially subglabrous, veins finely pilose, base shallowly cordate to subrotund, margin coarsely crenate, apex acute. Racemes terminal on lateral branches, 10–16 cm. Fruiting pedicel ca. 3 mm, puberulent. Fruiting calyx ca. 4 mm, very sparsely pubescent or subglabrous; scutellum flabellate, ca. 5 mm, slightly reflexed, ciliate. Corolla not seen. Nutlets black-brown, ovoid, ca. 2 × 0.5 mm, tuberculate. Fr. Aug.

- Slopes; 2300 m. Xizang [Nepal].

76. *Scutellaria sessilifolia* Hemsley, J. Linn. Soc., Bot. 26: 297. 1890.

石蜈蚣草 shi wu gong cao

Scutellaria sessilifolia f. *ramiflora* C. Y. Wu & S. Chow;
S. sessilifolia f. *terminalis* C. Y. Wu & S. Chow.

Herbs perennial, rhizomatous, stoloniferous. Stems ascending, trailing at base, 50 cm tall, slightly winged, glabrous, unbranched, base leafless. Leaves sessile or subsessile, ovate, 1.9–3.5 × 0.9–2 cm, ± leathery, adaxially sparsely strigose, abaxially sometimes glabrous, base rounded to slightly amplexicaul or truncate, margin subentire, obscurely 3- or 4-crenate, or remotely acutely serrate, apex acute to caudate-acuminate. Racemes 3–7-flowered, pendent, secund, almost 2 × as long as leaves, in axils of mid stem leaves, sometimes also terminal; bracts ovate-subulate, glandular pubescent. Pedicel ca. 2.5 mm, glandular pubescent. Calyx ca. 2 mm, ca. 3.5 mm in fruit, slightly glandular pubescent; scutellum ca. 1.5 mm, to 3.5 mm in fruit. Corolla purplish to purple red, base white, ca. 1.8 cm, sparsely glandular puberulent outside, glabrous inside; tube base saccate-spurred, spur to 2 mm, throat to 3.5 mm wide; middle lobe of lower lip triangular-ovate, ca. 5 mm wide, apex rounded. Fl. Jun–Aug, fr. Aug–Sep.

- Subtropical valley forests, thickets, wet rocky mountain slopes; 800–2600 m. Sichuan.

77. *Scutellaria caudifolia* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 42. 1966.

尾叶黄芩 wei ye huang qin

Herbs perennial, rhizomatous. Rhizomes robust. Stems erect, 30–45 cm tall, angles slightly winged, purplish, with 4–9 pairs of leaves, internodes to as long as leaves. Petiole 4–7 mm; leaf blade ovate-oblong to oblong-lanceolate, ca. 5–8 × 2–3.5 cm, membranous or thin papery, base shallowly cordate, sometimes obliquely so, margin irregularly crenate, apex caudate-acuminate. Racemes axillary and terminal, 6–14-flowered, ca. 4–10 cm, axillary racemes with 2–4 pairs of reduced lower leaves; bracts gradually reduced upward, sessile, caudate-acuminate, margin ciliolate upward. Pedicel ca. 2.5–3 mm, densely glandular pubescent. Calyx ca. 2 mm, pubescent, to 3.5 mm in fruit; scutellum ca. 1.2 mm, to 2.5 mm, conspicuously netted in fruit. Corolla purplish, ca. 2.2 cm, sparsely glandular puberulent outside, glabrous inside; tube base saccate-spurred, to 3 mm wide, throat abruptly dilated to 5 mm wide; upper lip subcircular; middle lobe of lower lip triangular-ovate, to 5 mm wide, apex emarginate; lateral lobes ovate to circular. Nutlets unknown. Fl. Jun - Aug.

- Forest margins, slopes, hillside thickets; 900–1700 m. Guizhou, Sichuan.

- 1a. Plants glabrous or subglabrous; leaves papery, glabrous or very sparsely strigose, margin 9–15-crenate, base shallowly cordate; bracts ovate-orbicular; lateral lobes of lower lip of corolla ovate, apex round 77a. var. *caudifolia*
- 1b. Plants pilose; leaves membranous, sparsely appressed white pilose, 18-crenate or more, base obliquely shallowly cordate; bracts ovate-lanceolate; lateral lobes of lower lip of corolla circular, apex emarginate 77b. var. *obliquifolia*

77a. *Scutellaria caudifolia* var. *caudifolia*

尾叶黄芩 wei ye huang qin

Plants glabrous or subglabrous. Leaves thin, papery, base shallowly cordate, glabrous or sparsely strigose, margin 9–15-crenate. Bracts ovate-orbicular. Lateral lobes of lower lip of corolla ovate, apex rounded.

- Forest margins, slopes; 900–1700 m. Guizhou, Sichuan.

77b. *Scutellaria caudifolia* var. *obliquifolia* C. Y. Wu & S. Chow, Fl. Reipubl. Popularis Sin. 65(2): 585. 1977.

斜叶变种 xie ye bian zhong

Plants pilose. Leaves membranous, base obliquely and shallowly cordate, sparsely appressed white pilose, margin 18-crenate or more. Bracts ovate-lanceolate. Lateral lobes of lower lip of corolla circular, apex emarginate.

- Hillside thickets; 1300 m. Sichuan (Xingwen Xian).

78. *Scutellaria delavayi* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 221. 1911.

方枝黄芩 fang zhi huang qin

Scutellaria sessilifolia Hemsley var. *delavayi* (H. Léveillé) Doan.

Herbs perennial. Stems erect, 25–60 cm tall, angles slightly winged, glabrous except nodes sometimes puberulent, much branched. Petiole 1–3 mm, glabrous; leaf blade ovate to lanceolate, 2–7 × 1.3–3 cm, papery, glabrous, base broadly cuneate to roundish, margin remotely undulate-denticulate, apex caudate-acuminate. Racemes terminal or abruptly reflexed and axillary; rachis puberulent; bracts conspicuous, ovate to lanceolate, 3–8 mm, glabrous, margin entire. Pedicel ca. 3 mm, puberulent, sometimes also pubescent. Calyx ca. 3 mm, finely puberulent outside, to 5 mm in fruit; scutellum ca. 1.5 mm, to 4.5 mm in fruit. Corolla cream yellow to white, ca. 2.3 cm, sparsely glandular pubescent outside, glabrous inside; tube base saccate, throat to 6 mm wide; middle lobe of lower lip triangular-ovate, to 8 mm wide at base, apex emarginate; lateral lobes narrowly triangular. Nutlets black, ovoid, ca. 1 mm in diam., tuberculate, adaxially umbonate on base. Fl. Apr–May, fr. May–Jun.

- Subtropical, montane, broad-leaved forests, thickets; 1000–1600 m. Hunan, Sichuan, Yunnan.

79. *Scutellaria galericulata* Linnaeus, Sp. Pl. 2: 599. 1753.

盔状黄芩 kui zhuang huang qin

Herbs perennial, rhizomatous. Stems erect, 35–40 cm tall, slightly grooved, glabrous except for sparsely retrorse pubescent angles, leafless basally, much branched upward.

Petiole 2–7 mm; leaf blade oblong-lanceolate, 1.5–6 × 0.8–3 cm, larger basally, membranous to papery, pubescent, base shallowly cordate, margin crenate-serrate, apex acute. Flowers axillary on apical part of stem, secund; pedicel ca. 2 mm, densely retrorse pubescent. Calyx ca. 3.5 mm, densely white pubescent outside, to 5 mm in fruit; scutellum ca. 0.8 mm, erect, to 1.5 mm in fruit. Corolla purple to blue, ca. 1.8 cm, glandular pubescent outside, lips partly puberulent; tube base slightly saccate, throat 3.5–5 mm wide; upper lip semicircular, ca. 2.5 mm wide; middle lobe of lower lip triangular-ovate, apex emarginate; lateral lobes oblong, ca. 1.5 mm wide. Nutlets yellow, triquetrous, ovoid, ca. 1 mm in diam., tuberculate, adaxially umbonate at middle. Fl. Jun-Jul, fr. Jul-Aug.

Alluvial soils; 400–1100 m. Nei Mongol, Shaanxi, Xinjiang [Japan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe, North America].

80. *Scutellaria regeliana* Nakai, Bot. Mag. (Tokyo) 35: 197. 1921.

狭叶黄芩 xia ye huang qin

Herbs perennial, rhizomatous, stoloniferous. Stems erect, 26–30 cm tall, occasionally with long prostrate branches from base. Petiole 0.5–1 mm, densely short hairy; leaf blade lanceolate to triangular-lanceolate, 1.7–3.3 cm × 3–6 mm, base shallowly cordate to subtruncate, margin entire and involute, apex obtuse. Flowers axillary on apical part of stem, secund. Pedicel ca. 4 mm, densely puberulent. Calyx ca. 4 mm, densely pubescent outside, to 6 mm in fruit; scutellum ca. 0.5 mm, to 1 mm in fruit. Corolla purple, 2–2.5 cm, pubescent outside, apically sparsely pilose inside, throat to 8 mm wide; middle lobe of lower lip suboblate, ca. 9 mm wide, margin entire; lateral lobes oblong, ca. 3.5 mm wide. Nutlets yellow-brown, ovoid, ca. 1.25 × 1 mm, tuberculate, adaxially umbonate at base. Fl. Jun-Jul, fr. Jul-Sep.

• Riverbanks, marshy areas; 500–1000 m. Hebei, Heilongjiang, Jilin, Nei Mongol [Korea, Mongolia, Russia].

- 1a. Stems with upwardly curved hairs especially on angles; adaxial leaf surface densely strigose, abaxial surface densely puberulent and sparsely fine granular glandular 80a. var. *regeliana*
- 1b. Stems with appressed very short hairs only on angles; adaxial leaf surface glabrous or sparsely fine strigose, abaxial surface sparsely fine granular glandular, veins and margin with appressed, very short hairs 80b. var. *ikonnikovii*

80a. *Scutellaria regeliana* var. *regeliana*

狭叶黄芩 xia ye huang qin

Scutellaria galericulata Linnaeus var. *angustifolia* Regel; *S. angustifolia* (Regel) V. Komarov.

Stems with upwardly curved hairs especially along angles. Leaves adaxially densely strigose, abaxially densely puberulent, fine sparsely granular glandular.

• Riverbanks, marshy areas; 500–1000 m. Hebei, Heilongjiang, Jilin, Nei Mongol [Korea, Russia].

80b. *Scutellaria regeliana* var. *ikonnikovii* (Juzepczuk) C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 226. 1977.

塔头变种 ta tou bian zhong

Scutellaria ikonnikovii Juzepczuk, Bot. Mater Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 14: 358. 1951; *S. angustifolia* (Regel) V. Komarov, p.p.

Stems with appressed, very short pubescence only on angles. Leaves glabrous or adaxially sparsely fine strigose, abaxially with appressed, very short pubescence on veins and margin, otherwise sparsely fine granular glandular.

• Riverbanks, marshy sedge-grasslands; 500 m. Heilongjiang, Jilin, Nei Mongol [Mongolia, Russia].

81. *Scutellaria linarioides* C. Y. Wu, Fl. Yunnan. 1: 564. 1977.

长叶并头草 chang ye bing tou cao

Herbs rhizomatous perennials, woody, branched, 12–35 cm tall. Stems purplish, glabrous to sparsely pubescent or subglabrous upward, unbranched. Leaves sessile to subsessile, oblong to narrowly lanceolate, 1.5–3.3 cm × 2–5(–7) mm, yellow glandular, subglabrous or abaxially sparsely pubescent only on veins, base attenuate, margin entire or 1-serrulate and involute, apex rounded to somewhat obtuse. Racemes poorly defined, terminal, secund, obliquely spreading upward; floral leaves linear, 0.8–2.5 cm; bracteoles needlelike, ciliolate, inserted on apical 1/3 of pedicels in pairs. Flowers axillary. Pedicel 1.5–2.5 mm, finely puberulent. Calyx 2–2.5 mm, finely puberulent, to 4 mm in fruit; scutellum ca. 1 mm, to 2 mm in fruit. Corolla purple-red, 2–2.2 cm, densely puberulent outside, pilose on conjunctive parts of upper lip and lateral lobes of lower lip inside; tube slightly saccate in front at base, ca. 1.5 mm in diam., gradually dilated to 4 mm at throat; upper lip ca. 2.5 mm; middle lobe of lower lip broadly triangular, to 7 mm wide, margin subentire; lateral lobes triangular-ovate, ca. 2 mm wide. Nutlets unknown. Fl. Mar-Jul, fr. Apr-Aug.

• Wet slopes; 1200 m. Sichuan, Yunnan.

82. *Scutellaria dependens* Maximowicz, Prim. Fl. Amur. 219. 1859.

纤弱黄芩 qian ruo huang qin

Scutellaria nipponica Franchet & P. A. L. Savatier; *S. oldhamii* Miquel.

Herbs rhizomatous. Stems ± erect, 15–35 cm tall, glabrous or sparsely pubescent on angles, unbranched or few branched from base. Petiole 0.8–4 mm, puberulent or subglabrous; leaf blade ovate-triangular to triangular, 0.5–2.4 cm × 3–12 mm, membranous, adaxially sparsely puberulent, abaxially puberulent only on veins, base shallowly cordate to truncate-cordate, margin irregularly and shallowly 1–3-dentate to subentire and ciliolate, apex obtuse to rounded. Racemes poorly defined, terminal, obliquely spreading upward initially, becoming pendent; bracteoles needlelike, ca. 0.75 mm, inserted at base of pedicels in pairs. Flowers axillary. Pedicel 2–3 mm, appressed puberulent. Calyx 1.8–2 mm, conspicuously veined, ciliolate on veins and margin, to 4 mm in fruit; scutellum ca. 1 mm, to 2 mm in fruit. Corolla white or white with purple on lower lip, 5–6.5 mm, puberulent outside, pilose only on middle of lower lip inside; tube slightly curved; middle lobe of lower lip spreading upward, trapeziform, ca. 1.5 × 2–2.5 mm, apex emarginate; lateral lobes triangular-ovate, slightly longer than upper lip. Nutlets yellow-brown, ovoid, ca. 0.7 × 0.5 mm, tuberculate, adaxially slightly swollen, umbonate near base. Fl. and fr. Jun-Sep.

• Streamsides, wet areas in larch forests; to 300 m. Heilongjiang, Jilin, Nei Mongol, Shandong [Japan, Korea, Russia].

83. *Scutellaria shansiensis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 586. 1977.

山西黄芩 shan xi huang qin

Herbs rhizomatous. Stems erect, 14–20 cm tall, ca. 1 mm in diam., sparsely pilose along angles, unbranched. Petiole 1.5–7 mm, pilose; leaf blade cordate, 0.7–1.3 × 0.8–1.2 cm, thin papery, pilose, base shallowly cordate, margin 4- or 5-crenate-serrate, apex obtuse to acute. Bracteoles needlelike, less than 0.5 mm, inserted at base of pedicels in pairs. Flowers axillary. Pedicel ca. 3 mm, pilose. Calyx ca. 3 mm, finely pilose; scutellum ca. 0.3 mm. Corolla purplish, 9–10 mm, puberulent outside, sparsely pilose only on lower lip inside; tube slightly curved, ca. 1.5 mm wide, gradually dilated to 3.5 mm wide at throat; middle lobe of lower lip spreading upward, trapeziform, ca. 3.5 × 5 mm, apex emarginate; lateral lobes ovate, almost as long as upper lip. Fl. May–Jun.

• Shady areas in valleys; 1500 m. Shanxi.

84. *Scutellaria barbata* D. Don, Prodr. Fl. Nepal. 109. 1825.

半枝莲 ban zhi lian

Scutellaria adenophylla Miquel; *S. cavaleriei* H. Léveillé & Vaniot; *S. komarovii* H. Léveillé & Vaniot; *S. minor* Linnaeus var. *indica* Benth; *S. rivularis* Wallich ex Benth.

Stems erect, 12–35(–55) cm tall, glabrous or sparsely appressed pubescent upward. Petiole 1–3 mm, concave-convex, sparsely pubescent; leaf blade triangular-ovate to ovate-lanceolate, 1.3–3.2 × 0.5–1(–1.4) cm, subglabrous to sparsely appressed pubescent along veins, base broadly cuneate to subtruncate, margin remotely and obtusely shallow dentate, apex acute. Racemes poorly defined, terminal; floral leaves similar to stem leaves, to 8 mm basally, much reduced and elliptic to narrowly elliptic upward, adaxially sparsely pubescent, abaxially sparsely pubescent only on veins; bracteoles needlelike, ca. 0.5 mm, inserted at middle of pedicels. Flowers axillary. Pedicel 1–2 mm, puberulent. Calyx ca. 2 mm, puberulent along veins outside, margin ciliate, to 4.5 mm in fruit; scutellum ca. 1 mm, to 2 mm in fruit. Corolla purple blue, 0.9–1.3 cm, pubescent outside, sparsely pilose on throat inside; tube saccate in front at base, ca. 1.5 mm wide at middle, gradually dilated to 3.5 mm wide at throat; upper lip semicircular, ca. 1.5 mm; middle lobe of lower lip trapeziform, ca. 2.5 × 4 mm, margin entire; lateral lobes triangular-ovate, ca. 1.5 mm wide, apex acute. Nutlets brown, oblate, ca. 1 mm in diam., warty. Fl. and fr. Apr–Jul.

• Margins of rice paddies, streamsides, wet grasslands; to 2000 m. Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [India, Japan, Korea, Laos, Myanmar, Nepal, Thailand, Vietnam].

Used medicinally for traumatic injuries and to reduce inflammation caused by various diseases.

85. *Scutellaria scordifolia* Fischer ex Schrank, Denkschr. Bayer. Bot. Ges. Regensburg 2: 55. 1822.

并头黄芩 bing tou huang qin

Herbs rhizomatous. Stems purplish, erect, 12–36 cm tall, subglabrous to upwardly curved pubescent or densely strigose especially upward. Petiole 1–3 mm, pubescent; leaf blade

linear to triangular-ovate, 1.5–3.8 × 0.2–1.4 cm, adaxially glabrous, densely strigose, or densely appressed pubescent, abaxially sparsely appressed puberulent except on veins or sparsely pubescent along midrib and veins, sometimes subglabrous, glandular or not, margin shallowly dentate or occasionally subentire. Racemes poorly defined, terminal, secund; bracteoles needlelike, ca. 1 mm, inserted near base of pedicels in pairs. Flowers axillary. Pedicel 2–4 mm, pubescent. Calyx 3–4 mm, pubescent outside, ciliate, to 4.5 mm in fruit; scutellum ca. 1 mm, to 2 mm in fruit. Corolla blue-purple, 2–2.2 cm, pubescent outside, glabrous inside; tube saccate-geniculate in front, base ca. 2 mm wide, gradually dilated to 6.5 mm wide at throat; middle lobe of lower lip circular-ovate, ca. 7 mm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide, apex emarginate. Nutlets black, ellipsoid, ca. 1.5 × 1 mm, tuberculate, adaxially umbonate near base. Fl. Jun–Aug, fr. Aug–Sep.

• Deciduous broad-leaved forests, pine forests, marshy grasslands, grassy slopes; to 2100 m. Gansu, Hebei, Heilongjiang, Henan, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shanxi [Japan, Mongolia, Russia].

- 1a. Stems subglabrous or hairy only on angles.
 - 2a. Stems subglabrous or angles with sparse, upwardly curved puberulent hairs; leaves triangular-ovate to lanceolate, 4–14 mm wide.
 - 3a. Adaxial leaf surface glabrous 85a. var. *scordifolia*
 - 3b. Adaxial leaf surface sparsely appressed puberulent 85b. var. *puberula*
- 2b. Stem angles sparsely retrorse puberulent; leaves lanceolate-linear to linear, 0.2–0.6 cm wide 85d. var. *ammophila*
- 1b. Stems uniformly densely strigose or upwardly curved pubescent especially apically.
 - 4a. Stems and adaxial leaf surfaces densely strigose 85c. var. *wulingshanensis*
 - 4b. Stems and adaxial leaf surfaces densely appressed pubescent 85e. var. *villosissima*

85a. *Scutellaria scordifolia* var. *scordifolia*

并头黄芩 bing tou huang qin

Scutellaria galericulata Linnaeus var. *scordifolia* Regel; *S. scordifolia* f. *glabrescens* Franchet; *S. scordifolia* var. *subglabra* V. Komarov.

Stems subglabrous or with sparse, upwardly curved, puberulent hairs on angles. Leaves triangular-ovate to lanceolate, 4–14 mm wide, adaxially glabrous, abaxially sparsely pubescent only on midrib and veins, sometimes subglabrous.

• Marshy grasslands; to 2100 m. Hebei, Heilongjiang, Nei Mongol, Qinghai, Shanxi [Japan, Mongolia, Russia].

Rhizome used medicinally; leaves used as tea.

85b. *Scutellaria scordifolia* var. *puberula* Regel ex V. Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 25: 344. 1907.

微柔毛变种 wei rou mao bian zhong

Stems with dense, upwardly curved puberulent hairs on angles. Leaves triangular-ovate to lanceolate, 4–14 mm wide, sparsely appressed puberulent except on veins of abaxial surface.

• Grassy slopes, marshy grasslands; to 1400 m. Hebei, Heilongjiang, Nei Mongol, Shanxi.

85c. *Scutellaria scordifolia* var. *wulingshanensis* (Nakai & Kitagawa) C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 233. 1977.

雾灵山变种 wu ling shan bian zhong

Scutellaria wulingshanensis Nakai & Kitagawa, Rep. Exped. Manchoukuo Sect. IV, 1: 53. 1934.

Stems densely strigose. Leaves triangular-ovate to lanceolate, 4–14 mm wide, adaxially densely strigose.

• Deciduous broad-leaved forests; 1500–1700 m. Hebei, Shanxi.

85d. *Scutellaria scordifolia* var. *ammophila* (Kitagawa) C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 234. 1977.

喜沙变种 xi sha bian zhong

Scutellaria scordifolia var. *subglabra* V. Komarov f. *ammophila* Kitagawa, Lin. Fl. Manshur. 386. 1939.

Stems sparsely retrorse puberulent only on angles. Leaves linear-lanceolate to linear, 1.4–4 cm × 2–6 mm, adaxially glabrous, abaxially sparsely puberulent on veins, densely impressed glandular, margin entire to remotely few crenate, apex obtuse.

• Hebei, Heilongjiang, Liaoning, Nei Mongol, Shaanxi.

85e. *Scutellaria scordifolia* var. *villosissima* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 234. 1977.

多毛变种 duo mao bian zhong

Stems with dense, upwardly curved pubescence especially apically and on angles. Leaves triangular-ovate to lanceolate, 4–14 mm wide, densely appressed pubescent.

• Grassy slopes, pine forests; 1500–1900 m. Gansu, Henan, Qinghai, Shaanxi, Shanxi.

86. *Scutellaria strigillosa* Hemsley, J. Linn. Soc., Bot. 26: 297. 1890.

沙滩黄芩 sha tan huang qin

Scutellaria schmidtii Kudô; *S. scordifolia* Fischer ex Schrank var. *hirta* F. Schmidt; *S. taquetii* H. Léveillé & Vaniot.

Herbs perennial. Rhizomes producing stolons from nodes. Stems purplish, erect to slightly curved, 8–24(–35) cm tall, sparsely and upwardly curved strigose-pubescent to hirsute especially on nodes and angles. Petiole 5–6.5 mm basally, 1–2 mm upward, hirsute; leaf blade elliptic, rarely narrowly elliptic, 1–2.5 cm × 3–15 mm, thin, papery, densely appressed strigose-hirsute, abaxially densely impressed glandular, base shallowly cordate to subtruncate, margin shallowly obtuse dentate, sometimes serrate to subentire, apex obtuse to rounded. Racemes poorly defined, terminal; bracteoles needlelike, ca. 1 mm, inserted on basal 1/4 of pedicels. Flowers axillary. Pedicel 2.5–3.5(–5) mm, densely appressed pubescent. Calyx 3–3.5 mm, densely strigose-hirsute, to 6 mm in fruit; scutellum inconspicuous, less than 1 mm, ca. 1.5 mm in fruit. Corolla purple, 1.6–1.8(–2.4) cm, glandular pubescent outside, glabrous inside; tube slightly saccate in front at base, 1.5(–2.5) mm wide at middle, gradually dilated upward, to 5(–6) mm wide at throat; middle

lobe of lower lip longer than upper lip, broadly ovate, ca. 8 mm wide, apex emarginate; lateral lobes shorter than upper lip, narrowly ovate, apex subtruncate. Nutlets yellow-brown, subglobose, ca. 1.25 mm in diam., densely tuberculate, adaxially umbonate. Fl. and fr. May–Oct.

• Beaches. Hebei, Jiangsu, Liaoning, Shandong, Zhejiang [Japan, Korea, Russia].

87. *Scutellaria tuminensis* Nakai, Bot. Mag. (Tokyo) 35: 198. 1921.

图们黄芩 tu men huang qin

Rhizomes white. Stems purple, to 35 cm tall, finely pilose, pubescent on nodes. Leaves short petiolate to subsessile, ovate to oblong-ovate, 2–3 × ca. 1.3 cm, fine glandular abaxially, base obscurely subhastate, white hirtellous, apex somewhat obtuse. Flowers solitary, axillary. Pedicel ca. 2 mm, spreading glandular villous. Calyx obconical-campanulate, spreading glandular villous, 4–5 mm. Corolla purple-blue, 1.4(–2.5) mm; tube narrow, gradually dilated, glandular pubescent outside; lower lip longer than upper lip. Stamens slightly exerted; anthers pilose (no material seen).

• Riverside grasslands; to 600 m. Jilin (Tumen Jiang) [Russia].

88. *Scutellaria moniliorrhiza* V. Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 25: 346. 1907.

念珠根茎黄芩 nian zhu gen jing huang qin

Herbs perennial. Rhizomes white, moniliform with tuberlike internodes to 6 mm in diam., stoloniferous. Stems purplish, erect, (12–)20–36 cm tall, glabrous except for white pilose nodes. Petiole 1.5–4 mm, white pilose on margin of groove of abaxial side, glabrous abaxially; leaf blade ovate to ovate-oblong, 0.8–2.3 cm × 3–13 mm, adaxially glabrous or sparsely white pilose, abaxially purplish, sparsely pilose on veins otherwise densely glandular, base rounded to shallowly cordate, margin 3–7-crenate, apex acute to obtuse. Racemes poorly defined, terminal; bracteoles linear, inserted on basal 1/3 of pedicels in pairs. Flowers few, axillary. Pedicel ca. 4 mm, sparsely pubescent. Calyx 3(–4) mm, glabrous or slightly puberulent, white pilose along margin, slightly enlarged, to 5 mm in fruit; scutellum ca. 1 mm, ca. 1.5 mm in fruit. Corolla blue, ca. 3.2 cm, puberulent outside, white villous on conjunctive parts of upper lip and lateral lobes of lower lip inside; tube saccate in front at base, ca. 2 mm wide at middle, gradually dilated to 8 mm wide at throat; middle lobe of lower lip subcircular, to 1 cm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide, apex emarginate. Nutlets brownish, ellipsoid, ca. 1 × 0.75 mm, tuberculate. Fl. Jul–Aug, fr. Aug–Sep.

• Gravelly springsides, grassy places, marshes. 1000 m. Jilin [Korea, Russia].

89. *Scutellaria sieversii* Bunge, Fl. Altaic. 2: 394. 1830.

宽苞黄芩 kuan bao huang qin

Scutellaria albertii Juzepczuk; *S. krylovii* Juzepczuk; *S. soongorica* Juzepczuk; *S. soongorica* var. *grandiflora* C. Y. Wu & H. W. Li; *S. transiliensis* Juzepczuk.

Subshrubs perennial. Rhizomes woody. Stems purplish, 9–32 cm tall, ascending, erect to curved, sometimes flexuous, branched basally, sparsely and finely minute tomentose. Petiole 2–13 mm, sparsely fine minute tomentose; leaf blade broadly ovate to elliptic, 0.6–2.2 × 0.5–1.5 cm, adaxially sparsely fine tomentose, abaxially densely appressed white or

gray tomentose, lateral veins inconspicuous to slightly conspicuous abaxially, base truncate to obtuse, margin 4–6-incised-serrate, apex obtuse. Racemes 2.5–12 cm, somewhat lax after anthesis; bracts ovate to broadly ovate, attenuate on both extremes, to 1.5 × 1 cm, ± membranous, sparsely or densely villous, intermixed with few short stipitate glandular hairs, apex subacute. Calyx ca. 2 mm, densely villous outside, glandular hairy, to 4.5 mm in fruit; scutellum ca. 1 mm, to 3.5 mm in fruit. Corolla yellow or yellowish, 2.2–3 cm, stipitate glandular outside; tube saccate in front at base, ca. 1.3 mm wide at middle, to 5 mm wide at throat; middle lobe of lower lip broadly ovate, apex emarginate, lateral lobes ovate. Nutlets 1.5–2 mm. Fl. May–Aug, fr. Aug–Sep.

• Dry gravelly sunny slopes; 700–1000 m. Xinjiang [Kazakhstan, Russia].

90. *Scutellaria przewalskii* Juzepczuk, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 14: 400. 1951.

深裂叶黄芩 shen lie ye huang qin

Subshrubs perennial. Rhizomes woody, to 1.5 cm in diam., flexuous. Stems purplish, numerous, 6–22 cm tall, ascending to subprostrate, flexuous, ca. 1.5 mm in diam., sparsely fine minute tomentose. Petiole (1.5–)5–10(–14) mm, flat, narrowly winged, tomentose; leaf blade ovate to elliptic, (0.6–)1.2–2.2 × (0.4–)0.8–1.5(–2.2) cm, adaxially sparsely tomentose, abaxially densely gray tomentose, lateral veins conspicuously impressed adaxially, base subtruncate, margin 4–7-pinnatifid, apex acute; segments fingerlike, 2–6(–8) × ca. 1 mm. Racemes 2.5–5 cm, to 7 cm in fruit; bracts purplish upward, broadly ovate, (8–)12–15 cm × 6–10 mm, ± membranous, apex acute to acuminate, villous sometimes intermixed with short-stipitate glandular hairs, apex acute to acuminate. Pedicel ca. 5 mm, villous. Calyx ca. 2 mm, villous outside, stipitate glandular hairy, ca. 4 mm in fruit; scutellum ca. 1.5 mm, ca. 4 mm in fruit. Corolla yellow or yellow with purple on limb, 2.5–3.3 cm, pilose outside, short stipitate glandular hairy; tube saccate in front at base, ca. 1.5 mm wide at middle, gradually dilated upward, to 7 mm wide at throat; middle lobe of lower lip broadly ovate, apex emarginate; lateral lobes ovate. Nutlets triquetrous, ovoid, ca. 1.5 × 1 mm, densely gray tomentose, adaxially umbonate at basal 1/3. Fl. Jun–Aug, fr. Jul–Sep.

• Grasslands, dry gravelly open slopes, riverbank terraces, dry valleys; 900–2300 m. Gansu, Xinjiang [Kyrgyzstan].

91. *Scutellaria supina* Linnaeus, Sp. Pl. 2: 598. 1753.

仰卧黄芩 yang wo huang qin

Scutellaria irregularis Juzepczuk; *S. tschimganica* Juzepczuk.

Subshrubs. Rhizomes woody. Stems yellowish green or slightly purplish, numerous, 10–45 cm tall, ascending to suberect, ± appressed retrorse pubescent, spreading villous especially upward. Leaves petiolate to subsessile; basal petioles to 1.5 cm, upper ones ca. 1/2 as long as blades and pubescent as stems; leaf blade oblong-ovate to ovate, 1–4 × 0.6–2 cm, adaxially sparsely pilose or hirsute, abaxially sparsely pilose or hirsute along veins otherwise glandular, lateral veins impressed adaxially, base broadly cuneate to shallowly cordate, margin shallowly 3–7-crenate-serrate, apex obtuse to sometimes acute. Racemes ca. 3 cm, lax; basal bracts ovate, to 1.4 × 0.9 cm, sparsely villous, stipitate glandular on veins and margin otherwise subglabrous, apex acute; upper bracts purple-red. Pedicel 2–3 mm, flat. Calyx

ca. 2 mm, villous outside, short stipitate glandular; scutellum 3 mm. Corolla yellow, 2.2–3.5 cm, glandular pubescent outside; tube bent in front at base, ca. 2 mm wide at middle, gradually dilated to 6 mm wide at throat; upper lip ca. 6 mm wide; middle lobe of lower lip broadly ovate, ca. 7 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm. Nutlets triquetrous, ovoid, ca. 1.5 mm. Fl. Aug, fr. Sep.

• Hilltop grasslands; 1900 m. Xinjiang [Kazakhstan, Mongolia, Russia].

92. *Scutellaria prostrata* Jacquemont ex Benth, Labiat. Gen. Spec. 733. 1835.

平卧黄芩 ping wo huang qin

Herbs perennial. Rhizomes woody. Stems few, ca. 10 cm tall, ascending, sparsely puberulent. Leaves subsessile upward, narrowly ovate, 1.5–1.7 cm × 7–9 mm, adaxially sparsely puberulent, abaxially subglabrous and glandular, base cuneate, margin remotely serrate, apex acuminate. Verticillasters numerous, crowded in terminal spikes ca. 6 cm; floral leaves broadly ovate, papery, densely pilose, long ciliate, margin subentire to slightly 1- or 2-serrate, apex acuminate. Pedicel ca. 3 mm, densely pilose. Calyx ca. 2 mm, pubescent outside; scutellum to 3 mm. Corolla yellowish, purplish on upper lip and lateral lobes of lower lip, purple spotted on middle lobe of lower lip, ca. 3 cm; tube pubescent outside, glabrous inside, slightly bent in front at base, ca. 3 mm wide at middle, gradually dilated to 5 mm wide at throat; middle lobe of lower lip subcircular, puberulent outside, glabrous inside, apex emarginate; lateral lobes near upper lip. Nutlets unknown.

• Slopes. Xinjiang (Kashi Shi) [India].

Kamelin (in litt.) believes that the taxon described here should be called *Scutellaria grandiflora* Sims (Bot. Mag. 17: t. 635. 1803). Plants from Kashi, Xinjiang, with subentire to 1- or 2-serrate bracts and less hairy leaves differ somewhat from the original description. They may represent a local variant of the species.

93. *Scutellaria oligodonta* Juzepczuk, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 14: 370. 1951.

少齿黄芩 shao chi huang qin

Subshrubs perennial. Rhizomes woody, branched, producing numerous stems. Stems purplish, 6–20 cm tall, ascending to suberect, flexuous to nearly straight, sparsely retrorse strigose, ± spreading pilose, stipitate glandular upward. Petiole 2–5 mm, strigose; leaf blade ovate, (0.4–)0.9–1.8 × (0.2–)0.5–1.5 cm, sparsely strigose, stipitate glandular, base rounded to broadly cuneate, margin 1–4-crenate-serrate to occasionally entire, apex obtuse to slightly obtuse. Racemes 3–5.5 cm, compact; bracts ovate-elliptic to broadly elliptic, ca. 1.5 × 1 cm basally, ± herbaceous, densely spreading villous outside, stipitate glandular, base broadly cuneate, margin entire or 1- or 2-serrate basally, apex subobtuse to acute. Pedicel to 4 mm, flat, densely pubescent. Calyx ca. 2 mm, densely villous outside, stipitate glandular; scutellum ca. 3 mm. Corolla yellowish except for purplish apex of upper lip and lateral lobes of lower lip, purple spotted on lower lip, 2.5–3 cm, densely pilose outside, stipitate glandular; tube bent in front at base, ca. 2 mm wide at middle, gradually dilated to 6 mm wide at throat; upper lip ca. 6 mm wide; middle lobe of lower lip subcircular, ca. 1 cm wide, apex emarginate; lateral lobes near upper lip, ovate, ca. 2.5 mm wide. Nutlets unknown. Fl. Jul–Aug.

• Grassy slopes, alpine grasslands, riverbank terraces; 2500–2600 m. Xinjiang [Kyrgyzstan].

Kamelin (in litt.) believes that the taxon described here should be called *Scutellaria paulsenii* Briquet (Bot. Tidsskr. 28: 233. 1908) and that true *S. oligodonta* has been included in *S. orthotricha* (species 95 in this account).

94. *Scutellaria altaica* Fischer ex Sweet, Brit. Flow. Gard. 45. 1823–25.

阿尔泰黄芩 a er tai huang qin

Scutellaria altaicola C. Y. Wu & H. W. Li; *S. lupulina* Linnaeus var. *violacea* Bunge.

Subshrubs perennial, ca. 25 cm tall. Rhizomes woody, to 1 cm in diam., tortuous. Stems numerous, base woody, prostrate to ascending, much branched; branches dark purple, tortuous, sparsely floccose pubescent, glandular. Petiole 3–12 mm, flat, finely pubescent; leaf blade ovate, 1–2 × 0.8–1.2 cm, adaxially sparsely pubescent, abaxially finely appressed pubescent, base broadly cuneate, margin irregularly coarsely 4–6-dentate to crenate, teeth oblong and acute to obtuse, apex acute. Racemes 3–3.5 cm; bracts largest basally, gradually reduced upward, broadly ovate, to 1.6 × 1.2 cm, pubescent, short stipitate glandular along veins and margin outside, apex short acuminate. Pedicel ca. 2 mm. Calyx ca. 3 mm, densely pubescent outside, glandular, to 4 mm in fruit; scutellum ca. 2 mm, to 4 mm in fruit. Corolla yellowish, 2.2–2.5 cm, pubescent outside, glandular; tube saccate-geniculate in front at base, ca. 2 mm wide at basal 1/3, gradually dilated to 6 mm wide at throat; upper lip ca. 5 mm wide; middle lobe of lower lip broadly ovate, ca. 8 mm wide, apex emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets triquetrous, ovoid, ca. 1.5 × 0.75 mm, abaxially umbonate, densely gray tomentose. Fl. Jul–Aug, fr. Aug.

• Slopes; 1600–2500 m. Xinjiang.

Kamelin (in litt.) believes that this plant is not true *Scutellaria altaica*, which has a violet corolla, but rather *S. irregularis* Juzepczuk (Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 14: 369. 1951).

95. *Scutellaria orthotricha* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 587. 1977.

展毛黄芩 zhan mao huang qin

Subshrubs perennial, 10–15(–20) cm tall. Rhizomes woody, to 7 mm in diam., brown, much branched. Stems numerous, densely spreading pilose-pubescent. Petiole 0.5–1.7 cm, longest basally, densely pilose; leaf blade ovate, (0.7–)1.3–2 × (0.4–)0.8–1.5 cm, adaxially sparsely appressed pilose, abaxially sparsely pubescent along veins otherwise subglabrous and glandular, base broadly cuneate, margin irregularly 2–5-crenate, teeth gradually larger and obtuse apically, apex obtuse. Racemes 2.5–3 cm; bracts ovate to broadly obovate, to 1.7 × 1.2 cm basally, ± densely spreading pilose, short stipitate glandular on veins and margin otherwise subglabrous, margin 2- or 3-dentate on apical half, upper bracts entire, apex short acuminate. Pedicel ca. 3 mm, flat, densely spreading pilose, stipitate glandular. Calyx ca. 2 mm, densely pilose outside, short stipitate glandular, to 4 mm in fruit; scutellum ca. 3 mm, to 3.5 mm in fruit. Corolla yellowish with purple spots, ca. 3 cm, pubescent outside, stipitate glandular; tube bent at base, ca. 1.5 mm wide at middle, gradually dilated to 6 mm wide at throat; upper lip ca. 6 mm wide; middle lobe of lower lip broadly ovate, ca. 1 cm wide, apex emarginate; lateral lobes ovate, ca. 3 mm wide.

Nutlets triquetrous, ovoid, ca. 1.25 × 1 mm, white tomentose, adaxially umbonate at base. Fl. Jun–Aug, fr. Jul–Sep.

• Slopes; 1200–1300 m. Xinjiang.

Kamelin (in litt.) believes that this species is conspecific with *Scutellaria oligodonta* Juzepczuk.

96. *Scutellaria tuberifera* C. Y. Wu & C. Chen, Fl. Yunnan. 1: 566. 1977.

假活血草 jia huo xue cao

Herbs. Rhizomes with long stolons, terminated in a globose to ovoid tuber 5–8 mm in diam. Stems erect to ascending, 10–25(–30) cm tall, densely spreading pilose. Petiole 0.4–1.5 cm, 3–15 cm basally, flat, densely, spreading pilose; leaf blade circular-ovate to lanceolate-ovate, or reniform, 1–1.8(–2.4) × 1.2–1.5(–2) cm, 0.5–1 × 0.8–1.3 cm basally, herbaceous, sparsely appressed pilose, abaxially glaucous, palmately veined, base subtruncate to deeply cordate, margin ± regularly 4–7-crenate, apex obtuse to rounded. Bracteoles ca. 1 mm. Flowers terminal or axillary, erect, later becoming pendent. Pedicel 2–3 mm, spreading pilose, basally 2-bracteolate. Calyx ca. 3 mm, pilose outside, to 6 mm in fruit; scutellum ca. 0.75 mm, to 3 mm in fruit. Corolla purplish or blue-purple, ca. 6 mm, sparsely pubescent outside, glabrous inside, tube erect, slightly saccate in front at base, gradually dilated to ca. 3 mm wide at throat; upper lip erect, oblong, ca. 1.5 mm, apex rounded rarely emarginate; middle lobe of lower lip spreading upward, trapeziform, ca. 4 × 5 mm, apex emarginate; lateral lobes oblong-ovate, slightly shorter than upper lip, almost entirely adnate to it. Nutlets yellow-brown, ovoid-globose, ca. 2 mm in diam., abaxially tuberculate, umbonate at apex of smooth conical adaxial side, without a wing on equatorial plane. Fl. Mar–Apr, fr. Apr.

• Shady, grassy slopes, bamboo forests, dense forests, stream-side tufts of grass; 100–200 m (to 1600 m in Yunnan). Anhui, Jiangsu, Yunnan, Zhejiang.

97. *Scutellaria guilielmi* A. Gray, Amer. Assoc. Advancem. Sci. 21: 25. 1873.

连钱黄芩 lian qian huang qin

Scutellaria lantienensis Handel-Mazzetti.

Herbs rhizomatous. Stems erect to prostrate-ascending, 12–35 cm tall, glabrous to sparsely pilose upward, branched. Leaves gradually reduced and narrower upward; petiole 4–14 mm, 1.2–3 cm basally, subglabrous or densely pilose; leaf blade circular-ovate to narrowly ovate, broadly ovate-orbicular to subreniform basally, 0.7–1.7 × 0.7–2.6 cm, herbaceous, sparsely appressed pilose, base cordate to subtruncate, margin coarsely 4–6-crenate, apex obtuse to rounded. Flowers terminal or axillary, erect, becoming pendent. Pedicel 2–4 mm, finely glandular pilose. Calyx ca. 3 mm, pilose outside, glandular pilose, to 4 mm in fruit; scutellum ca. 0.6 mm, ca. 2 mm in fruit. Corolla purple with white on throat, ca. 5 mm, sparsely pubescent outside, adaxially puberulent on base; tube erect, slightly dilated in front, gradually dilated to ca. 2 mm wide at throat; upper lip erect, circular, apex emarginate; lower lip spreading downward; middle lobe semicircular, ca. 1.2 × 2.2 mm; lateral lobes oblong-ovate, almost entirely adnate to upper lip. Nutlets orange-brown, oblate, ca. 2 mm in diam. including wing, abaxially densely tuberculate, with a cylindrical umbo near middle, densely spiny around umbo on adaxial side,

equatorial plane circumvented by a wing ca. 0.5 mm wide, margin irregularly comblike.

• Slopes, wet areas in forests, bamboo forests, limestone areas; 200–1700 m. Hunan, Shaanxi, Zhejiang [Japan].

98. *Scutellaria kingiana* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 59: 308. 1890.

藏黄芩 zang huang qin

Scutellaria tibetica C. Y. Wu & H. W. Li.

Herbs dwarf perennials. Rhizomes woody, ca. 0.6 cm in diam., much branched. Stems purplish, numerous, white pubescent. Petiole 1.5–2 mm, densely white pubescent; leaf blade ± purplish abaxially, subcircular to ovate-orbicular,

6–9 × 6–7 mm, herbaceous, corrugate, densely white pubescent, yellowish glandular, base broadly cuneate to rounded, margin crenate, apex obtuse. Bracteoles needlelike. Flowers solitary, axillary, ca. 2.2 cm. Pedicel ca. 1 mm, pubescent, 2-bracteolate at middle. Calyx ca. 4.5 mm, white pubescent outside, slightly saccate at ca. middle of upper lip, dilated, to 6 mm after anthesis. Corolla rose, yellow pubescent outside; tube suberect, base ca. 1.5 mm wide, gradually dilated to 4 mm wide at throat; upper lip to 6 mm wide, apex emarginate; middle lobe of lower lip nearly semicircular, to 9 mm wide, apex emarginate; lateral lobes ovate, ca. 2.5 mm wide, adnate to upper lip. Nutlets unknown. Fl. Jul.

• Gravelly sandy soils of alluvial fans in mountains; 4600 m. Xizang.

12. LAVANDULA Linnaeus, Sp. Pl. 2: 572. 1753.

薰衣草属 xun yi cao shu

Plants small shrubs, rarely herbs. Verticillasters 2–10-flowered, in crowded terminal spikes; bracteoles small or absent. Flowers short pedicellate or subsessile. Calyx ovoid-tubular to tubular, slightly dilated in fruit, straight, 13–15-veined, 2-lipped; upper lip entire, protracted into an appendage; lower lip equally (2–)4-toothed, teeth narrower than those of upper lip. Corolla blue or purple; tube exerted, throat ± dilated; limb 2-lipped, upper lip 2-lobed, lower 3-lobed. Stamens 4, included, anterior 2 longer; anther cells apically confluent. Style inserted at ovary base, apex 2-cleft, lobes flattened, ovate, connate. Nutlets smooth, shiny, each with a basal-dorsal areole.

About 28 species: China, India, Pakistan; Africa, SW Asia, Atlantic Islands, Europe; two species are cultivated in China.

1a. Bracts rhombic-ovate; lower calyx teeth distinct; lobes of upper lip of corolla straight, slightly overlapping

..... 1. *L. angustifolia*

1b. Bracts linear; lower calyx teeth indistinct; lobes of upper lip of corolla divaricate almost at right angles 2. *L. latifolia*

1. *Lavandula angustifolia* Miller, Gard. Dict. ed. 8, 1768.

薰衣草 xun yi cao

Lavandula spicata Linnaeus; *L. vera* de Candolle.

Shrubs dwarf, stellate tomentose. Branches gray-brown to dark brown, with long flowering and short leafy shoots, bark longitudinally exfoliating. Leaves widely spaced on flowering shoots, clustered on leafy shoots, linear to lanceolate-linear, 3–5 cm × 3–5 mm on flowering shoots, less than ca. 17 × 2 mm on leafy shoots, gray stellate tomentose, base attenuate to a very short petiole, margin entire and revolute, apex obtuse. Verticillasters 6–10-flowered, numerous, in crowded, interrupted or ± continuous spikes ca. 3(–5) cm; peduncle ca. 3 × as long as spike; bracts rust colored when dry, rhombic-ovate or acuminate-subulate; bracteoles indistinct. Pedicel short. Calyx ovoid-tubular to subtubular, 4–5 mm, 13-veined, densely gray stellate tomentose outside; upper lip entire, lower lip equally 4-toothed. Corolla blue, 8–10 mm, 13-veined, densely tomentose outside, base subglabrous, throat and limb glandular hairy, puberulent annulate inside; upper lip straight, with lobes circular and slightly overlapping; lower lip spreading. Nutlets 4, smooth. Fl. Jun.

Cultivated as an ornamental and aromatic plant in China [Africa, Europe].

2. *Lavandula latifolia* Villars, Hist. Pl. Dauphine 2: 363. 1787.

宽叶薰衣草 kuan ye xun yi cao

Subshrubs. Branches densely stellate tomentulose. Leaves clustered at branch bases, widely spaced apically, narrowly lanceolate to linear, 2–4 cm × 2–5 mm, densely stellate tomentulose, base attenuate to petiole, margin entire and revolute, apex obtuse to acute. Verticillasters 4–6-flowered, lax, 7 or 8 in a terminally interrupted 15–25 cm pedunculate spike; peduncle 17–30 cm; bracts linear, almost as long as corolla; bracteoles linear, shorter than calyx. Calyx tubular, straight, 5–6 mm, densely stellate tomentose, 13-veined, 5-toothed; posterior tooth conspicuously larger than other 4 inconspicuous teeth. Corolla 1–1.1 cm, densely tomentose; upper lip straight, with lobes divaricate almost at a right angle, ovate, apically obtuse; lobes of lower lip subcircular. Fl. Jun-Jul.

Occasionally cultivated in China [Africa, Europe].

13. MARRUBIUM Linnaeus, Sp. Pl. 2: 582. 1753.

欧夏至草属 ou xia zhi cao shu

Herbs erect perennials or very rarely annuals, ± villous to lanate. Leaves circular to ovate, corrugate, margin dentate. Verticillasters axillary, many flowered; bracts subulate, rarely absent. Flowers small. Calyx tubular, 5–10-veined; teeth 5–10, rigid, needlelike, equal or main teeth larger than accessory teeth, straight or spreading-reflexed. Corolla white or purple, rarely yellow, 2-lipped; tube included, glabrous or pilose annulate inside; upper lip straight, ± flat, apex emarginate or 2-lobed; lower

lip spreading, 3-lobed, middle lobe apex emarginate. Stamens 4, small, included, anterior 2 longer; anther cells 2, divergent. Style included, apex 2-cleft. Nutlets triquetrous, ovoid, smooth, apex rounded.

About 40 species: temperate N Africa, Asia, and Europe, especially in the Mediterranean region; one species in China.

1. Marrubium vulgare Linnaeus, Sp. Pl. 2: 583. 1753.

欧夏至草 ou xia zhi cao

Marrubium vulgare Linnaeus var. *lanatum* Benth.

Stems branched or unbranched, 30–40 cm tall, base woody, densely appressed lanate-villous. Leaves reduced upward; petiole 0.7–1.5 cm; leaf blade ovate to circular, 2–3.5 × 1.8–3 cm, adaxially polished, corrugate, and sparsely villous, abaxially densely scabrid strigose-villous, base broadly cuneate to rounded, margin dentate-serrate, apex obtuse to subrounded. Verticillasters axillary, many flowered, widely spaced basally, crowded upward, globose, 1.5–2.3 cm in diam.; bracts subulate, as long as to longer than calyx tube, reflexed. Calyx 10-veined; teeth 10, main 5 long, alternate

with 5 accessory teeth, 1–4 mm, subulate, hooked. Corolla white, ca. 9 mm; tube ca. 6 mm, densely pubescent outside, pilose annulate inside; upper lip as long as or slightly shorter than lower lip, straight or spreading, 2-lobed; middle lobe of lower lip reniform, undulate, 2-cleft. Nutlets triquetrous, ovoid, warty. Fl. Jun-Aug, fr. Jul-Sep.

Dry grassy loess, slopes. Xinjiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

A bitter herb, which when dried is used as tea for debility and colds. The plant is also used in certain candies for coughs and sore throat, as an expectorant, as a diaphoretic, and as a laxative when taken in large doses. It is the source of an essential oil used in liqueurs. It is also a honey plant.

14. LAGOPSIS (Bunge ex Benth) Bunge, Mém. Acad. Imp. Sci. St. Pétersbourg Divers Savans. 565. 1835.

夏至草属 xia zhi cao shu

Herbs diffuse or ascending, perennial. Leaves circular to cordate, palmately lobed or divided. Verticillasters axillary; bracteoles needlelike. Flowers small. Calyx tubular to tubular-campanulate, 5–10-veined; teeth 5, unequal, 2 slightly larger, conspicuous, spreading especially in fruit. Corolla white, yellow to brown-purple, 2-lipped; tube not hairy annulate; upper lip straight, entire or emarginate; lower lip 3-lobed, spreading, middle lobe widest and cordate. Stamens 4, small, anterior 2 longer, included; filaments short; anther cells 2, divergent. Style included, apex 2-cleft. Nutlets triquetrous, ovoid, smooth, scaly to finely netted.

Four species: mainly in N Asia, three species in China.

- 1a. Verticillasters in loose elongated spikes, not lanate; corolla white, rarely rose 3. *L. supina*
 1b. Verticillasters in compact, terminal, densely lanate spikes; corolla yellow to brown-purple.
 2a. Corolla yellow; leaves cordate, palmately lobed; terminal spikes ovoid 1. *L. flava*
 2b. Corolla brown-purple; leaves reniform-orbicular, palmately partite; terminal spikes oblong-ovoid 2. *L. eriostachys*

1. Lagopsis flava Karelin & Kirilow, Bull. Soc. Imp. Naturalistes Moscou 15: 425. 1842.

黄花夏至草 huang hua xia zhi cao

Marrubium flavum (Karelin & Kirilow) Walpers.

Stems branched at base, 7–20 cm tall, ± floccose-lanate. Petiole 2–3.5 cm basally, 1 cm upward; leaf blade cordate, 1–1.5 × 1.2–2 cm, lanate-villous; lobes broadly elliptic to ovate, margin callose crenate. Verticillasters many flowered, in terminal, densely lanate, ovoid spikes the 2 or 3 basal ones occasionally widely spaced; bracteoles 1/2 as long to as long as calyx tube. Pedicel absent. Calyx tubular-campanulate, 8–9 mm, 5-veined, densely lanate, glabrescent and conspicuously veined in fruit; teeth subequal, ca. 4 mm, triangular, apically spiny. Corolla yellow with brown base, ca. 7 mm, villous; tube cylindric, ca. 5 × 1–1.5 mm, included; upper lip ovate, slightly longer than lower lip; middle lobe of lower lip broadly elliptic, subentire or emarginate, lateral lobes elliptic. Nutlets yellow-brown, triquetrous, ovoid, ca. 2 mm. Fl. Jun-Jul, fr. Jul-Aug.

• Gravelly slopes; 2100–2400 m. Xinjiang [Kazakhstan, Kyrgyzstan].

2. Lagopsis eriostachys (Benth) Ikonnikov-Galitzky ex Knorring, Fl. URSS 20: 250. 1954.

毛穗夏至草 mao sui xia zhi cao

Marrubium eriostachyum Benth, Labiat. Gen. Spec. 586. 1834; *Moluccella mongholica* Turczaninow ex Ledebour.

Stems purple, erect, slightly branched from base, 25–30 cm tall, ± floccose-lanate. Petiole 2–4 cm basally, less than 1 cm upward; leaf blade reniform-orbicular, 2.5–3 × 3–4 cm, palmately divided, lobes ovate to broadly elliptic, adaxially ± villous, abaxially pilose and glandular, base cordate, margin 1- or 2-crenate, apex rounded. Verticillasters many flowered, in terminal, oblong-ovoid, densely white lanate spikes, 1 or 2 basal spikes widely spaced; floral leaves 3-lobed; bracteoles needlelike, ca. 5 mm, densely lanate. Pedicel absent. Calyx tubular-campanulate, ca. 1 cm, densely lanate, 5-veined, veins ± distinct in fruit; teeth 3–4 mm, triangular, apically spiny, subequal, 2 slightly longer. Corolla brown-purple, ca. 8 mm, villous; tube ca. 6 × 1.5 mm, included; upper lip ovate, almost as long as lower lip; middle lobe of lower lip broadly ovate, apex emarginate, lateral lobes elliptic. Immature nutlets triquetrous, ovoid. Fl. Aug.

• Stony slopes. Qinghai, Xinjiang [Mongolia, Russia].

3. Lagopsis supina (Stephan ex Willdenow) Ikonnikov-Galitzky ex Knorring, Fl. URSS 20: 250. 1954.

夏至草 xia zhi cao

Leonurus supinus Stephan ex Willdenow, Sp. Pl. 3: 116. 1800; *Marrubium incisum* Benth.

Stems purplish, few, 15–35 cm tall, densely puberulent. Petiole 2–3 cm basally, ca. 1 cm upward; leaf blade circular, 1.5–2 × 1.5–2 cm, adaxially sparsely puberulent, abaxially glandular, villous on veins, 3-lobed or 3-partite, lobes entire to oblong-dentate, basal lobes much larger, ciliate, base cordate. Verticillasters widely spaced, few flowered, ca. 1 cm in diam., lax basally, compact upward; bracteoles ca. 4 mm, curved, spinelike, densely puberulent. Calyx tubular-campanulate, ca. 4 mm, densely puberulent; teeth triangular, unequal, 1–1.5 mm, margin finely ciliate, apically spiny, distinctly spreading, 2 teeth slightly larger in fruit. Corolla white, rarely rose, slightly exerted, ca. 7 mm, lanate-villous;

tube ca. 5 × 1.5 mm; upper lip straight, longer than lower lip, oblong, margin entire; lower lip obliquely spreading, middle lobe oblate, lateral lobes elliptic. Nutlets brown, oblong-ovoid, ca. 1.5 mm, scaly. Fl. Mar-Apr, fr. May-Jun.

• A weed in open waste areas; to 2600 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan, Zhejiang [Japan, Mongolia, Russia].

Used medicinally.

15. *SIDERITIS* Linnaeus, Sp. Pl. 2: 574. 1753.

毒马草属 du ma cao shu

Subshrubs or annual or perennial herbs, lanate or villous. Leaves petiolate. Verticillasters 2- to many flowered, in terminal spikes; floral leaves reduced to bracts. Flowers small. Calyx tubular-campanulate, equally or subequally 5-toothed or slightly 2-lipped, 5–10-veined; teeth straight, apex spiny. Corolla yellow, 2-lipped; tube included; upper lip straight, nearly flat, entire to 2-lobed; lower lip spreading, 3-lobed; middle lobe large, apex emarginate. Stamens 4, included, didynamous, anterior 2 longer, with deformed anthers, posterior 2 shorter, with 2-celled anthers; anther cells divaricate. Style included, apex unequally 2-cleft. Nutlets triquetrous, ovoid, smooth, apex obtuse to rounded.

Approximately 100 species: temperate Asia and Europe, two species in China.

- 1a. Corolla yellow, turning purplish when dry; internodes of inflorescence longer than calyx 1. *S. montana*
1b. Corolla purplish; internodes of inflorescence shorter than calyx 2. *S. balansae*

1. *Sideritis montana* Linnaeus, Sp. Pl. 2: 575. 1753.

毒马草 du ma cao

Herbs annual. Stems ca. 20 cm tall, erect or ascending, spreading hirtellous. Petiole short to almost absent; leaf blade lanceolate to elliptic, 1–2 cm × ca. 5 mm, sparsely pilose, base cuneate, margin entire or remotely serrulate, apex acute. Verticillasters 6- to many flowered; bracts longer than flowers. Calyx 8–10 mm, tube cylindrical, villous, 10-veined; teeth equal or subequal, oblong-lanceolate, 3–4 mm, apex spiny, ciliate; fruiting calyx slightly dilated, urceolate-campanulate, distinctly veined. Corolla yellow; tube included; upper lip oblate, ca. 1.5 mm, 2-lobed; lower lip ca. 1 mm. Nutlets gray-brown, triquetrous, ovoid, ca. 1.5 mm, smooth. Fl. and fr. Jun-Aug.

• Valleys, thickets. Xinjiang [Russia, Turkmenistan; SW Asia, Europe].

A toxic weed.

2. *Sideritis balansae* Boissier, Diagn. Ser. 2, no. 4: 35. 1859.

紫花毒马草 zi hua du ma cao

Herbs annual. Stems 2–15 cm tall, erect or ascending, turning red basally, sparsely pilose. Leaves long petiolate, elliptic to oblong, to 15 × 8 mm, pilose, margin with few oblique serrations, apex obtuse. Verticillasters 2–6-flowered, in compact spikes; bracts similar to stem leaves, as long as or longer than flowers. Pedicel 2–3 mm. Calyx 5–9 mm, spreading pilose, sometimes reddish, distinctly 10-veined; teeth ovate-lanceolate, equal or subequal, straight, apex cuspidate; fruiting calyx slightly dilated, urceolate-campanulate, constricted. Corolla purplish, included or slightly exerted, upper lip 2-lobed. Nutlets gray, triquetrous, ovoid, 1–1.5 mm, smooth. Fl. and fr. Jun-Aug.

• Valleys, thickets. Xinjiang [Russia; SW Asia].

Kamelin (in litt.) believes that Chinese records of this species are based on misidentifications of *Sideritis montana* which can have a purplish corolla when dried.

16. *AGASTACHE* Clayton ex Gronovius, Fl. Virgin. 88. 1762.

藿香属 huo xiang shu

Herbs tall perennials. Leaves petiolate, margin dentate. Verticillasters many flowered, in terminal spikes. Calyx tubular-obconical, straight, 15-veined, not hairy annulate inside, throat oblique. Corolla tube straight, gradually dilated to throat, as long as to slightly longer than calyx, not hairy annulate inside, 2-lipped; upper lip straight, 2-lobed; lower lip spreading, 3-lobed, middle lobe widest, spreading, base not clawed, margin undulate, lateral lobes straight. Stamens 4, fertile, much exerted, posterior 2 longer and inclined forward, anterior 2 erect-ascending; anther cells 2, initially almost parallel, later ± divergent. Style subequally 2-cleft. Nutlets smooth, apex hairy.

Nine species: eight in North America and one in E Asia.

1. *Agastache rugosa* (Fischer & C. Meyer) Kuntze, Revis. Gen. Pl. 2: 511. 1891.

藿香 huo xiang

Lophanthus rugosus Fischer & C. Meyer, Index Sem. Hort. Petrop. 1: 31. 1835; *Elsholtzia monostachya* H. Léveillé & Vaniot; *L. argyi* H. Léveillé; *L. formosanus* Hayata.

Stems erect, 0.5–1.5 m tall, to 7–8 mm in diam., finely pubescent upward, branched, base glabrous. Leaves gradually reduced upward; petiole 1.5–3.5 cm; leaf blade cordate-ovate to oblong-lanceolate, 4.5–11 × 3–6.5 cm, adaxially subglabrous, abaxially puberulent, glandular, base cordate or rarely cuneate, margin serrate, apex caudate-acuminate. Spikes compact, cylindric, 2.5–12 × 1.8–2.5 cm; floral leaves lanceolate-linear, less than 5 × 1–2 mm basally, 2–3 mm apically; peduncles of cymes ca. 3 mm. Calyx ± purplish or purple-red, tubular-obconical, ca. 8 × 2 mm, glandular puberulent, yellow glandular, throat slightly oblique; teeth triangular-lanceolate, 3 posterior teeth ca. 2.2 mm, 2 anterior

teeth slightly shorter. Corolla purplish blue, ca. 8 mm, puberulent outside; tube base ca. 1.2 mm wide, slightly exerted, gradually dilated to ca. 3 mm wide at throat; upper lip straight, apex emarginate; middle lobe of lower lip larger, ca. 2 × 3.5 mm, spreading, margin undulate; lateral lobes semicircular. Ovary apex tomentose. Nutlets brown, ovoid-oblong, ca. 1.8 × 1.1 mm, adaxially ribbed, apically hirtellous. Fl. Jun-Sep, fr. Sep-Nov.

- Widely distributed, but cultivated as a medicinal plant in China [Japan, Korea, Russia; North America].

Used medicinally for abdominal pain and as the source of an essential oil.

17. LOPHANTHUS Adanson, Fam. Pl. 2: 194. 1763.

扭藿香属 niu huo xiang shu

Herbs perennial. Stem leaves short petiolate to sessile, dentate or incised-toothed. Cymes axillary; bracts small, linear-lanceolate to linear, rarely lanceolate. Calyx tubular to tubular-campanulate, straight or ± incurved, apex regular or oblique; teeth 5, subequal, ± 2-lipped [or not], (12–)15-veined, pilose annulate inside. Corolla straight or incurved; tube exerted, gradually dilated upward, twisted; limb 2-lipped, twisted at 90–180° so that position of lips is ± reversed; upper lip (true lower) 3-lobed, middle lobe largest; lower lip (true upper) 2-lobed. Stamens 4, exerted or included; anther cells parallel or almost not divergent. Style exerted, rarely included, apex equally or subequally 2-cleft. Nutlets brown, oblong-ovoid, slightly flattened, smooth.

Eighteen species: Kazakhstan, Kyrgyzstan, Mongolia, Russia, SW Asia; four species in China.

- 1a. Leaves sessile, irregularly incised or dentate 4. *L. tibeticus*
- 1b. Leaves ± petiolate, crenate.
 - 2a. Calyx 2-lipped, upper lip longer, teeth lanceolate to ovate-lanceolate; peduncle to 1.5 cm 3. *L. schrenkii*
 - 2b. Calyx teeth subequal, ovate to narrowly ovate.
 - 3a. Calyx tubular-campanulate, with ovate teeth; peduncle more than 5 mm, basal peduncles to 1 cm 1. *L. chinensis*
 - 3b. Calyx tubular, slightly dilated at limb, with narrow teeth; peduncle less than 5 mm 2. *L. krylovii*

1. *Lophanthus chinensis* Bentham, Edward's Bot. Reg. 15: t. 1282. 1829.

扭藿香 niu huo xiang

Stems branched, pubescent, glandular. Petiole short; leaf blade ovate, 1.5–3 × 1–2.5 cm, ± pubescent, glandular, base rounded to cordate, margin crenate, apex obtuse to rounded. Cymes 3–6- or more flowered; peduncle ca. 1 cm to almost absent; bracts linear-lanceolate. Calyx tubular-campanulate, 7–9 mm; limb dilated, 15-veined, pubescent, glandular, pilose annulate inside; teeth subequal, ovate, apex acute. Corolla 1.7–2 cm, pubescent; tube exerted, throat dilated; middle lobe of apparent upper lip circular, apex emarginate, lateral lobes small; lobes of apparent lower lip elliptic-oblong. Anterior stamens exerted. Fl. Oct.

- Slopes. Xinjiang [Mongolia, Russia].

A report of this species from Hebei may be incorrect since no specimens from this province have been seen.

2. *Lophanthus krylovii* Lipsky, Trudy Imp. S.-Peterburgsk. Bot. Sada 24: 122. 1905.

阿尔泰扭藿香 a er tai niu huo xiang

Stems numerous, erect or ascending, 20–30 cm tall, puberulent, glandular hairy. Leaves sometimes subsessile upward; petiole less than 1 cm, rarely to 1.5 cm; leaf blade ovate to ovate-cordate, 1–2.5 × 0.8–2(–3) cm, densely pubescent, glandular, base cordate, rarely subtruncate to rounded, margin crenate, apex obtuse to acute. Cymes widely spaced; peduncle 1–5 mm; bracts small, linear-lanceolate, pubescent. Calyx tubular-campanulate to subtubular, slightly dilated at apex, 8–9 mm, 12–15-veined, densely pubescent,

glandular, throat pilose annulate; upper lip 3-toothed; lower calyx teeth 2, shorter, narrowly ovate to oblong-ovate, apex acute. Corolla blue, 1.6–1.8 cm, pubescent; tube exerted, dilated at apex; middle lobe of apparent upper lip emarginate or 2-lobed, lateral lobes broadly elliptic; lobes of apparent lower lip subcircular. Anterior stamens exerted. Nutlets oblong-ellipsoid, ca. 2 mm. Fl. Jun-Aug.

- Shady areas in valleys, near springs, slopes; 2000–2500 m. Xinjiang (Altay Shan, Tian Shan) [Kazakhstan, Mongolia, Russia].

3. *Lophanthus schrenkii* Levin, Bot. Mater. Gerb. Bot. Inst. Komorova Akad. Nauk. SSSR 7: 218. 1937.

天山扭藿香 tian shan niu huo xiang

Stems erect, branched, pilose. Leaves subsessile upward; petiole ca. 1 cm; leaf blade ovate to narrowly ovate, 1.5–3 × 0.9–2.1 cm, villous, abaxially sparsely glandular, ± corrugate when dry, base shallowly cordate to truncate or rounded, margin crenate, apex obtuse to acute. Cymes 3- to many flowered; peduncle 8–15 mm. Calyx tubular-campanulate, dilated at apex, 1–1.2 cm, 15-veined, villous, pilose annulate inside, mouth oblique, upper lip longer; teeth lanceolate to ovate-lanceolate. Corolla blue, 1.7–2.1 cm, ± pubescent; tube exerted; middle lobe of apparent upper lip emarginate, margin undulate; lateral lobes smaller, subcircular; lobes of apparent lower lip broadly elliptic-oblong. Anterior stamens exerted. Fl. Aug.

- Stony slopes. Xinjiang [Kazakhstan, Kyrgyzstan].

- 15a. Verticillasters in globose to ovoid-globose terminal spikes, sometimes widely spaced basally; stem leaves \pm circular.
- 16a. Plants densely tomentose, gray or white; lateral branches sterile 10. *N. kokanica*
- 16b. Plants densely pubescent; lateral branches fertile 9. *N. supina*
- 15b. Verticillasters in cylindric or ovoid spikes but basal (1– or)2–5 widely spaced; stem leaves ovate, ovate-cordate, to oblong-ovate.
- 17a. Stem leaves linear-lanceolate, lanceolate, or oblong-ovate.
- 18a. Corolla yellow; leaves linear-lanceolate, apex acuminate, base rounded to cordate, margin serrate 3. *N. nervosa*
- 18b. Corolla blue; leaves lanceolate to oblong-ovate, apex acute to obtuse, base cuneate to rounded, margin entire, upper ones 1–4-serrate 7. *N. densiflora*
- 17b. Stem leaves ovate to rhombic-ovate or triangular-cordate.
- 19a. Leaf bases cuneate, blade ovate or rhombic.
- 20a. Leaves incised-serrate; calyx tube ca. 2.5 mm; verticillasters in cylindric spikes 11. *N. zandaensis*
- 20b. Leaves serrate; calyx tube 4.5–5.5 mm; verticillasters in broadly ovoid spikes 8. *N. kokamirica*
- 19b. Leaf bases cordate to subtruncate.
- 21a. Plants with underground succulent rhizomes 12. *N. raphanorhiza*
- 21b. Plants without underground succulent rhizomes.
- 22a. Stem leaves broadly ovate-cordate, wider than long; apical verticillasters in terminal ovoid spikes 1.2–3.7 cm 13. *N. lamiopsis*
- 22b. Stem leaves ovate to ovate-cordate or triangular-ovate, longer than wide; verticillasters in cylindric, more elongated spikes.
- 23a. Leaves ovate to triangular-ovate, 2.1–6 cm; spikes cylindric, (1.5–)3.5 cm, with 1 or 2 basal, widely spaced verticillasters 4. *N. laevigata*
- 23b. Leaves ovate to broadly triangular-ovate or ovate-cordate, 0.5–1.25 cm; spikes ovoid-oblong to cylindric, or basally interrupted, 2.5–4 cm.
- 24a. Bracts and bracteoles oblong-linear, as long as calyx; flowers sessile; calyx tube subglabrous, teeth ciliolate 5. *N. discolor*
- 24b. Bracts obovate to narrowly ovate, bracteoles lanceolate-linear, shorter than calyx; flowers pedicellate, pedicel ca. 2 mm; calyx tube pubescent, teeth densely sericeous 6. *N. taxkorganica*
- 14b. Flowers in loose or compact, simple or complex cymes.
- 25a. Calyx throat subregular or slightly oblique, not 2-lipped.
- 26a. Leaves sessile, leathery 33. *N. sessilis*
- 26b. Leaves petiolate, membranous or papery.
- 27a. Flowers ca. 0.8 cm; leaves triangular-ovate, 1.5–6.4 \times 1–5.2 cm, apex acute to apiculate, base cordate, coarsely crenate to dentate 30. *N. fordii*
- 27b. Flowers more than 2 cm; leaves variable.
- 28a. Leaves triangular-cordate, thin papery, dentate-crenate, 4–7.5 \times ca. 3.6 cm, apex caudate-acuminate, base truncate to cordate 31. *N. everardi*
- 28b. Leaves not triangular-cordate.
- 29a. Calyx throat slightly oblique, posterior calyx tooth slightly longer, erect, other teeth \pm oblique, projected, and narrowly lanceolate; leaves 3.2–10.5 \times 1–6.5 cm 32. *N. dentata*
- 29b. Calyx throat regular, teeth subequal, triangular or lanceolate; leaves ovate-lanceolate to narrowly ovate, 1.5–3 \times 1–2 cm, incised-serrate 34. *N. sungpanensis*
- 25b. Calyx throat oblique, conspicuously 2-lipped.
- 30a. Cymes in dense ovoid spikes 3–5 cm, these to 8.5(–12) cm when elongated 16. *N. coeruleascens*
- 30b. Cymes in lax, long inflorescences.
- 31a. Leaves subentire, linear-lanceolate, 2–4 cm \times 7–8 mm 28. *N. hemsleyana*
- 31b. Leaves serrate or crenate, not linear-lanceolate.
- 32a. Leaves subsessile or short petiolate.
- 33a. Leaves less than 2.5 cm, ovate to oblong, tomentose or scaly tomentose 27. *N. leucolaena*
- 33b. Leaves larger, not tomentose or scaly tomentose.
- 34a. Leaves strongly dentate-serrate 24. *N. prattii*
- 34b. Leaves crenate.
- 35a. Leaves oblong-ovate or elliptic-ovate, 4–7.4 \times 1.9–3 cm, densely pubescent adaxially 25. *N. wilsonii*
- 35b. Leaves ovate-oblong to lanceolate-oblong, 2.8–5.2 \times 1.1–1.7 cm,

- densely pubescent especially abaxially 26. *N. veitchii*
- 32b. Leaves with basal petioles more than 1.5 cm, middle petioles 0.3–1.8 cm.
- 36a. Plants gynomonocious; pistillate flowers 1.2–1.6 cm, slender 20. *N. tenuiflora*
- 36b. Flowers bisexual, more than 1.6 cm.
- 37a. Leaves pubescent adaxially, densely gray pubescent abaxially, sometimes intermixed with yellow glands 23. *N. souliei*
- 37b. Leaves pubescent along abaxial veins or puberulent on both surfaces.
- 38a. Leaves membranous, puberulent, margin coarsely mucronate-crenate; cymes few flowered 21. *N. membranifolia*
- 38b. Leaves papery, margin serrate or crenate to entire; cymes many flowered.
- 39a. Corolla 1.7–2 cm; middle petioles 2–3 cm, as long as 1/5–1/3 of blade 17. *N. manchuriensis*
- 39b. Corolla ca. 2 cm; middle petioles less than 2 cm, more than 1/7 as long as blades.
- 40a. Verticillasters 2–5-flowered; calyx white strigose, glandular puberulent; leaves oblong-ovate or ovate, 2–3.5 × 1–2 cm 22. *N. jomdaensis*
- 40b. Verticillasters 5–10-flowered; calyx densely glandular puberulent or glandular pubescent; leaves oblong to lanceolate.
- 41a. Leaves 6–10 × 2–2.5 cm; middle petioles 10–18 mm 19. *N. stewartiana*
- 41b. Leaves 3.4–9 × 1.2–2.2 cm; middle petioles 3–7 mm 18. *N. sibirica*

1. *Nepeta longibracteata* Benth. Labiat. Gen. Spec. 737. 1835.

长苞荆芥 chang bao jing jie

Glechoma longibracteata (Benth.) Kuntze.

Plants perennial. Stems 9–12 cm, 1–1.5 mm in diam., slender, diffuse; lower internodes long, sparsely short hairy, minutely white glandular, upper minutely long hairy and white. Leaves long petiolate, sessile basally; leaf blade obovate-cuneate or ovate-rhombic to ovate, or linear-lanceolate, scalelike basally, 0.8–1.5 cm × 5–12 mm, ± softly gray tomentose, base cuneate or truncate-cuneate, margin coarsely crenate, sometimes 3-lobed, apex obtuse. Inflorescences globose, rarely slightly elongated, 1.5–3(–3.5) cm; bracts purplish, linear, longer than flowers, 1.7–1.9 × 0.5–0.6 mm, minutely glandular hairy, margin densely ciliate. Pedicel 1–1.5 mm. Calyx straight, narrowly obconical, 7–8 × 1.6–2.5 mm, throat very oblique; teeth narrow, lanceolate-triangular, apex acuminate, posterior teeth slightly shorter, their margin and tube with long, dense, thin, simple hairs and scattered brown glands, anterior teeth slightly longer than calyx tube. Corolla blue-violet, 1.5–1.8 cm, slightly pubescent; tube thin, curved, 0.9–1.1 cm, gradually dilated apically, exerted part 1/3 as long as tube; upper lip concave; lower lip white with blue spots on middle, larger, middle lobe wide, base short clawed, margin remotely crenate, apex broadly emarginate, lateral lobes obovate. Fl. Jul–Aug.

• Stony or gravelly alpine slopes; 4900–5300 m. Xinjiang, Xizang [India (Kashmir), Tajikistan].

An easily recognized high alpine scree plant.

2. *Nepeta glutinosa* Benth. Labiat. Gen. Spec. 735. 1835.

腺荆芥 xian jing jie

Herbs perennial, tufted, 40–70 cm or more tall, densely glandular, aromatic. Stems with scalelike leaves basally,

densely glandular villous. Leaves sessile; leaf blade cordate-ovate, 1.3–3 × 0.8–2.2 cm, viscid, glandular, semi-amplexicaul, margin deeply incised-serrate. Verticillasters (2–)4- or 5-flowered, in axils of upper 4–8 pairs of leaves, densely glandular villous, widely spaced basally; lower peduncles 3–5(–10) mm; bracts and bracteoles narrowly lanceolate to linear, almost 1/2 as long as calyx. Pedicel 1–2.5 mm. Calyx 0.8–1.2 cm × 2–3 mm, erect, obconical, densely glandular villous, throat oblique; teeth ovate-triangular to lanceolate-triangular. Corolla bluish or purplish, 1.8–2.2 cm; tube slender, much exerted, dilated into limb, throat inconspicuous; upper lip 2.5–3 mm, lower lip ca. 1.5 × as long as upper lip, middle lobe reniform, ca. 2.5 × 4–5 mm. Nutlets greenish brown to brown, ellipsoid, 2–3 × 1–1.3 mm, base attenuate, apex attenuate and acute. Fl. Jul–Aug, fr. Aug–Sep (specimens not seen).

• Alpine grasslands; 3500–4200 m. Xinjiang [Afghanistan, India (Kashmir), Tajikistan].

The glandular indumentum is a characteristic feature.

3. *Nepeta nervosa* Royle ex Benth. var. **lutea** J. D. Hooker, Fl. Brit. India 4: 658. 1885.

黄花具脉荆芥 huang hua ju mai jing jie

Herbs perennial. Stems erect or ascending, 30–60 cm. Leaves sessile or short petiolate, linear-lanceolate, 5–10 × 0.8–1.7 cm, green or abaxially gray hairy, base rounded or cordate, margin serrate, apex acuminate. Spikes cylindrical, robust, 2.5–7.5 cm; bracts longer than calyx, ovate or lanceolate, apex apiculate, ciliate. Flowers sessile. Calyx ca. 6 mm, throat subtruncate; teeth subulate-acuminate, as long as tube, sparsely villous. Corolla yellow, ca. 2 × as long as calyx (specimens not seen).

• Alpine grasslands; 4200 m. Xizang [India, Pakistan].

4. *Nepeta laevigata* (D. Don) Handel-Mazzetti, Symb. Sin. 7: 916. 1936.

穗花荆芥 sui hua jing jie

Betonica laevigata D. Don, Prodr. Fl. Nepal. 110. 1825; *Nepeta spicata* Benthams; *N. spicata* var. *incana* H. Léveillé.

Stems 20–80 cm, white pubescent. Petiole 2–12 mm, white villous; leaf blade ovate to triangular-cordate, 2.1–6 × 1.5–4.2 cm, adaxially sparsely white pubescent, abaxially gray and densely white pubescent, base cordate to subtruncate, margin crenate-serrate, apex acute or rarely obtuse. Spikes terminal, cylindrical; bracts purplish red apically, linear, white villous. Calyx tubular, ca. 6–8 × 2 mm; teeth narrowly awned-lanceolate, as long as tube, posterior teeth slightly longer than anterior, margin densely white villous, dilated in fruit. Corolla blue-purple, ca. 1.5 × as long as calyx; tube ca. 1.5 mm in diam., to 5 mm in diam. at throat; lobes of upper lip circular-ovate, ca. 2 × 2 mm, middle lobe of lower lip oblate, ca. 3 × 5.5 mm. Nutlets gray-green, ovoid, ca. 1.5 × 1 mm, very shiny. Fl. Jul-Aug, fr. Sep-Nov.

• Grasslands, shrub-grasslands, grassy slopes, coniferous and mixed forest margins, forests; 2300–4100 m. Sichuan, Xizang, Yunnan [Afghanistan, India, Nepal].

Used medicinally as a diaphoretic.

5. *Nepeta discolor* Royle ex Benthams, Hooker's J. Bot. Kew Gard. Misc. 3: 378. 1833.

异色荆芥 yi se jing jie

Herbs perennial. Stems slender, ascending, gray pubescent. Leaves short petiolate, broadly ovate to ovate-cordate, ca. 1.2 × 1 cm, occasionally to 2.2 × 2 cm, densely puberulent, adaxially green, abaxially gray, with yellowish glands, base subcordate, margin crenate, apex obtuse. Spikes ovoid or cylindrical, continuous or basally interrupted, 3–5.5 cm; bracts oblong-linear, spiny, as long as calyx, ciliate. Flowers sessile. Calyx ca. 8 mm, pubescent; tube ca. 4 mm, throat oblique; teeth awned-lanceolate, ca. as long as tube, posterior teeth slightly longer, margin densely white villous. Corolla purple, glabrous or slightly villous on upper lip, ca. 1.4 cm; tube slender, ca. 1 cm, throat to 2.5 mm wide. Fl. Jul-Aug.

• Grassy or gravelly slopes, forests, thickets; 3600–4300 m. Xizang [Afghanistan, India, Nepal, Pakistan].

6. *Nepeta taxkorganica* Y. F. Chang, Bull. Bot. Res. 3(1): 163. 1983.

喀什荆芥 ka shi jing jie

Herbs perennial. Rhizomes with scalelike leaves. Stems erect or ascending, 15–30 cm, slender, sparsely pubescent. Leaves sessile upward; petiole 2–5 mm; leaf blade broadly triangular-ovate, 5–12 × 4–8 mm, base subcordate to broadly cuneate, margin dentate, apex apiculate. Verticillasters in dense, oblong-ovoid or cylindrical, continuous terminal spikes, sometimes basal 1 or 2 verticillasters interrupted, 2.5–4 cm; bracts obovate to narrowly ovate, 4–6 × 2–3.5 mm, membranous, pubescent, base cuneate, margin entire and villous, apex acute or acuminate; bracteoles lanceolate-linear, margin silky pubescent. Pedicel ca. 2 mm. Calyx obconical, 5–7 × 1–1.5 mm, sparsely pubescent; teeth subequal or anterior 2 slightly shorter, narrowly triangular, margin densely sericeous-villous. Corolla bluish, 1.2–1.4 cm, sparsely pubescent; tube narrow, throat dilated; upper lip 3.5–4 × 3–3.5 mm; middle lobe of lower lip inversely cordate, ca.

2 × 3 mm. Nutlets brown, broadly ellipsoid, 1–1.5 × 0.5–0.7 mm.

• Grassy slopes; 4600 m. Xinjiang (Taxkorgan Xian).

7. *Nepeta densiflora* Karelin & Kirilow, Bull. Soc. Naturalistes Moscou 14: 725. 1841.

密花荆芥 mi hua jing jie

Nepeta tarbagataica C. Y. Yang & B. Wang.

Plants perennial. Rhizomes with dark brown scalelike leaves. Stems 25–40 cm, ascending, 1.5–2.5 mm in diam., with sparse, curved villous hairs intermixed with minute glandular hairs especially basally, internodes to 5–6 cm, leaf axils mostly with short, sterile branchlets. Petiole 0–4 mm; leaf blade lanceolate or oblong-ovate, 1.5–3 cm × 2–10 mm, sparsely covered with short simple hairs and minute yellow glands, base truncate to rounded-truncate, margin remotely 1–4-serrate, apex acute to obtuse. Spikes ovoid to cylindrical, 1.5–8 × 2.5–3 cm, with lower verticillasters widely spaced. Calyx blue-purple, 8–10 mm, villous and densely glandular puberulent on veins otherwise pubescent, throat oblique; teeth narrowly triangular, apex acuminate, anterior teeth slightly shorter, posterior teeth ca. 2/3 as long as calyx tube. Corolla blue, 1.5–1.6 cm, pubescent; tube ca. 9 mm, base ca. 1.1 mm wide, abruptly dilated into throat ca. 4 × 5 mm; upper lip ca. 3 mm; middle lobe of lower lip 3–4 × (6.5–)7–8 mm, deeply 2-lobulate; lateral lobes semicircular-triangular, 0.75–1(–1.5) × 2.3–3 mm. Nutlets dark brown, broadly ovoid, ca. 2 × 1–1.25 mm. Fl. and fr. Aug.

• Stony and grassy slopes, valley thickets along rivers, sparse forests; 1400–2500 m. Xinjiang [Mongolia, Russia].

8. *Nepeta kokamirica* Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 358. 1880.

绢毛荆芥 juan mao jing jie

Plants perennial. Rhizomes with brown scalelike leaves. Stems numerous, ascending or prostrate, 15–50 cm tall, 1.5–3 mm in diam., base with brown scalelike leaves and dense, crisped, gray, simple, very short glandular hairs. Petiole 6–8.5 mm basally, ca. 2 mm upward; leaf blade ovate to rhombic-ovate, to 1.7 × 0.8 cm, densely gray stellate tomentose, base cuneate, margin serrate above base, apex acuminate to obtuse. Verticillasters in terminal, broadly ovoid or subglobose spikes, rarely remote basally; floral leaves and bracts tinged blue-purple, densely villous, with short glandular hairs and yellow glands; bracts linear, 4.5–6 mm. Calyx tinged blue-purple, 7–8 × 2–3 mm, pubescent and glandular as bracts; teeth oblong-triangular, 2–2.5 × 1–1.5 mm, apex acuminate, equal or anterior 2 slightly narrower, as long as 2/5–1/2 of calyx tube. Corolla bluish, pubescent, 1.6–1.8 cm; tube exerted; upper lip (2.5–)3 mm; middle lobe of lower lip 4.5–5 × 7–8 mm, base with claw 0.4–0.6 cm. Nutlets dark brown, oblong-ellipsoid, 1.6–2 × 0.7–1.25 mm. Fl. Jun-Jul, fr. Jul (specimens not seen).

• Gravelly and stony alpine areas. Xinjiang [Kazakhstan].

9. *Nepeta supina* Steven, Mém. Soc. Imp. Naturalistes Moscou 3: 265. 1812.

平卧荆芥 ping wo jing jie

Plants perennial. Rhizomes with scalelike leaves, dark brown. Stems 10–30 cm, decumbent or subprostrate, ± densely pubescent, white glandular. Petiole 0–3 mm; leaf

blade ovate, 1–2(–2.5) × 0.7–1.8(–2) cm, smaller on branches, adaxially with dense, simple, small, papillate glandular hairs when young, abaxially glandular dotted and subglabrous except on veins, base truncate to rounded, sometimes cuneate to shallowly cordate, margin dentate to subcrenate, apex acute to obtuse. Verticillasters in very compact, globose-ovoid capitula, sometimes remote basally; bracts slightly shorter than calyx, lanceolate-linear to linear, with dense, minute, and glandular hairs, margin ciliate. Calyx blue apically or rarely throughout, 7–8.5 mm, slightly curved, 2-lipped or nearly so; posterior teeth triangular, apex acute, (1/6–)1/4–1/3 as long as tube; anterior teeth narrowly lanceolate, apex acuminate to sometimes subulate, 1.5–2 × as long as posterior teeth. Corolla blue, 1.4–2 cm, tube dilated to 4.5–5.5 × 5–6 mm. Anterior stamens conspicuously shorter than posterior 2. Nutlets dark brown, ellipsoid, ca. 2 × 0.75–1 mm. Fl. Jul–Sep, fr. Aug–Oct (specimens not seen).

• Mountainous rocky crevices; 3600 m. Xizang [Pakistan, Russia].

This is possibly the same as *Nepeta kokanica*. True *N. supina* is probably restricted to the Caucasus and Turkey. In *Conspect. Fl. As. Med.* 9: 52. 1987, *N. supina* auct. is given as a synonym of *N. pamirica* Franchet, which Hedge considers a synonym of *N. kokanica*.

10. *Nepeta kokanica* Regel, *Descr. Pl. Nov. Rar.* 65. 1882.

绒毛荆芥 rong mao jing jie

Plants perennial, with gray or white tomentose hairs. Rhizomes with scalelike leaves. Stems (5–)10–40 cm, slender, ascending or erect, with scalelike leaves basally, branched along entire length, ± densely white tomentose especially on nodes below inflorescence. Petiole 2/7–2/3 as long as blade; stem leaf blade circular to rhombic-ovate, rarely subreniform, 5–15 × 5–15 cm, densely tomentose, base cuneate, margin dentate to crenate above base, apex obtuse to acute. Capitula terminal, 1.7–3.5 × (2–)2.5–3.5 cm, rarely with a distant basal verticillaster; bracts shorter than calyx, narrowly linear, with dense, small capitate glands, margin ciliate. Calyx 6–7.5 mm, with dense, small capitate glands, throat very oblique; teeth subequal, narrowly triangular or tubular-lanceolate, apex subulate-acute, posterior teeth 1/2–2/3 as long as calyx tube. Corolla bluish, 1.5–1.8 cm; pubescent, glandular; tube exerted, 2–2.5 mm wide beyond calyx; upper lip 2.7–3.3 mm; middle lobe of lower lip 3.8–4.5 × 6–6.5 mm, broadly emarginate. Nutlets dark brown, triquetrous, 2–2.3 × 1–1.8 mm, slightly narrower basally. Fl. Jul–Sep, fr. Aug–Oct (specimens not seen).

• Gravelly alpine alluvial fans and rock crevices. Xinjiang [Afghanistan, Pakistan, Tajikistan].

11. *Nepeta zandaensis* H. W. Li, *Fl. Xizang.* 4: 126. 1985.

札达荆芥 zha da jing jie

Plants perennial. Stems 20–25 cm, slender, ascending or erect, ± densely white puberulent, nodes white ciliate. Petiole 1.5–2.5 mm; stem leaf blade ovate to rhombic-ovate, 9–12 × 7–10 mm, base cuneate, margin incised-serrate, apex acute, with dense, white puberulent hairs and yellowish glands. Verticillasters many flowered, in long pedunculate spikes; spikes 2.5–4.5 × ca. 1.5 cm, terminal, and cylindrical; bracts narrowly ovate, 8 × 2 mm; bracteoles linear, ca. 6 × less than 1 mm, margin ciliate, apex spiny. Calyx tubular-campanulate, puberulent, ca. 7.5 mm, tube ca. 2.5 mm, throat

oblique; teeth 5, linear-lanceolate, margin ciliate, posterior teeth slightly longer. Corolla reddish, ca. 1.1 cm, slightly puberulent outside; tube much exerted, gradually dilated into throat, to 2 mm wide; upper lip ca. 1.5 mm, 2-lobed to 2/3 its length. Fl. Jun–Jul.

• On gravelly slopes and mountainous, stony alluvial fans; 4300–4600 m. Xizang.

Related to *Nepeta kokanica*; differing from it in the incised-serrate leaves.

12. *Nepeta raphanorhiza* Bentham, *Labiata. Gen. Spec.* 734. 1835.

块根荆芥 kuai gen jing jie

Plants perennial, with succulent walnut-sized tubers. Stems numerous, diffuse or ascending 15–45 cm tall, puberulent basally, slightly viscid, unbranched or branched. Petiole ca. 1/2 as long as blade; leaf blade broadly ovate to ovate-cordate, 1.2–2.5 × 1.2–2.5 cm, hirtellous, base truncate, margin serrate-crenate, apex somewhat obtuse. Verticillasters in ovoid, ± interrupted spikes less than 2.5 cm; bracts ovate to lanceolate, as long as calyx. Calyx ca. 4 mm; teeth subulate, ciliate, shorter than tube. Corolla purple blue; tube slender, ca. 2 × as long as calyx. Fl. Jun–Jul.

Thickets along streams; 4100 m. Xizang [Afghanistan, India (Kashmir)].

Of uncertain affinity but easily recognized by the prominent tubers if they are present.

13. *Nepeta lamiopsis* Bentham ex J. D. Hooker, *Fl. Brit. India* 4: 659. 1885.

假盖草 jia bao gai cao

Herbs perennial. Stems ascending, ca. 25 cm tall, few branched, flaccid, puberulent. Petiole 0–3 mm; stem leaf blade broadly ovate-cordate, 1.5–2 × 1.7–2.3 cm, gray puberulent, base cordate, margin coarsely crenate, apex obtuse. Lower verticillasters axillary, upper, in ovoid spikes 1.2–3.7 cm; bracts leaflike, circular, margin crenate, ciliate; bracteoles linear, to 7 mm, ciliate. Calyx ca. 8.5 mm, puberulent, throat oblique; teeth 3–3.5 mm, subulate, posterior teeth longer, ciliate. Corolla violet, ca. 1.2 cm, puberulent; tube slender, ca. 8 mm. Nutlets broadly oblong. Fl. Jun–Jul, fr. Aug.

Xizang [Bhutan, India (Sikkim), Nepal].

A number of Yunnan specimens at Edinburgh seem to belong here. Probably there is confusion with *Nepeta laevigata* and *N. discolor*.

14. *Nepeta floccosa* Bentham, *Labiata. Gen. Spec.* 736. 1835.

丛卷毛荆芥 cong juan mao jing jie

Nepeta kunlunshanica C. Y. Yang & B. Wang.

Herbs perennial. Stems purplish basally, ca. 35 cm, few branched, erect or ascending, with dense, whitish floccose-tomentose hairs. Basal 3 leaf pairs clustered, long petiolate; upper 2 pairs remote, sessile or short petiolate; leaf blade cordate to triangular-cordate, 1.5–3 × 1.5–3 cm, rigid, thick, corrugate, densely white tomentulose and glandular, margin crenulate. Verticillasters capitate, 6–8-flowered, ca. 1 × 0.7–1 cm; bracts violet, lanceolate, ca. 1/2 as long as calyx, margin with entangled, white villous hairs. Calyx violet, tubular, 8–10 mm, straight but somewhat curved apically, sparsely white

tomentose and yellow, scaly glandular, throat very oblique; teeth narrowly triangular, 1.2–1.7 × 0.7 mm, margin ciliate, apex acuminate, teeth of upper lip ca. 1/4 as long as calyx tube, teeth of lower lip ca. 1/3 as long. Corolla blue or bluish, 1.2–1.3 cm, densely puberulent, glandular; tube slender, incurved, exerted beyond calyx, 2–3 mm, throat dilated; lobes of upper lip elliptic, ca. 1.5 × 1 mm, apex obtuse; lower lip ca. 2 × as long as upper lip, middle lobe 2.5 × 3.5–4 mm, base bearded inside, margin crenate. Nutlets dark brown, oblong, ca. 2.5 × 1 mm, glabrous. Fl. Jun-Jul.

Stony, alpine slopes, grasslands, valleys; 2100–3800 m. Xinjiang, Xizang [Afghanistan, India].

15. *Nepeta yanthina* Franchet, Bull. Mus. Hist. Nat. (Paris) 3: 324. 1897.

淡紫荆芥 dan zi jing jie

Plants suffrutescent, with cylindrical roots and numerous stems. Stems to 30 cm, finely pilose. Petiole 4.5–5.5 cm basally, gradually shorter to almost absent upward, flat, sparsely short lanate; leaf blade broadly ovate to ovate-cordate, 1–2.5 × 1–2.5 cm, bullate, sparsely short lanate, base cordate, margin irregularly crenate, apex rounded to obtuse. Verticillasters remote, pedunculate basally, many flowered and subsessile upward; bracts lanceolate, margin entire, apex mucronate, purple lanate; bracteoles purple lanate. Calyx purple lanate outside; teeth lanceolate, subulate, those of upper lip almost divaricate, teeth of lower lip projected and slightly longer. Corolla blue-purple, ca. 1.2 mm, tube slightly exerted. Fl. Jun-Jul.

- Gravelly slopes, deserts near lakes; 4200–4300 m. Xizang.

16. *Nepeta coerulescens* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg, sér. 3, 27: 529. 1881.

藍花荆芥 lan hua jing jie

Dracocephalum coerulescens (Maximowicz) Dunn; *Nepeta thomsonii* Bentham ex J. D. Hooker.

Herbs perennial. Stems 25–42 cm, pubescent. Petiole of basal leaves 3–10 mm, 0–2.5 mm in upper ones; stem leaf blade lanceolate-oblong, 2–5 × 0.9–2.1 cm, densely pubescent, adaxially olive green, abaxially greenish, glandular, base truncate to shallowly cordate, margin crenate-serrate, apex acute. Verticillasters on the apical 4 or 5(–10) stem nodes, in ovoid spikes 3–5 cm, to 8.5–12 cm when elongated; peduncle 0–2 mm; bracts bluish, as long as to longer than calyx, linear or linear-lanceolate, ciliate. Calyx 6–7 mm, hirtellous, yellow glandular, throat very oblique; teeth of upper lip broadly triangular-lanceolate, apex acuminate; teeth of lower lip linear-lanceolate. Corolla blue, 1–1.2 cm, puberulent; tube ca. 6 × 1.5 mm, abruptly dilated into throat 3–3.5 × ca. 4.5 mm; upper lip straight, ca. 3 mm, 2-lobed; lower lip ca. 6.5 mm, middle lobe inversely cordate, ca. 3 × 3.5 mm, apex emarginate; lateral lobes reflexed, semicircular, ca. 1.5 × 2 mm. Nutlets brown, ovoid, ca. 1.6 × 1.1 mm, glabrous. Fl. Jul-Aug, fr. Aug-Sep.

- Grassy slopes, stony, alluvial fans, ravine sides, thickets, grassy riverbanks; 3300–4800 m. Gansu, Qinghai, Sichuan, Xizang.

17. *Nepeta manchuriensis* S. Moore, J. Bot. 18: 5. 1880.

黑龙江荆芥 hei long jiang jing jie

Herbs perennial. Stems to 1 m, to 4–5 mm in diam., rigid, erect, basally dark purple, subglabrous or sparsely short

simple hairy, apically densely pilose, finely glandular. Petiole 3–5 mm; leaf blade lanceolate, to 15 × 3.5–4(–7) cm, thin, papery when dry, adaxially dark green, glabrous or sparsely simple hairy, abaxially greenish gray, sparsely pilose, densely yellow glandular, base rounded-truncate to cuneate or rarely obtuse, margin serrate, entire on upper blades, apex acuminate or acute. Verticillasters 4–7, forming spikes 2–6(–9) cm; peduncle 0.4–3 cm; bracts narrow lanceolate, 4–7 mm. Pedicel to 1.5 cm. Calyx 8.5–9.5 mm, densely fine glandular; teeth lanceolate, apex acuminate, posterior teeth ca. 2/5 as long as tube, anterior longer. Corolla 1.7–2 cm, densely short glandular hairy, narrowest part of tube exerted to 1/3 its length, gradually dilated into broad throat 5–7 × 5–7 mm; upper lip 2.5–3.5 mm, middle lobe reniform, 3–4 × 7–7.5 mm, apex broadly emarginate; lateral lobes triangular, 2–2.2 × 2.8–3 mm. Nutlets brown, ellipsoid-obovoid, 2.5–2.6 × 1–1.2 mm, indistinctly ribbed adaxially. Fl. Jun-Jul, fr. Aug.

- Mixed forests on gravelly soil along riverbanks. Heilongjiang [Japan, Russia].

18. *Nepeta sibirica* Linnaeus, Sp. Pl. 2: 572. 1753.

大花荆芥 da hua jing jie

Dracocephalum sibiricum (Linnaeus) Linnaeus; *Moldavica elata* Moench; *M. sibirica* (Linnaeus) Moench ex Steudel; *Nepeta macrantha* Fischer.

Herbs perennial. Stems numerous, ca. 40 cm, puberulent, glandular. Petiole 3–7 mm, 1.5–1.7 cm in basal leaves; leaf blade triangular-oblong to triangular-lanceolate, 3.4–9 × 1.2–2.2 cm, adaxially sparsely puberulent, abaxially densely yellow glandular, veins pubescent, base shallowly cordate, margin denticulate, apex acute. Verticillasters lax, on apical part of stem, 9–15 cm; peduncle 5–8 mm; bracts linear, 2.5–3 mm, pubescent, ciliate. Pedicel ca. 1 mm. Calyx 9–10 mm, densely glandular pubescent, throat very oblique; teeth joined for 1/3–1/2 their length, lanceolate-triangular, apex acuminate; teeth of lower lip separated to base, longer, narrower, apex acute. Corolla blue or bluish, 2–2.9 cm, sparsely pubescent; tube nearly straight, narrow, abruptly dilated into throat ca. 6 × 6 mm; lobes of upper lip ca. 1/2 as long as upper lip, elliptic, apex obtuse; middle lobe of lower lip reniform, deeply sinuate, margin coarsely crenate; lateral lobes ovate to ovate-triangular. Nutlets unknown. Fl. Aug-Sep.

- Hillsides; 1800–2700 m. Gansu, Nei Mongol, Ningxia, Qinghai [Mongolia, Russia].

Source of an essential oil. Cultivated as an ornamental.

19. *Nepeta stewartiana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 237. 1912.

多花荆芥 duo hua jing jie

Dracocephalum stewartianum (Diels) Dunn.

Plants perennial. Stems 5–1.5 m, glabrescent. Petiole 0.5–2 cm, 2–3 mm in upper leaves; leaf blade oblong to lanceolate, 6–10 × 2–2.5 cm, adaxially olive green, abaxially whitish pubescent, mixed with yellow glands, base rounded to broadly cuneate, margin crenulate-serrate, apex acute to ± obtuse. Verticillasters ± sessile apically; peduncle ca. 5 mm; bracts linear-lanceolate, shorter than calyx, densely

puberulent, glandular. Calyx 1–1.4 cm, dilated in fruit, densely glandular puberulent, throat very oblique; adaxial teeth joined for ca. 2/3 their length, lanceolate triangular, 1.5–1.8 mm, apex acute; teeth of lower lip narrow lanceolate, ca. 5 mm, apex acuminate. Corolla purple or blue, 2–2.5 cm, sparsely pubescent; tube slightly incurved, ca. 2 × as long as calyx, gradually dilated into broad throat; upper lip deeply divided into 2 obtuse lobes; middle lobe of lower lip elliptic, ca. 5 × 10 mm, base bearded inside, apex sinuate; lateral lobes semicircular, ca. 4 mm wide. Posterior stamens slightly shorter than upper lip of corolla. Nutlets brown, oblong, somewhat flattened, ca. 2.6 × 1.3 mm, adaxially ribbed, glabrous. Fl. Aug–Oct, fr. Sep–Nov.

• Grassy slopes, forests; 2700–3300 m. Sichuan, Xizang, Yunnan.

20. *Nepeta tenuiflora* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 238. 1912.

细花荆芥 xi hua jing jie

Dracocephalum tenuiflorum (Diels) Dunn.

Herbs perennial. Stems numerous, 30–160 cm tall. Petiole (2–)4–20 mm; leaf blade broadly lanceolate to oblong-lanceolate, 4–8 × 1.5–2.5 cm, thin papery, adaxially densely puberulent, abaxially sparsely pubescent, with small yellowish white glands, base rounded to shallowly cordate, margin somewhat unequally crenulate-serrate, apex acute. Verticillasters on 3–8 apical nodes, short pedunculate; bracts linear, to as long as calyx, densely yellow glandular puberulent. Calyx (6–)8–11 mm, yellow glandular puberulent, throat very oblique; teeth of upper lip ca. 1/3 as long as lip, broadly lanceolate or lanceolate-triangular; teeth of lower lip narrowly lanceolate. Corolla purple-blue or bluish, puberulent, 1.3–1.5 cm in pistillate flowers, to 2.1 cm in bisexual flowers; tube slightly incurved, slender, narrowest part slightly exerted, abruptly dilated into throat to 5 mm wide; upper lip ca. 4 × 4 mm, divided into 2 obtuse lobes ca. 1/2 as long as lip; middle lobe of lower lip obovate, ca. 3 mm, margin undulate, apex emarginate; lateral lobes subcircular, ca. 1 mm. Nutlets grayish brown, oblong, somewhat flattened, ca. 2 × 1.4 mm, adaxially ribbed, minutely pubescent. Fl. Aug–Sep, fr. Sep–Oct.

• Grassy hillsides, forest margins, thickets; 2800–3600 m. Sichuan, Yunnan.

21. *Nepeta membranifolia* C. Y. Wu, Fl. Yunnan. 1: 574. 1977.

膜叶荆芥 mo ye jing jie

Herbs perennial. Stems few, 45–60 cm, puberulent basally, glandular puberulent upward. Petiole 1–2.5 cm; leaf blade oblong-lanceolate, 5.5–10.5 × 2–3.8 cm, wider basally, gradually narrowed to apex, membranous, puberulent, adaxially olive green, abaxially greenish, base rounded to shallowly cordate, margin coarsely mucronate-crenate, apex obtuse. Verticillasters on 3–5 apical nodes, close together, few flowered; peduncle 2–5(–25) mm; bracts linear, 1.5–2 mm, glandular puberulent. Calyx 9–10 mm, glandular puberulent, throat very oblique; teeth of upper lip triangular-lanceolate, 1.8–2.1 mm; teeth of lower lip linear, 4.2–5 mm. Corolla purple, 2–2.2 cm, sparsely puberulent; tube slightly incurved, base 1.2–1.5 mm wide, narrowest part slightly exerted, abruptly dilated into throat ca. 6.5 × 7 mm; upper lip

deeply 2-lobed, straight, ca. 3.5 mm; lower lip upwardly oblique, ca. 1 cm; middle lobe inversely cordate, 2-lobulate, base bearded; lateral lobes obliquely semicircular, conspicuous. Style exerted, apex 2-cleft. Fl. Aug.

• Mixed valley forests; 3100 m. Yunnan.

Distinguished from *Nepeta stewartiana* in the original description by the membranous leaves with wider bases and larger marginal serrations.

22. *Nepeta jomdaensis* H. W. Li, Fl. Xizang. 4: 132. 1985.

江达荆芥 jiang da jing jie

Herbs perennial. Stems 30–40 cm, retrorse puberulent. Petiole 0.5–2.5 cm, longer basally, shorter upward, retrorse puberulent; leaf blade ovate to oblong-ovate, 2–3.5 × 1–2 cm, puberulent, abaxially intermixed with yellowish glands, base truncate-cordate to shallowly cordate, margin crenate, apex obtuse. Verticillasters 1–5-flowered, short pedunculate or sessile; bracts linear, ca. 6 × less than 1 mm, finely white strigose. Calyx tubular, ca. 1 cm, white strigose, glandular puberulent, glabrous inside; tube 5–6 mm, throat oblique; teeth of upper lip oblong-lanceolate, apex acute; teeth of lower lip recurved, triangular-lanceolate. Corolla purple-blue, 2.4–2.8 cm, pilose, glabrous inside; tube 2–2.3 cm, abruptly dilated on apical 2/5; upper lip 2-lobed, lobes to 1/2 its length; middle lobe of lower lip inversely cordate. Fl. Jul.

• Hillside thickets; 3500 m. Xizang (Jomda Xian).

Related to *Nepeta hemsleyana* but with distinctly petiolate leaves.

23. *Nepeta souliei* H. Lévillé, Repert. Spec. Nov. Regni Veg. 9: 221. 1911.

狭叶荆芥 xia ye jing jie

Dracocephalum souliei (H. Lévillé) Handel-Mazzetti.

Herbs perennial. Stems 60–80 cm, densely pubescent. Petiole 0.4–3.5 cm; leaf blade broadly to narrowly lanceolate, 3.5–6(–9.5) × (1.5–)1.8–2.4 cm, papery, adaxially olive green, puberulent, abaxially grayish, densely pubescent, sometimes mixed with small yellow glands, base rounded or subtruncate to shallowly cordate, margin serrulate, apex acute. Verticillasters on 4–6 apical nodes; peduncle short, densely pubescent, glandular; bracts linear, to 8 mm, ciliate. Pedicel densely pubescent, glandular. Calyx 6–8 mm, glandular pubescent, ciliate, throat very oblique; teeth of upper lip to 1/3 as long as lip, narrowly triangular, apex acute; teeth of lower lip narrowly lanceolate, apex acuminate. Corolla purple, 1.6–2.2(–2.5) cm, ca. 1.4 cm in pistillate flowers; tube slender, slightly incurved, base ca. 1.5 mm wide, abruptly dilated into throat ca. 10 × 7 mm; upper lip ca. 5 × 5 mm, with obtuse lobes to 2.5 mm; middle lobe of lower lip inversely cordate, yellow barbate, ca. 4 × 6 mm, margin erose, apex emarginate; lateral lobes semicircular, ca. 1.5 mm. Nutlets unknown. Fl. Jul–Oct.

• Hillsides, forest margins, sparse forests; 2600–3400 m. Sichuan, Xizang.

24. *Nepeta prattii* H. Lévillé, Repert. Spec. Nov. Regni Veg. 9: 245. 1911.

康藏荆芥 kang zang jing jie

Dracocephalum prattii (H. Lévillé) Handel-Mazzetti; *D. robustum* Nakai & Kitagawa; *Nepeta macrantha* Dunn.

Herbs perennial. Stems 70–90 cm, retrorse hirtellous or glabrate, yellowish glandular. Petiole 3–6 mm, very short to absent in upper leaves; leaf blade ovate-lanceolate to lanceolate, 6–8.5 × 2–3 cm, adaxially olive green, sparsely pubescent, abaxially greenish, glandular puberulent, veins hirtellous, base shallowly cordate, margin densely dentate-serrate, apex acute. Verticillasters on 3–9 upper nodes, widely spaced basally, upper 3–6 in compact spikes; bracts to 1.3 cm, linear to linear-lanceolate, glandular puberulent, ciliate. Calyx 1.1–1.3 cm, pubescent, white glandular, throat very oblique; teeth of upper lip broadly lanceolate or lanceolate-triangular; teeth of lower lip narrowly lanceolate, apex acuminate. Corolla purple or blue, 2.8–3.5 cm, sparsely pubescent outside; tube slightly incurved, base ca. 1.5 mm wide, exerted portion of narrowest part ca. as long as calyx, abruptly dilated into throat to 10 × 9 mm; lobes of upper lip to 1/2 as long as lip; middle lobe of lower lip reniform, base white barbate, margin erose, apex emarginate. Nutlets brown, obovoid-oblong, ca. 2.7 × 1.5 mm, basally attenuate, adaxially ribbed, smooth. Fl. Jul–Oct, fr. Aug–Nov.

• Wet grassy slopes; 1900–4400 m. Gansu, Hebei, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang.

25. *Nepeta wilsonii* Duthie, Gard. Chron., ser. 3, 40: 334. 1906.

圆齿荆芥 yuan chi jing jie

Dracocephalum wilsonii (Duthie) Dunn.

Herbs perennial. Stems 35–70 cm, erect, sparsely retrorse pubescent. Petiole 0–4 mm; leaf blade oblong-ovate to elliptic-ovate, 4–7.4 × 1.9–3 cm, papery, adaxially olive green, sometimes blackish, densely puberulent, abaxially greenish, sparsely pubescent, yellowish glandular, base shallowly cordate or subtruncate, margin crenate, apex obtuse. Verticillasters on 2–6 apical nodes; bracts lanceolate to linear, ca. 1/2 as long as calyx or slightly shorter, long ciliate. Calyx 0.9–1.1 cm, sparsely villous, with a mixture of long ciliate and glandular puberulent hairs, throat very oblique; upper lip ca. 3 mm, teeth triangular; lower lip ca. 2.5 mm, teeth lanceolate, apex acuminate. Corolla purple or blue, sometimes white, 1.8–2.5 cm, sparsely pubescent or subglabrous; tube slightly incurved, exerted portion of narrowest part slightly shorter than calyx, abruptly dilated into throat, to 10 × 8 mm; lobes of upper lip to more than 1/2 as long as lip; middle lobe of lower lip obcordate, base white barbate, margin undulate, apex emarginate. Style exerted. Nutlets black-brown, oblong, flattened, ca. 2.8 × 1.5 mm, adaxially ribbed, smooth. Fl. Jul–Sep, fr. Sep–Nov.

• Grassy slopes; 2600–4100 m. Sichuan, Yunnan.

26. *Nepeta veitchii* Duthie, Gard. Chron., ser. 3, 40: 334. 1906.

川西荆芥 chuan xi jing jie

Dracocephalum veitchii (Duthie) Dunn.

Herbs perennial. Stems 30–60 cm, erect, puberulent. Petiole 0–2 mm; leaf blade ovate-oblong to lanceolate-oblong, 2.8–5.2 × 1.1–1.7(–2.2) cm, pubescent, adaxially olive green, abaxially gray-green, yellowish glandular, becoming black when dry, base rounded to shallowly cordate, margin crenulate-serrulate, apex acute. Verticillasters on 5 or 6 apical nodes, 2 or 3 basal nodes very widely spaced but 3 apical nodes in spikes; bracts ca. 2/3 as long as calyx, ciliate. Calyx

8–9 mm, spreading pubescent, yellowish glandular, throat very oblique; teeth of upper lip narrowly triangular, teeth of lower lip narrowly lanceolate. Corolla blue-purple, 1.8–2.5 cm, sparsely pubescent, yellowish glandular; tube incurved, exerted portion of narrowest part ca. 1/2 as long as calyx, abruptly dilated into throat ca. 6 × 4 mm; upper lip ca. 3 mm, obtusely 2-lobed; lower lip obcordate, base white barbate, apex emarginate. Nutlets unknown. Fl. Jul–Aug.

• Grassy slopes; 3600–4100 m. Sichuan, Yunnan.

27. *Nepeta leucolaena* Benth. ex J. D. Hooker, Fl. Brit. India 4: 662. 1885.

白绵毛荆芥 bai mian mao jing jie

Stems 60–90 cm, erect, white stellate dendroid tomentose. Petiole 0–4 mm; leaf blade ovate, 0.8–2.5 cm, scaly tomentose, base rounded to cordate, margin crenate, apex acute to obtuse. Verticillasters few flowered, widely spaced, in interrupted terminal spikes, short pedunculate basally; bracts lanceolate. Calyx 5–6 mm, lanate; posterior teeth much shorter than calyx tube, triangular; anterior teeth subulate, shorter. Corolla 1.5–1.8 cm, tube incurved, funnel-form, limb short. Nutlets linear-oblong, 1.5–2 mm.

• Slopes; 2600–4000 m. Xizang [India].

28. *Nepeta hemsleyana* Oliver ex Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 59: 305. 1890.

藏荆芥 zang jing jie

Dracocephalum hemsleyana (Oliver ex Prain) Prain ex Marquand & Airy Shaw; *Nepeta angustifolia* C. Y. Wu.

Plants perennial. Stems erect, ca. 60 cm, finely striate, retrorse floccose-puberulent. Stem leaves sessile, linear-lanceolate, 2–4 cm × 7–8 mm, puberulent, glandular, base broadly cuneate, margin entire or remotely 1–3-serrate, apex acute to obtuse. Verticillasters axillary, 2–10-flowered, pedunculate; peduncle 2–7 mm; bracts linear, 5–10 × ca. 1 mm, puberulent. Calyx tubular, ca. 1.5 cm; tube ca. 8 mm, incurved, puberulent, conspicuously 15-veined; teeth spiny, posterior teeth triangular, anterior teeth reflexed, lanceolate-triangular. Corolla blue or purple, 2.5–3 cm, pilose; tube 2–2.5 cm, abruptly dilated beyond calyx; upper lip straight, ca. 3 × 8 mm, lobes to 1.5 mm; lower lip reflexed, ca. 5 × 13 mm; middle lobe inversely cordate, base with triangular pulvinate swelling inside, apex emarginate. Nutlets oblong-ovoid, ca. 3 × 2 mm, apex rounded, villous-tufted. Fl. Jul–Sep, fr. Sep–Oct.

• Grassy slopes; 4200–4500 m. Xizang.

Used medicinally in Xizang for convulsions.

29. *Nepeta cataria* Linnaeus, Sp. Pl. 2: 570. 1753.

荆芥 jing jie

Calamintha albiflora Vaniot; *Nepeta bodinieri* Vaniot.

Plants perennial. Stems 40–150 cm, white pubescent. Petiole 0.7–3 cm, slender; leaf blade ovate to triangular-cordate, 2.5–7 × 2.1–4.7 cm, adaxially yellow-green, hirtellous, abaxially whitish pubescent especially on veins, base cordate to truncate, margin coarsely crenate to dentate, apex obtuse to acute. Cymes axillary basally, upper ones in loose or compact, interrupted terminal panicles; bracts and

bracteoles subulate, minute. Calyx tubular, ca. 6×1.2 mm, white pubescent; teeth hirsute inside, subulate, 1.5–2 mm, posterior teeth longer, urceolate in fruit. Corolla white with purple spots on lower lip, white villous; throat pubescent inside, ca. 7.5 mm; tube slender, ca. 0.3 mm in diam., abruptly dilated into broad throat; upper lip ca. 2×3 mm, apex emarginate; middle lobe of lower lip subcircular, ca. 3×4 mm, cordate, margin coarsely dentate. Stamens included. Nutlets nearly triquetrous, ovoid, ca. 1.7×1 mm. Fl. Jul-Sep, fr. Sep-Oct.

• Thickets or around houses; to 2500 m. Cultivated in Gansu, Guizhou, Henan, Hubei, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan [Afghanistan, Japan; Africa, Europe, North America].

Dried leaves and flowering tops are used medicinally as a stimulant, tonic, carminative, diaphoretic, and for infantile colic.

30. *Nepeta fordii* Hemsley, J. Linn. Soc., Bot. 26: 289. 1890.

心叶荆芥 xin ye jing jie

Herbs perennial. Stems slender, 30–60 cm tall, pubescent. Petiole slender, 1–4 cm; leaf blade triangular-ovate, $1.5\text{--}6.4 \times 1.5\text{--}2$ cm, hirtellous, adaxially olive green, abaxially greenish, base cordate, margin crenate to dentate, apex acute. Cymes axillary, sometimes helicoid, in loose terminal panicles; bracts subulate, minute, ca. 2.5 mm. Calyx tubular, minutely hispid, ca. 4 mm, veins elevated; teeth subequal, lanceolate, ca. 1 mm. Corolla purple, ca. 8 mm, pubescent, glabrous inside; tube ca. 0.8 mm in diam. at base, narrowest part ca. 2 mm, abruptly dilated into throat ca. 3×3 mm; upper lip ca. 1.2 mm, 2-lobed; lower lip longer, middle lobe subcircular, ca. 2.5×2.2 mm, margin undulate. Style exserted. Nutlets dark purple-brown, ovoid, triquetrous, ca. 0.8×0.6 mm, glabrous. Fl. and fr. Apr-Oct.

• Thickets; 100–700 m. Guangdong, Henan, Hubei, Hunan, Shaanxi, Sichuan.

31. *Nepeta everardi* S. Moore, J. Bot. 16: 135. 1878.

浙荆芥 zhe jing jie

Herbs erect. Stems 60–100 cm, finely striate, puberulent. Petiole narrowly winged, 1.5–4.5 cm, puberulent; leaf blade triangular-cordate, $4\text{--}7.5 \times$ ca. 3.6 cm, thin papery, puberulent, base truncate to cordate, margin dentate-crenate, apex caudate-acuminate. Cymes 7–9-flowered, short pedunculate, in compact, terminal panicles on apices of stems and branches; floral leaves and bracts linear; bracteoles linear, 1–1.5 mm. Pedicel ca. 1 mm. Calyx tubular, ca. 5 mm, densely minute hispid, glandular, throat oblique; teeth lanceolate, ca. 1.7 mm, apex acute. Corolla purple, to 2 cm; tube ca. 0.6 mm in diam. at base, to 6 mm at mouth, puberulent; upper lip ca. 3×5 mm, minutely hispid near margin; middle lobe of lower lip inversely cordate, ca. 5×6 mm, base cordate, margin undulate, apex rounded; lateral lobes very distinct, subtruncate. Nutlets dark brown, ovoid, triquetrous, ca. 1.5×1 mm. Fl. May, fr. Aug.

• Thickets of low elevations. Anhui, Hubei, Zhejiang.

32. *Nepeta dentata* C. Y. Wu & Hsuan, Fl. Reipubl. Popularis Sin. 65(2): 589. 1977.

齿叶荆芥 chi ye jing jie

Nepeta atroviridis C. Y. Wu & Hsuan.

Herbs perennial. Stems ca. 80 cm, sparsely puberulent. Petiole 0.4–2.6 cm, sparsely hirtellous; leaf blade ovate-oblong or triangular-lanceolate to lanceolate, $3.2\text{--}10.5 \times (1\text{--})1.6\text{--}6.5$ cm, papery, sparsely hirtellous, adaxially olive green, abaxially greenish, densely yellow glandular, base rounded to cordate, margin coarsely crenate-dentate, apex acute to acuminate. Cymes 2–11-flowered, inserted on 6–10 apical stem and branch nodes, widely spaced; peduncle 3–15 mm; bracts and bracteoles linear, 1–1.5 mm. Pedicel 1–1.5 mm, glandular puberulent. Calyx purple-red throughout or abaxially, tubular, ca. 8.5 mm, ca. 2.5 mm in diam., glandular puberulent, throat oblique; posterior teeth 3–4 mm; anterior teeth 2, slightly shorter, narrowly lanceolate, base sparsely hirsute inside. Corolla blue-purple, ca. 2 cm, sparsely puberulent, yellow glandular; tube slender, base ca. 1 mm in diam., narrowest part ca. $1.5 \times$ as long as calyx, gradually dilated into throat ca. 8×6 mm; upper lip straight, ca. 2 mm; lower lip oblique, ca. 8 mm; middle lobe concave, cordate, ca. 5×7 mm, not bearded inside; lateral lobes semicircular, ca. 1.5×3.5 mm. Nutlets brown, globose-ovoid, ca. 1.5×1.2 mm, adaxially ribbed, glabrous. Fl. and fr. Aug.

• Forests, thickets, grassy hillsides, gravelly terraces; 2100–3500 m. Xizang.

Distinguished, in the original description, from *Nepta everardi*, by the coarsely crenate-dentate, ovate-oblong leaves.

33. *Nepeta sessilis* C. Y. Wu & Hsuan, Fl. Yunnan. 1: 577. 1977.

无柄荆芥 wu bing jing jie

Herbs perennial. Stems 50–80 cm, densely retrorse pubescent, sometimes intermixed with glandular puberulent hairs. Leaves sessile, largest on mid stem; leaf blade leathery, adaxially olive green, densely hirtellous, abaxially greenish, pubescent, with dark brown impressed glands, base cordate, margin undulate-crenate or shallowly serrate, apex obtuse to acute. Cymes dichotomous, 2–15-flowered, inserted in leaf axils of upper leaves; peduncle 3.5–4 mm; bracts and bracteoles linear, 1.5–3 mm, glandular pubescent. Pedicel ca. 1 mm, densely glandular pubescent. Calyx tubular, $7\text{--}9 \times 1.6\text{--}2$ mm, hirtellous, glandular puberulent, throat subregular; teeth subequal, oblong-lanceolate or lanceolate, 1.7–2 mm. Corolla blue, with white spots on middle lobe of lower lip, ca. 2.5 cm, puberulent; tube straight, base ca. 1.8 mm wide, narrowest part ca. $2 \times$ as long as calyx, gradually dilated into throat to 9×6.5 mm; upper lip straight, ca. 2.5 mm; lower lip oblique or slightly spreading, ca. 6 mm, 3-lobed; middle lobe of lower lip cordate, margin bent inward, undulate, glabrous inside, base slightly swollen; lateral lobes semicircular, distinct. Nutlets dark brown, triquetrous, ovoid, ca. $2 \times 1.3\text{--}1.6$ mm, glabrous. Fl. Aug-Sep, fr. Sep-Oct.

• Mountain slopes, thickets; 3100 m. Sichuan, Yunnan.

34. *Nepeta sungpanensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 590. 1977.

松潘荆芥 song pan jing jie

Herbs erect or suberect. Stems ca. 90 cm, much branched, puberulent. Petiole 2–10 mm, densely puberulent; leaf blade ovate-lanceolate to narrowly ovate, $1.5\text{--}3 \times 1\text{--}2$ cm, adaxially olive green, densely puberulent, abaxially greenish, densely puberulent, impressed glandular, base

rounded to truncate, margin incised-serrate, apex short acuminate to acute. Cymes dichotomous, in upper leaf axils; peduncle 2–10 mm; bracts and bracteoles minute, subulate. Pedicel 1–1.5 mm, puberulent. Calyx campanulate, 5–6 mm, dilated and urceolate in fruit, 11–15-veined, pubescent, mouth regular; teeth lanceolate to triangular-ovate, 1.2–3 mm, posterior 3 slightly longer. Corolla blue, ca. 2.2 cm, puberulent; upper lip straight, 2–4.5 mm; middle lobe of lower lip subcircular, ca. 6 mm wide, base abruptly clawed, margin undulate, apex slightly emarginate; lateral lobes short, indistinct. Nutlets ovoid, slightly flattened, ca. 1.5 × 1.2 mm, distinctly or indistinctly warty. Fl. Sep-Oct, fr. Oct-Nov.

• Open hillsides, wasteland adjacent to cultivated areas; 1700–2200 m. Sichuan (Songpan Xian).

Two varieties are sometimes recognized: var. *sunghanensis* has calyx 11–13-veined, with triangular-ovate teeth 1.2–1.5 mm, and distinctly warty nutlets; and var. *angustidentata* C. Y. Wu & Y. C. Huang (Fl. Reipubl. Popularis Sin. 65(2): 590, 1977) has calyx 13–15 veined, with lanceolate teeth ca. 3 mm, and nutlets indistinctly warty.

35. *Nepeta micrantha* Bunge, Fl. Altaic. 2: 401. 1830.

小花荆芥 xiao hua jing jie

Herbs annual. Stems erect, (2.5–)5–30(–35) cm, densely white pubescent, glandular puberulent. Petiole 1–3 cm, densely white pubescent; lower and mid stem leaf blades ovate, oblong-elliptic, to lanceolate, 0.8–4 × 0.7–3.5 cm, thin papery, adaxially olive green, puberulent, abaxially greenish, glandular pubescent, yellow glandular, base broadly cuneate to rounded, margin remotely 3–5-serrate or subentire, apex obtuse. Cymes in axils of upper leaves, (1–)2.5–6.5 cm; peduncle 0–5 mm, densely white pubescent, glandular puberulent; bracts linear, 2.5–3 mm. Calyx tubular, 3.5–4 × 1–1.2 mm, bottle-shaped and 4.5–6.5 × ca. 2 mm in fruit, densely white patent villous, yellow glandular, throat oblique; posterior teeth triangular to oblong-triangular, 0.7–1.1 mm, apex acute to acuminate, middle tooth longest; anterior teeth 2, narrowly lanceolate, apex acuminate. Corolla purplish, 4.5–6 mm, pilose; tube slender, ca. 2.5 × 0.7 mm, dilated into throat ca. 1 × 1.2 mm; upper lip straight, ca. 0.8 mm; lower lip almost 2 × as long as upper lip, spreading, lobed; middle lobe cordate, ca. 1.1 × 1.3 mm, reflexed, margin undulate, apex emarginate; lateral lobes semicircular, ca. 0.3 × 0.7 mm. Nutlets dark brown, oblong-ovoid, ca. 1.5 × 0.7 mm, adaxially obtusely ribbed, minutely tuberculate. Fl. and fr. Jun-Jul.

• Sandy areas. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan].

36. *Nepeta nuda* Linnaeus, Sp. Pl. 2: 570. 1753.

直齿荆芥 zhi chi jing jie

Nepeta pannonica Linnaeus.

Plants perennial. Stems erect, 50–120 cm, 3–5 mm in diam., rigid. Petiole 0–10 mm; leaf blade oblong-ovate or oblong-elliptic to lanceolate, 3.8–6.5 × 1.8–2.5 cm, adaxially greenish, sparsely puberulent or subglabrous, abaxially pale, pubescent, base truncate or shallowly cordate, margin crenate or serrate, apex obtuse to acute or acuminate. Cymes numerous, axillary, many flowered, in terminal panicles 3–8.5 × 2.5 cm; bracts and bracteoles linear, 1.5–2.5 mm. Pedicel 0.3–0.5 mm. Calyx tubular, 3–4 × 1–1.2 mm, pubescent, glandular puberulent inside; teeth subequal, subulate, 1.1–1.3 mm, margin narrow, membranous. Corolla

purplish, 5.5–8.5 mm, sparsely pubescent; tube ca. 0.9 mm wide at base, abruptly dilated into throat 1.5–2 × ca. 2.5 mm; upper lip straight, 1.8–2 mm, deeply divided into 2 ovate lobes; lower lip spreading, 4–6 mm, with middle lobe of lower lip broadly ovate-cordate, margin slightly undulate, apex emarginate. Nutlets brown, oblong, ca. 1.6 × 1.1 mm, adaxially ribbed, glabrous, apex minutely tuberculate, sparsely hairy. Fl. Jul-Sep, fr. Aug-Oct.

• Grasslands below forest zone, mountain basins, along valley streams; 1600–1900 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; Europe].

Used as a honey plant.

37. *Nepeta virgata* C. Y. Wu & Hsuan, Fl. Reipubl. Popularis Sin. 65(2): 590. 1977.

帚枝荆芥 zhou zhi jing jie

Herbs perennial. Stems obliquely ascending, ca. 30 cm, finely striate, subglabrous or slightly glandular puberulent. Petiole 1–2 mm; leaf blade ovate or ovate-elliptic, 1.5–3.5 × 0.7–1.5 cm, sparsely fine strigose, adaxially olive green, abaxially greenish, with small, yellowish impressed glands, base broadly cuneate to shallowly cordate, margin dentate-serrate, apex apiculate. Cymes 5–7-flowered, axillary, in narrow racemes; peduncle 1.5–8 mm; bracts and bracteoles linear, shorter than calyx, 2–3 mm. Calyx narrowly tubular, 4–5 mm, densely puberulent, throat regular; teeth lanceolate-subulate, nearly as long as tube, apex awned-acuminate. Corolla reddish, less than 1 cm, puberulent, glandular; tube slightly incurved, base ca. 0.6 mm wide, gradually dilated toward apex, abruptly dilated into throat ca. 1.5 × 1.5 mm; upper lip ca. 2.5 × 3 mm, apex deeply divided; lower lip downwardly oblique, with middle lobe reniform, ca. 2.5 × 3 mm, base bearded, emarginate. Nutlets unknown. Fl. Aug.

• Mountain basins. Xinjiang.

The relationship to *Nepeta nuda* needs careful consideration.

38. *Nepeta ucranica* Linnaeus, Sp. Pl. 2: 570. 1753.

尖齿荆芥 jian chi jing jie

Teucrium sibiricum Linnaeus.

Plants perennial. Stems 17–50 cm, erect or ascending, subglabrous or with upwardly curved, short, simple hairs. Petiole almost as long as blade basally, very short in upper leaves; leaf blade ovate to lanceolate or narrowly lanceolate, 1.5–3.5 × 1–1.8 cm, largest on mid stem, adaxially tinged gray-blue, glabrous or sparsely appressed puberulent, abaxially paler, puberulent, yellowish glandular, veins and margin pubescent, base shallowly cordate to broadly cuneate, margin dentate-serrate, apex acute or obtuse. Cymes pyramidal, compact, many flowered, terminal, cymules 3-flowered; peduncle 2–5 mm; bracts purple, linear, as long as calyx. Pedicel 1–2.5 mm. Calyx ca. 1.1 cm, tubular-campanulate, base densely white lanate, apex glandular; teeth triangular-subulate, at least as long as tube, apex long spiny. Corolla blue, 0.9–1.2 cm, pubescent, tube nearly included, gradually dilated into throat; middle lobe of lower lip reniform, 2–3 × 3–5 mm. Nutlets black-brown, ellipsoid, 2.5–2.7 mm, round-truncate at apex and base, densely depressed tuberculate. Fl. May-Jun, fr. Jun-Jul.

• Plains, grassy hills, open gravelly slopes. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan; Europe].

The specimens from Xinjiang are somewhat different from the range outside of China: 1) Leaves strongly dentate-serrate, green tinged

gray-blue; veins not shiny, impressed adaxially, elevated abaxially; 2) Pyramidal cymes compact, many flowered, terminal on stem and branches; peduncles of cymes 2–5 mm; 3) Calyx densely white lanate at apex. The correct name for our plant is uncertain; it may be the W Asian *Nepeta heliotropifolia* Lamarck.

39. *Nepeta pungens* Benth., *Labiata. Gen. Spec.* 487. 1834.

刺尖荆芥 ci jian jing jie

Nepeta fedtschenkoi Pojarkova.

Plants annual. Stems 5–25 cm, erect, pubescent, apex with short-stalked or sessile glands. Petiole 0.8–1.5 cm, subsessile upward; stem leaf blade ovate, 1.4–1.9 × 1–1.2 cm, adaxially olive green, sparsely puberulent, abaxially pubescent, stalked or sessile glandular, base broadly cuneate, margin remotely dentate to subentire, apex obtuse to acute, or spinescent-acuminate. Cymes 3–5-flowered, 2 or 3 upper pairs sessile, in dense ovoid capitula, basal pairs widely spaced with peduncle 3–13 mm; bracts petiolate, elliptic-lanceolate to lanceolate linear, 0.8–1.2 cm, rigid, margin entire, apex spinescent-acuminate, glandular, ciliolate. Calyx 5.5–7 mm, (13–)15-veined, villous, glandular; teeth subequal, 2.5–3.5 mm, straight, apex spinescent-acuminate. Corolla 7–8.5 mm, slightly pilose; tube slender, 4.5–5.8 mm, slightly curved, abruptly dilated into throat; upper lip 1.3–1.7 mm, concave, 2-lobed; middle lobe of lower lip reniform, 0.7–1 × 1.5–1.7 mm. Nutlets yellow-brown, obovoid, ca. 1.5 × 1 mm, adaxially ± distinctly ribbed. Fl. May–Jun, fr. Jun–Jul.

• Foothills above rivers, rocky areas. Xinjiang [Afghanistan, Kazakhstan, Mongolia, Russia; SW Asia].

40. *Nepeta multifida* Linnaeus, *Sp. Pl.* 2: 572. 1753.

多裂叶荆芥 duo lie ye jing jie

Nepeta lavendulacea Linnaeus f.

Herbs perennial. Rhizomes woody. Stems numerous, erect, to 40 cm tall, semiwoody, white villous. Petiole ca. 1.5 cm; leaf blade ovate, pinnatifid or pinnatifid, sometimes pinnatifid to subentire, 2.1–3.4 × 1.5–2.1 cm, adaxially puberulent, abaxially white-yellow or white hirtellous, glandular, base truncate to cordate, lobes linear-lanceolate to ovate, margin entire or remotely serrate, ciliate, apex acute. Verticillasters in continuous or rarely interrupted terminal spikes 6–12 cm; bracts leaflike, gradually reduced toward apex, ovate, ca. 1 cm basally, divided or entire, apex cuspidate, purplish, longer than flowers; bracteoles ovate-lanceolate to lanceolate, purplish, as long as to slightly longer than flowers. Calyx purple, base yellowish, ca. 5 × 2 mm, 15-veined, sparsely pubescent; teeth triangular, ca. 1 mm, apex acute. Corolla blue-purple, yellowish when dry, ca. 8 mm, intricately villous, tube gradually dilated toward throat. Anterior stamens shorter than upper lip of corolla, posterior stamens slightly longer. Nutlets brown, triquetrous, oblong, ca. 1.6 × 0.6 mm, base attenuate, smooth. Fl. Jul–Sep, fr. Aug–Oct.

• Margins of pine forests, grassy slopes, wet grasslands; 1300–2000 m. Gansu, Hebei, Nei Mongol, Shaanxi, Shanxi [Mongolia, Russia].

Source of an essential oil.

41. *Nepeta tenuifolia* Benth., *Labiata. Gen. Spec.* 468. 1834.

裂叶荆芥 lie ye jing jie

Elsholtzia integrifolia Benth.; *Nepeta vaniotiana* H. Léveillé.

Herbs annual. Stems 30–100 cm tall, much branched, sparsely gray pubescent. Leaves 3-fid, unequal; petiole 2–10 mm; leaf blade 1–3.5 × 1.5–2.5 cm, adaxially dark puberulent, abaxially gray-green, pubescent especially on veins and margin, glandular, base cuneate-decurrent into petiole, lobes lanceolate, 1.5–4 mm wide, with middle lobe largest, margin entire, apex acute. Spikes terminal, 2–13 cm, interrupted, of numerous verticillasters; bracts leaflike, reduced upward, as long as flowers; bracteoles linear, minute. Calyx tubular-campanulate, ca. 3 × 1.2 mm, gray pilose, 15-veined; teeth triangular-lanceolate to lanceolate, ca. 0.7 mm, apex acuminate, posterior teeth longer. Corolla violet, ca. 4.5 mm, pilose. Nutlets brown, triquetrous, oblong, ca. 1.5 × 0.7 mm, dotted. Fl. Jul–Sep, fr. Aug–Oct.

• Sloping forest margins, valleys; 500–2700 m. Gansu, Guizhou, Hebei, Heilongjiang, Henan, Liaoning, Qinghai, Shaanxi, Shanxi, Sichuan [Korea]; cultivated in Fujian, Jiangsu, Yunnan, Zhejiang.

Variety *japonica* (Maximowicz) Kitagawa is native to Japan.

A traditional Chinese herb used for diaphoresis and also as the source of an essential oil.

42. *Nepeta annua* Pallas, *Acta Acad. Sci. Imp. Petrop.* 2: 263. 1783.

小裂叶荆芥 xiao lie ye jing jie

Nepeta botryoides Solander; *Schizonepeta botryoides* (Solander) Briquet.

Herbs annual. Stems 13–26 cm tall, branched from base, white pilose, angles purple-brown. Petiole shorter to longer than blade; leaf blade broadly ovate to oblong-ovate, 1–2.3 × 0.7–2.1 cm, bipinnate-partite, white pilose, densely so abaxially, occasionally yellow glandular, lobes linear-oblong to ovate-oblong, margin entire or occasionally 1- or 2-serrate, apex obtuse to rounded. Spikes terminal, (1–)2–8 × 1.2–1.4 cm, white pilose; verticillasters numerous, 4–10-flowered, contiguous upward, widely spaced basally; floral leaves linear-lanceolate upward, as long as calyx, margin entire, apex acuminate; bracteoles linear-subulate, minute. Pedicel 1–4 mm. Calyx 5–6 × 3.5 mm, white pilose, throat oblique, 15-veined; teeth ovate, sinuses with a thickened fold, margin scarious, apex short spiny; posterior teeth ca. 1.8 mm, anterior teeth shorter. Corolla purplish, 6.5–8 mm, villous; tube 5–6 mm, gradually dilated upward; upper lip short, straight, 2-lobed; middle lobe of lower lip unequally dentate. Posterior stamens slightly exerted. Nutlets brown, triquetrous, oblong, 1.7–2 × 0.8–1 mm, base acute, apex rounded, sparsely hairy or glabrous. Fl. Jun–Aug, fr. Aug–Sep.

River terraces; 1700 m. Nei Mongol, Xinjiang, Xizang [Mongolia, Russia].

Source of an essential oil.

19. GLECHOMA Linnaeus, *Sp. Pl.* 2: 578. 1753, nom. cons.

活血丹属 huo xue dan shu

Herbs stoloniferous, perennial, gynodioecious or gynomonocious. Stems ascending to prostrate. Leaves long petiolate, base cordate. Verticillasters axillary, 2–6 (to many) flowered. Calyx tubular to campanulate, slightly curved near throat, 15-veined, indistinctly 2-lipped, adaxial lip 3-toothed, abaxial lip 2-toothed. Corolla tubular, dilated at apex, 2-lipped; adaxial lip straight, emarginate or 2-lobed; abaxial lip spreading, 3-lobed. Stamens 4, anterior 2 inserted below lateral lobes of abaxial lip, posterior 2 inserted near throat below adaxial lip; filaments glabrous, undeveloped in pistillate flowers; anther cells oblong, parallel or divergent. Ovary glabrous. Style slender, apex subequally 2-cleft. Nutlets dark brown, oblong-ovoid, smooth or impressed-punctate, glabrous.

About eight species: Asia, Europe, cultivated in North and South America; five species in China.

- 1a. Corolla rarely to 2 × as long as calyx.
- 2a. Calyx 5–7 mm, teeth ovate, ca. 1 mm; leaves glabrous 1. *G. hederacea*
- 2b. Calyx 9–11 mm, teeth ovate-triangular, 3–5 mm; leaves hairy 2. *G. longituba*
- 1b. Corolla usually more than 2 × as long as calyx.
- 3a. Leaves cordate-ovate, coarsely crenate to serrate-crenate; basal petioles 2–3 × as long as blade; corolla tube campanulate to tubular-campanulate.
- 4a. Plants (except flowers) sparsely retrorse pubescent; calyx teeth ovate-triangular, apex awned 2. *G. longituba*
- 4b. Plants villous, puberulent; calyx teeth triangular, apex spinescent-aristate 3. *G. biondiana*
- 3b. Leaves reniform to cordate-reniform, crenate; basal petioles more than 3 × as long as blade; corolla tube funnelliform.
- 5a. Calyx ca. 7–10 mm, teeth ovate; leaf blade ca. 2 × 3 cm 4. *G. grandis*
- 5b. Calyx 10–12 mm, teeth triangular-lanceolate, spinescent-aristate; leaf blade ca. 3 × 4–4.5 cm 5. *G. sinograndis*

1. *Glechoma hederacea* Linnaeus, Sp. Pl. 2: 578. 1753.

欧活血丹 ou huo xue dan

Nepeta glechoma Benth.

Stems 10–17 cm, ascending, base purplish, subglabrous, nodes retrorse strigose. Petiole of basal leaves 3.5–4 cm, 0.8–1.8 cm in upper leaves, with sparse, retrorse, minutely hooked hairs; upper blade larger than basal one, reniform to reniform-orbicular, 0.8–1.3 × ca. 2 cm, glabrous except sometimes sparsely retrorse strigose on abaxial veins, margin ± coarsely crenate, apex rounded. Cymes 2–4-flowered, in verticillasters; bracts and bracteoles subulate, ca. 1 mm. Calyx tubular, slightly curved at apex, 5–7 mm, hirtellous; teeth ovate, ca. 1 mm, apex acute, ciliate. Corolla purple, ca. 1 cm, hirtellous; tube ca. 7.5 mm, straight, funnelliform; upper lip straight, ca. 3 mm, 2-lobed, lobes oblong; lower lip obliquely spreading, ca. 4 mm, middle lobe flabellate, apex emarginate; lateral lobes ovate. Nutlets unknown. Fl. May.

Valley grasslands. Xinjiang (Gongliu Xian) [Russia; Europe].

Used medicinally for pneumonia and nephritis.

2. *Glechoma longituba* (Nakai) Kuprianova, Bot. Zhurn. (Moscow & Leningrad) 33: 236. 1948.

活血丹 huo xue dan

Glechoma hederacea Linnaeus var. *longituba* Nakai, Bot. Mag. (Tokyo) 35: 173. 1921; *G. brevityuba* Kuprianova; *Nepeta glechoma* Benth. var. *hirsuta* Debeaux; *N. glechoma* var. *sinensis* Miquel.

Stems 10–20(–30) cm, ascending, base purplish red, young parts sparsely villous. Petiole 1–2 × as long as blade; leaf blade of basal leaves smaller, cordate to subreniform, upper blade cordate, 1.8–2.6 × 2–3 cm, adaxially sparsely strigose or puberulent, abaxially purplish, veins pilose or hirsute, margin coarsely crenate or serrate-crenate, apex acute to obtuse. Verticillasters 2(–6)-flowered; bracts and bracteoles linear, to 4 mm, ciliate. Calyx tubular, 0.9–1.1 cm, villous especially on veins; teeth ovate-triangular, 3–5 mm, apex awned, ciliate, adaxial ones longer. Corolla blue to purple with dark spots on lower lip, tubular-campanulate, long-tubed

corolla 1.7–2.2 cm, short-tubed corolla 1–1.4 cm, ± villous, puberulent; upper lip straight, 2-lobed, lobes subreniform; lower lip elongated, obliquely spreading, middle lobe reniform, 2–3 × as long as upper lip, apex emarginate; lateral lobes oblong, ca. 1/2 as long as middle lobe. Nutlets ca. 1.5 × 1 mm, basally ± triquetrous, apex rounded. Fl. Apr–May, fr. May–Jun.

Grasslands, forest margins, forests, streamsides; 100–2000 m. All provinces except Gansu, Qinghai, Xinjiang, Xizang [Korea, Russia].

Used medicinally.

3. *Glechoma biondiana* (Diels) C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 31. 1974.

白透骨消 bai tou gu xiao

Stolons ascending, rooting at nodes. Stems 15–30 cm or more, young parts sparsely villous to puberulent, glabrescent, base sometimes purplish. Petiole of basal leaves ca. 3 × as long as blade, mid cauline petioles 1.2–2.5 cm; leaf blade of basal leaves smaller, mid cauline blade cordate, 2–4.2 × 1.9–3.8 cm, villous, abaxially purplish, margin coarsely crenate, apex needlelike-acute. Verticillasters 6–9-flowered; bracts and bracteoles linear, ca. 4 mm, ciliate. Calyx tubular to campanulate, slightly curved, 1–1.2 cm, villous, puberulent; teeth narrowly triangular, 4–5 mm, apex spinescent-aristate, ciliate. Corolla reddish to purplish, tubular-campanulate, 2–2.4 cm, sparsely villous; tube gradually dilated ascending, to 6 mm wide at throat; upper lip straight, broadly ovate, apex emarginate; lower lip obliquely spreading, middle lobe flabellate, apex emarginate; lateral lobes ovate. Nutlets basally slightly triquetrous, with impressed dots. Fl. Apr–May, fr. May–Jun.

• Wet fertile forest margins, streamsides; 1000–2200 m. Gansu, Hebei, Henan, Hubei, Shaanxi, Sichuan.

- 1a. Plants glabrous or puberulent on young parts, ca. 30 cm tall; calyx campanulate 1.2–1.5 cm, subglabrous except for pilose teeth 3b. var. *glabrescens*
- 1b. Plants villous or sparsely villous; calyx tubular-campanulate or tubular, villous, puberulent.

- 2a. Plants 15–30 cm tall, villous; verticillasters 6-flowered; calyx tubular-campanulate
 3a. var. *biondiana*
 2b. Plants more than 30 cm tall, sparsely villous; verticillasters (6–)9-flowered; calyx tubular
 3c. var. *angustituba*

3a. *Glechoma biondiana* var. *biondiana*

白透骨消 bai tou gu xiao

Dracocephalum biondianum Diels; *Meehaniopsis biondiana* (Diels) Kudô.

Plants 15–30 cm tall, villous. Verticillasters 6-flowered. Calyx tubular-campanulate.

• Wet fertile forest margins, streamsides; 1000–1700 m. Shaanxi.

3b. *Glechoma biondiana* var. *glabrescens* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 31. 1974.

无毛变种 wu mao bian zhong

Plants ca. 30 cm tall, glabrous or puberulent on young parts, long stoloniferous. Calyx campanulate, 1.2–1.5 cm, subglabrous except pilose on teeth.

• Wet fertile valley forests, streamsides; 1200–2200 m. Gansu, Hebei, Henan, Hubei, Shaanxi.

3c. *Glechoma biondiana* var. *angustituba* C. Y. Wu & C. Chen, Acta Phytotax. Sin. 12: 31. 1974.

狭萼变种 xia e bian zhong

Plants more than 30 cm tall, sparsely villous. Verticillasters (6–)9-flowered. Calyx tubular.

• Dense forests. Hubei, Sichuan.

4. *Glechoma grandis* (A. Gray) Kuprianova, Bot. Zhurn. (Moscow & Leningrad) 33: 237. 1948.

日本活血丹 ri ben huo xue dan

Nepeta glechoma Bentham var. *grandis* A. Gray, Mem. Amer. Acad. Arts 6: 402. 1858; *Glechoma hederacea* Linnaeus var. *grandis* (A. Gray) Kudô.

Stems tufted, ca. 20 cm tall, erect becoming prostrate, base purple, pubescent. Petioles of basal leaves 3–4.5 cm, hirsute, upper petioles 2–3.5 cm, pilose; leaf blade reniform, 1.5–2 × 2–3 cm, herbaceous, adaxially strigose, abaxially pilose on veins, margin crenate, apex rounded. Verticillasters 2(–4)-flowered; bracts and bracteoles linear-subulate, ca. 2 mm, ciliate. Calyx tubular, slightly dilated at apex, 7–10 mm, villous; teeth ovate, 1.5–2 mm, apex needlelike, ciliate. Corolla purplish, straight, funnelliform, 1.5–2 cm, villous outside, pilose on throat inside; adaxial lip straight, lobes subcircular, lower lip erect, middle lobe wide, flabellate, apex emarginate; lateral lobes ovate, as long as upper lip. Nutlets base slightly triquetrous, apex rounded. Fl. Apr–May, fr. Jun.

Wet areas, near houses. Jiangsu, Taiwan [Japan].

5. *Glechoma sinograndis* C. Y. Wu, Acta Phytotax. Sin. 8: 7. 1959.

大花活血丹 da hua huo xue dan

Stolons ascending. Stems to 25 cm, sparsely floccose-villous. Petiole of upper leaves 1.5–2 × as long as blade, densely villous; leaf blade of basal leaves reniform, villous; upper blade cordate-reniform, 1–3.5 × 1.5–5 cm, adaxially hirtellous, abaxially purplish, sparsely puberulent, red glandular, veins spreading hirtellous, margin remotely mucronate-crenate, apex obtuse. Verticillasters inserted in middle axils, 2(–4)-flowered; peduncle less than 5 mm, villous; bracts and bracteoles linear-subulate, ciliate. Pedicel ca. 3 mm, villous. Calyx tubular 1–1.2 cm, finely glandular, veins sparsely villous; teeth triangular-lanceolate, 3.5–4 mm, apex spinescent, ciliate. Corolla reddish or bluish, straight, funnelliform, 2.5–2.7 cm, ± pilose; upper lip straight; middle lobe of lower lip subcircular, margin undulate, apex emarginate; lateral lobes ovate, as long as upper lip. Nutlets ca. 2 × 1 mm, base slightly triquetrous, apex subrounded, smooth, slightly shiny. Fl. Apr–May, fr. Jun.

• Wet mixed forests near streams; 2000–3000 m. Yunnan.

Used medicinally for infantile bronchitis.

20. SUZUKIA Kudô, J. Soc. Trop. Agric. 2: 145. 1930.

台钱草属 tai qian cao shu

Herbs stoloniferous. Stems slender, densely spreading white hirsute. Leaves long petiolate, circular, cordate, or reniform, margin with ovate-deltoid to broadly ovate and apically callose-acute teeth. Verticillasters few flowered, in interrupted terminal racemes; floral leaves similar to cauline leaves. Calyx obconical-campanulate, slightly 2-lipped; teeth ovate-deltoid, 3 of upper lip larger than 2 of lower lip, apex slightly curved. Corolla tubular, dilated at apex, pilose annulate near base inside, 2-lipped; upper lip ovate, galeate; middle lobe of lower lip trapeziform, deeply 2-lobulate, lateral lobes elliptic-obovate. Stamens 4, didynamous, much exserted, anterior 2 longer; filaments complanate; anther cells 2, parallel. Style apex equally 2-cleft. Nutlets triquetrous, ovoid, rounded at apex and on backside, shiny, glabrous.

Two species: China, Japan; both in China.

- 1a. Middle lobe of abaxial corolla lip entire 1. *S. shikikunensis*
 1b. Middle lobe of abaxial corolla lip irregularly incised 2. *S. luchuensis*

1. *Suzukia shikikunensis* Kudô, J. Soc. Trop. Agric. 2: 146. 1930.

台钱草 tai qian cao

Glechoma shikikunensis (Kudô) Masamune.

Stems long procumbent, internodes much longer than leaves. Petiole slender, 5–10 mm; leaf blade subcircular to reniform-circular, rarely subcordate, 1–1.5 × 1–1.5 cm, membranous, sparsely white hirsute, base shallowly cordate,

margin remotely serrate, apex subrounded. Verticillasters 2-flowered, in apical axils, widely spaced or 3 or 4 in interrupted racemes; bracts oblong, base attenuate, margin entire, apex acute, ciliate. Pedicel ca. 1.5 mm. Calyx 5–6 mm, conspicuously 5-veined, veins white hirsute; teeth 1–1.5 mm, smaller than those of upper lip, apex callose-acute, slightly curved. Corolla red, ca. 1.4 cm, puberulent mainly abaxially, puberulent annulate inside; tube ca. 1.1 cm, subcylindrical, ca. 2 mm wide, slightly dilated at throat; upper lip ovate, ca. 3 mm, subgaleate; lower lip obliquely spreading, ca. 4 × 3 mm, 3-lobed; middle lobe largest, trapeziform, deeply lobulate; lateral lobes elliptic-obovate. Nutlets dark brown, ca. 2 × 1.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

- Hilly forests. Taiwan.

2. *Suzukia luchuensis* Kudô, J. Soc. Trop. Agric. 3: 226. 1931.

齿唇台钱草 chi chun tai qian cao

Stem internodes 3.5–4.5 cm, much longer than leaves. Petiole slender, 6–8 mm; leaf blade subcircular, ca. 1.5 cm in diam., membranous, densely white hirsute, base shallowly cordate, margin crenate, apex obtuse to acute. Verticillasters 2-flowered, apical. Pedicel short. Calyx to 7 mm, 10-veined, densely white hirsute; throat pubescent, oblique; teeth subequal, ca. 2 mm, apex acuminate, slightly curved. Corolla ca. 1.4 cm, tube ca. 9 × 1.5 mm; upper lip ovate, galeate, ca. 4 mm, pubescent; lower lip wide, obliquely spreading, ca. 8 × 6 mm; middle lobe largest, subrhombic, ca. 4 × 5 mm, margin irregularly incised; lateral lobes ovate, ca. 1.5 mm wide. Nutlets brown, ca. 2 × 1.2 mm, adaxially ribbed. Fl. Jul.

Hills. Taiwan [Japan including Ryukyu Islands].

21. MARMORITIS Bentham, Bot. Misc. 3: 377. 1833.

扭连钱属 niu lian qian shu

Phyllophyton Kudô

Herbs perennial, villous, rhizomatous or stoloniferous. Stems erect or ascending. Leaves widely spaced, smaller or absent basally, overlapping upward, sessile or subsessile; leaf blade subcircular to reniform-ovate, papery. Verticillasters apical, obscured by upper leaves; bracts small, linear-subulate. Calyx tubular, straight or slightly curved, 15-veined, tube villous annulate inside, ± 2-lipped, upper lip 3-toothed, lower lip 2-toothed. Corolla tubular, gradually dilated at apex, exerted, usually resupinate, 2-lipped; upper lip (apparent lower lip when corolla resupinate) straight, 2-lobed; lower lip (apparent upper lip when corolla resupinate) 3-lobed, middle lobe slightly cuculate, lateral lobes oblong to oblong-ovate. Stamens 4, didynamous, anterior 2 (posterior when corolla resupinate) shorter, included, posterior 2 sometimes long exerted; anther cells 2, divergent. Ovary glabrous. Style slender, apex 2-cleft. Nutlets oblong-ovoid, smooth, base small umbonate.

About five species: China, India; all in China.

- 1a. Corolla not resupinate; plants brown lanate 1. *M. pharicus*
 1b. Corolla resupinate; plants villous, hirsute or tomentose.
 2a. Calyx teeth ovate to ovate-triangular; plants white villous.
 3a. Calyx apex pilose; lobes of lower lip of corolla oblong 2. *M. complanatum*
 3b. Calyx glabrous; lobes of lower lip of corolla circular 3. *M. decolorans*
 2b. Calyx teeth lanceolate to triangular; plants hirsute or tomentose.
 4a. Corolla 2-lipped, bluish, 1.5–1.7 cm; posterior stamens exerted 4. *M. nivalis*
 4b. Corolla regular, white, 1.9–2.2 cm; stamens included 5. *M. rotundifolia*

1. *Marmoritis pharicus* (Prain) A. L. Budantzev, Bot. Zurn. (Moscow & Leningrad) 77(12): 125. 1992.

帕里扭连钱 pa li niu lian qian

Nepeta pharica Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 59: 306. 1891; *Phyllophyton pharicum* (Prain) Kudô; *Pseudolophanthus pharicus* (Prain) Kuprianova.

Herbs perennial, brown lanate throughout. Rhizomes trailing. Stems erect, 4–10 cm. Upper leaves overlapping, circular, 1.5–2 cm in diam., margin crenate. Cymes axillary, sessile, few flowered, shorter than leaves; bracts small. Calyx ca. 9 mm, flaccid tomentose, tube villous inside; upper lip with 3 wide short teeth. Corolla ca. 1.6 cm; tube straight, slightly dilated at throat. Stamens included or slightly exerted. Nutlets linear-oblong, ca. 2.8 mm, smooth.

- Moraines; 5000 m. Xizang (Yadong Xian).

2. *Marmoritis complanatum* (Dunn) A. L. Budantzev, Bot. Zurn. (Moscow & Leningrad) 77(12): 125. 1992.

扭连钱 niu lian qian

Nepeta complanata Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 122. 1913; *Dracocephalum rockii* Diels; *Glechoma complanata* (Dunn) Turrill; *Phyllophyton complanatum* (Dunn) Kudô; *Pseudolophanthus complanatus* (Dunn) Levin.

Rhizomes woody, brown. Stems numerous, ascending or prostrate, 13–25 cm, apex white villous, finely glandular, base purple-red, leafless, subglabrous. Leaves crowded, largest at mid stem; petiole short or obsolete; leaf blade broadly ovate-orbicular to subreniform, 1.5–2.5 × 2–3 cm, papery, white villous, adaxial veins glabrous, base broadly cuneate to subcordate, margin crenate, ciliate, apex obtuse to rounded. Cymes 3-flowered; peduncle 1–3 mm; bracts linear-subulate. Pedicel 1–2 mm, villous. Calyx 0.9–1.2 cm, densely white hirsute, conspicuously veined; limb oblique, 2-lipped; teeth ovate to ovate-triangular, ciliate. Corolla reddish, 1.5–2.3 cm, sparsely puberulent; tube tubular, dilated at apex; limb resupinate; middle lobe of upper lip widest, ovate-oblong, apex sometimes emarginate; lateral lobes small, broadly ovate-oblong; lobes of lower lip oblong, straight, ca. 4 mm. Nutlets oblong to oblong-ovoid, adaxially slightly triquetrous. Fl. Jun–Jul, fr. Jul–Sep.

• Crevices of weathered rocks, stony alluvial fans; 4300–5000 m. Qinghai, Sichuan, Xizang, Yunnan.

3. Marmoritis decolorans (Hemsley) H. W. Li, *Novon* 3: 157. 1993.

褪色扭连钱 tui se niu lian qian

Nepeta decolorans Hemsley, *Hooker's Icon. Pl.* 25: t. 2470. 1896; *Glechoma decolorans* (Hemsley) Turrill; *Phyllophyton decolorans* (Hemsley) Kudô; *Pseudolophanthus decolorans* (Hemsley) Levin.

Rhizomes woody, brown-purple, branched. Stems ascending or subprostrate, much branched, apex white sericeous-villous, finely glandular, base purplish, puberulent. Petiole short or obsolete; blade of mid cauline leaves circular to reniform, 1.5–2 × 2–2.7 cm, adaxially corrugate, densely white sericeous-villous, abaxially yellowish glandular, base cuneate to broadly cuneate, margin crenate, ciliate, apex rounded to subobtusely, veins spreading white villous. Cymes 2- or 3-flowered; peduncle ca. 1.5 mm; bracteoles subulate or sublanate. Pedicel ca. 1.2 mm. Calyx slightly dilated at apex, curved, 1–1.2 cm, densely white villous, puberulent, conspicuously veined; teeth ovate, ca. 1.5 mm, teeth of upper lip wider than those of lower lip. Corolla yellowish or blue, 1.1–1.4 cm, puberulent and villous near throat, tube resupinate; middle lobe of apparent upper lip wide, rhombic-flabellate, apex emarginate; lateral lobes small, circular; lobes of lower lip straight, circular, ca. 2 mm. Nutlets brown, oblong-ovoid, smooth. Fl. Jul, fr. Aug-Sep.

• Stony sandy slopes, valleys; 4800–5000 m. Xizang.

4. Marmoritis nivalis (Jaquemont ex Benth) Hedge, *Fl. Pakistan* 192: 119. 1990.

雪地扭连钱 xue di niu lian qian

Nepeta nivalis Jaquemont ex Benth, *Labiata. Gen. Spec.* 737. 1835; *Phyllophyton nivale* (Jaquemont ex

22. MEEHANIA Britton, *Bull. Torrey Bot. Club* 21: 33. 1894.

龙头草属 long tou cao shu

Herbs annual or perennial, stoloniferous. Stems erect, nodes hairy, base sometimes woody. Leaves cordate-ovate to lanceolate, papery, margin dentate. Verticillasters few flowered, lax, in terminal or sometimes axillary racemes, sometimes 2-flowered; floral leaves leaflike, lanceolate, gradually reduced upward; bracteoles 2, small, subulate or nearly bristly. Calyx campanulate or tubular-campanulate, hairy, glabrous inside, 15-veined, dilated in fruit, 2-lipped; teeth ovate-triangular to lanceolate, 3 in upper lip, 2 in abaxial. Corolla purplish to purple, tubular, base narrower, gradually dilated to throat, not hairy annulate inside, 2-lipped; upper lip shorter, straight, apex emarginate or 2-lobed; lower lip long, 3-lobed, with middle lobe larger. Stamens 4, didynamous, included or posterior 2 slightly exerted, sometimes slightly complanate; anther cells 2, puberulent. Style slender, exerted, apex equally 2-cleft. Nutlets oblong to oblong-ovoid, glabrous.

About seven species: six in temperate to subtropical Asia, one in North America; five species in China.

- 1a. Leaves ovate to narrowly lanceolate, base slightly cordate or cuneate.
 - 2a. Leaves ovate, base subtruncate to slightly cordate, 2.8–5 cm wide; inflorescence short, floral leaves different from cauline leaves 4. *M. faberi*
 - 2b. Leaves narrowly lanceolate to lanceolate, 1.2–2.5 cm wide; inflorescence long, floral leaves similar to cauline leaves 5. *M. pinfaensis*
- 1b. Leaves cordate to ovate, base cordate, rarely truncate to rounded.
 - 3a. Verticillasters in terminal and lateral racemes; calyx tube narrowly tubular 3. *M. henryi*
 - 3b. Verticillasters in terminal racemes or 2-flowered inserted in leaf axils of upper 2 or 3 leaf pairs on stem; calyx campanulate or ± tubular.
 - 4a. Calyx campanulate, inconspicuously veined, floccose-villous on veins, teeth ovate to ovate-triangular,

Benth) C. Y. Wu; *Pseudolophanthus nivalis* (Jaquemont ex Benth) Levin.

Herbs perennial, hirsute and glandular throughout. Stems 10–15 cm. Leaves sessile or subsessile; leaf blade circular, or circular-ovate to subreniform, 1.5–2.2 × 1–2.4 cm, base rounded to subcordate, margin crenate, apex rounded. Cymes sessile upward; peduncle 2–5 mm at mid inflorescence; floral leaves shorter than to almost as long as peduncle; bracts small, linear-subulate. Calyx dilated at apex, very slightly incurved, 8–10 mm, pilose annulate inside; teeth triangular to lanceolate, narrow, 3–5 mm. Corolla bluish, resupinate, 1.5–1.7 cm; tube exerted, gradually dilated at apex; middle lobe of apparent upper lip denticulate; lateral lobes small, broadly ovate, lobes of apparent lower lip broadly ovate. Nutlets oblong-ovoid, smooth, brown.

• Stony alluvial fans; 5000–5300 m. Xizang.

5. Marmoritis rotundifolia Benth, *Bot. Misc.* 3: 377. 1833.

圆叶扭连钱 yuan ye niu lian qian

Nepeta rotundifolia (Benth) Benth; *N. tibetica* Jaquemont ex Benth; *Phyllophyton tibeticum* (Jaquemont ex Benth) C. Y. Wu; *Pseudolophanthus tibeticum* (Jaquemont ex Benth) Kuprianova.

Rhizomes slender. Stems ascending or prostrate, 7.5–15 cm, much branched, tomentose. Petiole 4–8.3 mm; leaf blade circular or flabellate, 1.2–2.5 cm, ± leathery, base truncate-cuneate to cuneate, margin crenate, apex rounded, corrugate, pubescent-lanate. Cymes axillary, few flowered, shorter than leaves; bracts filiform, shorter than pedicels. Calyx ca. 1.2 cm, slightly incurved, flaccid villous; teeth subequal, lanceolate to subulate, shorter than calyx tube. Corolla white, ca. 1.8 cm, erect, throat dilated, funnellform, limb small, regular. Nutlets linear-oblong, ca. 6 mm, smooth.

Stony alluvial fans; 5300 m. Xizang [India].

- subequal 1. *M. urticifolia*
 4b. Calyx narrow, ± tubular, conspicuously veined, sparsely pubescent on veins, teeth triangular to narrowly triangular 2. *M. fargesii*

1. *Meehania urticifolia* (Miquel) Makino, Bot. Mag. (Tokyo) 13: 159. 1899.

荨麻叶龙头草 qian ma ye long tou cao

Dracocephalum urticifolium Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 109. 1865; *Cedronella urticifolia* (Miquel) Maximowicz; *D. sinense* S. Moore; *Glechoma urticifolia* (Miquel) Makino.

Herbs perennial. Stems slender, erect, tufted, 20–40 cm, unbranched, villous or retrorse villous when young, glabrous or subglabrous except for nodes. Leaves largest at mid stem; petiole 0.5–4 cm, shorter toward apex, sometimes obsolete; leaf blade cordate to ovate-cordate, 3.2–8.2 × 2.6–6.8 cm, pilose, base cordate, margin serrate to crenate-serrate, apex acuminate to acute. Verticillasters 2- to few flowered, in terminal racemes; adaxial floral leaves ovate to lanceolate, less than 3.5 cm, villous; bracteoles subulate, ca. 1 mm. Pedicel 3–9 mm. Calyx campanulate, 1.3–1.8 cm, floccose-pilose or sparsely puberulent; teeth ovate to ovate-triangular, ca. 3 mm, ciliate, apex acute or cuspidate, rarely acuminate, adaxial teeth longer. Corolla bluish purple to purple-red, 2.2–4 cm, villous, gradually dilated at apex; upper lip straight, elliptic, 2-lobed, lobes circular to suboblong; lower lip dilated, middle lobe flabellate, apex emarginate; lateral lobes small, subovate to oblong, 2/5–1/2 as long as middle lobe. Nutlets ovoid-oblong, adaxially slightly triquetrous at base, pubescent, base small umbonate. Fl. May–Jun, fr. Jun.

Mossy areas in mixed and coniferous forests. Jilin, Liaoning [Japan, Korea, Russia].

2. *Meehania fargesii* (H. Léveillé) C. Y. Wu, Acta Phytotax. Sin. 8: 12. 1959.

华西龙头草 hua xi long tou cao

Herbs perennial. Stems slender, base prostrate or stoloniferous, ascending-erect, 10–20(–45) cm, pubescent. Leaves larger basally; petiole 0.5–2.5 cm, shorter toward apex; leaf blade cordate to oblong-ovate, 2.5–15 × 2–4.5 cm, papery, adaxially sparsely strigose, abaxially pilose, base cordate, margin crenate to obtuse serrate, apex apiculate. Verticillasters 2- (to many) flowered, at upper 1–3 nodes or in a terminal raceme; bracts reduced toward stem apex, narrowly ovate to sublanceolate, margin dentate; bracteoles ca. 1 mm. Pedicel 2–6 mm. Calyx tubular, 1.5–1.8 cm, densely puberulent, upper lip longer; teeth ovate-triangular to narrowly triangular, sometimes slightly curved, 2–3 mm, ciliate, apex acuminate. Corolla reddish to purple-red, 2.8–4.5 cm, pubescent; tube straight, tubular, gradually dilated at apex; limb partly villous inside; upper lip straight, lobes circular to oblong; middle lobe of lower lip subcircular, margin undulate; lateral lobes oblong to circular, 1/2 as long as middle lobe. Nutlets unknown. Fl. Apr–Jun, fr. Jul.

• Shady areas in mixed evergreen, and coniferous forests; 700–3500 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

- 1a. Verticillasters 6- to many flowered, conspicuously pedunculate, in terminal racemes

- 2c. var. *pedunculata*
 1b. Verticillasters 2-flowered, inconspicuously pedunculate, inserted in 1–3 upper stem nodes.
 2a. Stem much branched, bearing trailing stolons; leaves oblong-ovate, 3–15 cm, crenate 2b. var. *radicans*
 2b. Stem unbranched, base prostrate; leaves cordate or ovate to ± triangular, 2.5–6.5 cm, sparsely serrate or obtusely serrate.
 3a. Leaves ovate to triangular-ovate, papery, short petiolate to sessile 2d. var. *pinetorum*
 3b. Leaves cordate, ovate-cordate to triangular-cordate, 2.8–6.5 cm, thin papery; petioles 0.5–2.5 2a. var. *fargesii*

2a. *Meehania fargesii* var. *fargesii*

华西龙头草 hua xi long tou cao

Dracocephalum fargesii H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 246. 1911.

Stems unbranched, base procumbent. Petiole 0.5–2.5 cm; leaf blade cordate or ovate-cordate to triangular-cordate, 2.8–6.5 cm, papery. Verticillasters 2-flowered, inconspicuously pedunculate, inserted in upper 1–3 stem nodes.

• Shady areas in mixed and coniferous forests; 1900–3500 m. Sichuan, Yunnan.

Used medicinally.

2b. *Meehania fargesii* var. *radicans* (Vaniot) C. Y. Wu, Acta Phytotax. Sin. 8: 13. 1959.

走茎变种 zou jing bian zhong

Dracocephalum radicans Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 180. 1904; *Meehania radicans* (Vaniot) A.L. Budantzev.

Stems tall, much branched, stoloniferous. Leaves oblong-ovate, 3–15 cm, base cordate, margin crenate. Verticillasters 2-flowered, short pedunculate, inserted in upper 1–3 stem nodes.

• Evergreen and mixed deciduous broad-leaved forests; 1200–1800 m. Guangdong, Hubei, Jiangxi, Sichuan, Yunnan, Zhejiang.

Used medicinally for colds and snake bites.

2c. *Meehania fargesii* var. *pedunculata* (Hemsley) C. Y. Wu, Acta Phytotax. Sin. 8: 14. 1959.

梗花变种 geng hua bian zhong

Dracocephalum urticifolium Miquel var. ? *pedunculatum* Hemsley, J. Linn. Soc., Bot. 26: 293. 1890.

Stems robust, much branched, without trailing stolons. Leaves triangular-ovate. Verticillasters 6- to many flowered, conspicuously short or long pedunculate, in terminal racemes.

• Montane evergreen, coniferous, and mixed broad-leaved forests; 1400–3500 m. Guangxi, Hubei, Hunan, Sichuan, Yunnan.

Used medicinally for diarrhea.

2d. *Meehanian fargesii* var. *pinetorum* (Handel-Mazzetti) C. Y. Wu, Acta Phytotax. Sin. 8: 15. 1959.

松林变种 song lin bian zhong

Dracocephalum urticifolium Miquel var. *pinetorum* Handel-Mazzetti, Akad. Wiss. Wien Sitzungsber., Math.-Naturwiss. Kl. Abt. 1, 57: 236. 1925; *D. simplex* Vaniot; *Meehanian pinetorum* (Handel-Mazzetti) Kudô; *M. urticifolia* (Miquel) Makino var. *pinetorum* Handel-Mazzetti.

Plants xerophilous, 12–45 cm tall, erect. Leaves sessile or subsessile, smaller upward, petiole 1.3–2.5 cm; leaf blade ovate to triangular-ovate, 2.5–5 cm, papery. Verticillasters in long, loose racemes; floral leaves sessile or nearly so.

- Pine forests; 700–2700 m. Guizhou, Sichuan, Yunnan.

3. *Meehanian henryi* (Hemsley) Sun ex C. Y. Wu, Acta Phytotax. Sin. 8: 15. 1959.

龙头草 long tou cao

Herbs perennial. Stems erect, 30–60 cm, pilose when young, glabrous or subglabrous except villous on nodes. Leaves subsessile at stem apex; petiole less than 10 cm, sometimes dilated at apex; leaf blade 4–13(–17) × 1.8–4(–10) cm, papery or ± membranous, adaxially puberulent, abaxially subglabrous, apex acuminate. Verticillasters 2- to many flowered, in terminal and lateral racemes 6–7 cm; bracts ovate-lanceolate or lanceolate, 3–6 mm, margin dentate; bracteoles subulate, ca. 1 mm. Pedicel 1–4 mm. Calyx narrowly tubular, opening slightly at mouth, 1–1.3 cm, puberulent, base saccate in fruit; teeth triangular, 3–4 mm, ciliate, apex acuminate, adaxial teeth longer. Corolla reddish purple or purplish, 2.3–2.7 cm, sparsely puberulent; tube straight, tubular, slender, gradually dilated at apex; upper lip slightly curved, lobes oblong; middle lobe of lower lip flabellate, apex emarginate, villous inside; lateral lobes oblong, ca. 1/2 as long as middle lobe. Stamens included. Nutlets globose-oblong, smooth, densely pubescent, adaxially slightly triquetrous, base small umbonate. Fl. Sep, fr. Oct.

- Streamsides, evergreen broad-leaved and mixed forests; 500–700 m. Guizhou, Hubei, Hunan, Sichuan.

- 1a. Leaf blade narrowly elliptic-oblong, base rounded 3c. var. *stachydifolia*
- 1b. Leaf blade cordate to narrowly triangular-ovate, base truncate to cordate.
 - 2a. Leaves cordate to ovate, base cordate, undulate-serrate to coarsely serrate 3a. var. *henryi*
 - 2b. Leaves narrowly triangular-ovate, base truncate to shallowly cordate, sparsely serrate 3b. var. *kaitcheensis*

3a. *Meehanian henryi* var. *henryi*

龙头草 long tou cao

Dracocephalum henryi Hemsley, J. Linn. Soc., Bot. 26: 291. 1890; *D. cavaleriei* H. Léveillé; *Meehanian urticifolia* (Miquel) Makino var. *henryi* (Hemsley) Kudô.

Leaves cordate to ovate, base cordate, margin undulate-serrate to coarsely serrate.

- Evergreen broad-leaved and mixed forests of low elevations. Guizhou, Hubei, Hunan, Sichuan.

Used medicinally as a tonic and for snake bites.

3b. *Meehanian henryi* var. *kaitcheensis* (H. Léveillé) C. Y. Wu, Acta Phytotax. Sin. 8: 16. 1959.

长叶变种 chang ye bian zhong

Dracocephalum kaitcheense H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 422. 1910.

Petiole dilated at apex; leaf blade narrowly triangular-ovate, base truncate to shallowly cordate, margin sparsely serrate. Racemes terminal or axillary, composed of verticillasters.

- Valley streamsides, moist forests; 500 m. Guizhou.

3c. *Meehanian henryi* var. *stachydifolia* (H. Léveillé) C. Y. Wu, Acta Phytotax. Sin. 8: 16. 1959.

圆基叶变种 yuan ji ye bian zhong

Dracocephalum stachydifolium H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 422. 1910.

Petiole slightly dilated at apex, villous; leaf blade narrowly elliptic-oblong, base rounded, margin sparsely serrate. Terminal raceme shorter or ternate on stem apex.

- Streamsides in montane forests; 700 m. Guizhou.

4. *Meehanian faberi* (Hemsley) C. Y. Wu, Acta Phytotax. Sin. 8: 17. 1959.

肉叶龙头草 rou ye long tou cao

Dracocephalum faberi Hemsley, J. Linn. Soc., Bot. 26: 291. 1890; *Meehanian urticifolia* (Miquel) Makino var. *faberi* (Hemsley) Kudô.

Herbs perennial. Stems erect, slender, 18–25 cm, unbranched, retrorse pubescent or puberulent when young, glabrescent except on nodes. Leaves in 2 or 3 pairs, crowded upward; petiole 0.5–2.5 cm, shorter to obsolete upward; leaf blade ovate to ovate-elliptic, 5–11 × 1.5–5 cm, ± succulent, adaxially subglabrous or puberulent, abaxially subglabrous, veins pilose or sparsely pubescent, margin sparsely undulate-crenate to dentate, rarely subentire, apex acute to acuminate or sometimes rounded. Verticillasters 2-flowered, in terminal or rarely axillary racemes; bracts ovate-lanceolate to lanceolate, 2–3 mm. Pedicel ca. 2 mm. Calyx tubular, gradually open at mouth, 1.1–1.3 cm, puberulent; teeth triangular-ovate, ca. 1/3 as long as calyx, apex acuminate. Corolla purple or reddish, 3.5–4 cm, puberulent; tube straight or slightly curved, gradually dilated at apex; upper lip straight, lobes oblong; middle lobe of lower lip nearly square, apex truncate or emarginate; lateral lobes oblong, ca. 1/2 as long as middle lobe. Nutlets unknown. Fl. Jul-Sep, fr. Oct.

- Mixed forests; 1500 m. Gansu, Sichuan.

5. *Meehanian pinfaensis* (H. Léveillé) Sun ex C. Y. Wu, Acta Phytotax. Sin. 8: 17. 1959.

狭叶龙头草 xia ye long tou cao

Dracocephalum pinfaense H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 422. 1910; *D. esquirolii* H. Léveillé; *D. urticifolia* (Miquel) Makino var. *angustifolia* (Dunn) Handel-Mazzetti.

Herbs annual. Stems ca. 50 cm, slender, erect, unbranched, pubescent or retrorse pubescent when young,

glabrescent, villous on nodes. Petiole 0.4–2.5 cm, shorter toward stem apex; leaf blade narrowly lanceolate to lanceolate, sometimes slightly curved, 6–12 × 1.2–2.5 cm, papery, puberulent, base rounded to subtruncate, margin sparsely serrulate or undulate-serrulate, apex acuminate. Verticillasters 2-flowered, in upper axils; bracts lanceolate, less than 2.5 cm, margin dentate or subentire. Pedicel 1–4 mm. Calyx tubular, slightly open at mouth, ca. 1.2 cm, puberulent, saccate in fruit; teeth triangular-ovate to subtriangular, ca. 5 mm, apex acuminate, adaxial teeth longer.

Corolla red or purple, 2.5–4 cm, pubescent; tube straight or slightly curved, gradually dilated beyond middle; upper lip straight, oblate, apex emarginate; middle lobe of lower lip labellate, apex emarginate, pilose; lateral lobes oblong, ca. 1/2 as long as middle lobe. Nutlets ovoid-oblong, adaxially slightly triquetrous, densely pubescent, base small umbonate. Fl. May-Jul, fr. Jul-Aug.

- Forested hillsides. Guizhou.

23. DRACOCEPHALUM Linnaeus, Sp. Pl. 2: 594. 1753, nom. cons.

青兰属 qing lan shu

Fedtschenkiella Kudrjashev.

Herbs perennial, rarely annual. Stems erect or prostrate. Leaves long petiolate at stem base, petiolate or sessile upward, entire, pinnate. Verticillasters in dense capitula or spikes, or widely spaced; bract margin acute serrate or spinescent, rarely entire. Calyx tubular or campanulate-tubular, straight or slightly curved, 15-veined, 2-lipped, 5-toothed; teeth subequal or sometimes middle tooth of upper lip wider than lateral teeth, sinuses with a thickened fold. Corolla blue-purple, pink, or violet, rarely white, slender basally, dilated at throat, 2-lipped; upper lip straight or slightly curved; lower lip 3-lobed, middle lobe largest. Stamens 4, posterior 2 longer than anterior 2; anthers glabrous, rarely hairy, cells 2, divaricate at nearly 180°. Style apex equally 2-cleft. Nutlets oblong, smooth, sometimes mucilaginous.

About 70 species: alpine and semidry regions mainly in temperate Asia, with a few in Europe, one in North America; 35 species in China.

Closely related to *Nepeta* but calyces with a thickened fold between the teeth.

- 1a. Stamens long exerted; corolla ca. 0.8 cm 35. *D. stamineum*
- 1b. Stamens included or only short exerted; corolla 1–4.2 cm.
 - 2a. Dwarf caespitose plants, stems 3–15 cm; branches numerous, crowded; leaves 3–5 mm, circular-ovate, pinnati- or palmatipartite.
 - 3a. Middle tooth of upper lip of calyx slightly wider than lateral teeth, upper lip teeth the same shape; leaves palmately 5-parted 30. *D. palmatoides*
 - 3b. Middle tooth of upper lip of calyx 2.5–5 × wider than lateral teeth, broadly ovate, lateral teeth lanceolate to narrowly triangular; leaves pinnatifid.
 - 4a. Middle tooth of upper lip of calyx ca. 2.5 × wider than lateral teeth 31. *D. origanoides*
 - 4b. Middle tooth of upper lip of calyx 4–5 × wider than lateral teeth 32. *D. paulsenii*
 - 2b. Stems erect or suberect, taller, unbranched or few branched; leaves more than 10 mm, simple to pinnatisect.
 - 5a. Leaves pinnatisect, segments linear.
 - 6a. Calyx conspicuously 2-lipped; leaves sometimes 2-pinnatifid 8. *D. bipinnatum*
 - 6b. Calyx of 5 subequal teeth, lanceolate to narrowly triangular; leaves clearly pinnatisect.
 - 7a. Leaf sections 2- or 3-paired, crowded toward blade base, appearing palmatisect.
 - 8a. Flowers 2.5–2.8 cm; leaf segments suberect 5. *D. forrestii*
 - 8b. Flowers 3.5–4.2 cm; leaf segments oblique or subpatent.
 - 9a. Calyx densely lanate-villous, teeth 1/4–1/3 as long as tube, teeth lanceolate-triangular, subulate-acuminate 6. *D. isabellae*
 - 9b. Calyx slightly scabrid, teeth ca. as long as tube, lanceolate, acute 7. *D. hookeri*
 - 7b. Leaf segments not crowded at blade base.
 - 10a. Corolla less than 1.5 cm 3. *D. propinquum*
 - 10b. Corolla more than 2 cm.
 - 11a. Internodes 1–1.2 cm; leaves abaxially strigose on nerves 1. *D. taliense*
 - 11b. Internodes 2–6 cm; leaves abaxially densely white pubescent.
 - 12a. Upper floral leaves much shorter than calyx 4. *D. tanguticum*
 - 12b. Upper floral leaves as long as to longer than calyx 2. *D. calophyllum*
 - 5b. Leaves undivided.
 - 13a. Leaves entire.
 - 14a. Bracts 2- or 3-serrulate; corolla 1.4–1.8 cm; teeth of upper lip of calyx divided almost to base, middle tooth of upper lip ca. 2 × as wide as lateral teeth; anthers glabrous.
 - 15a. Leaves lanceolate to ovate-lanceolate, 1.5–3 × 4–8 mm, entire 15. *D. integrifolium*
 - 15b. Leaves linear, 5–7 × 0.8–1.2 mm, 2- or 3-serrulate; teeth with apical spines to 3 mm 14. *D. fruticosum*
 - 14b. Bracts entire; corolla more than 1.8 cm; teeth of upper lip of calyx divided to nearly 1/2 its length, middle tooth of upper lip slightly wider than lateral teeth; anthers hairy.
 - 16a. Stems subglabrous; calyx minutely hairy toward base, subglabrous toward apex; corolla 3.3–4 cm 34. *D. argunense*

- 16b. Stems sparsely minute hairy toward base; calyx minutely hairy throughout; corolla 1.7–2.4 cm 33. *D. ruyshiana*
- 13b. Leaves serrate or dentate.
- 17a. Calyx conspicuously 2-lipped.
- 18a. Calyx 2-lipped nearly to base 11. *D. breviflorum*
- 18b. Calyx 2-lipped to ca. 1/2 its length.
- 19a. Leaves ovate, base ± cordate, crenate; bracts 3–8-spinescent-serrate; corolla white 9. *D. heterophyllum*
- 19b. Leaves lanceolate or narrowly oblong, base cuneate to rounded, denticulate; bracts 1–3-spinescent-serrate; corolla blue-purple.
- 20a. Perennial herbs; leaves ± leathery, base cuneate, few spinescent-denticulate 10. *D. peregrinum*
- 20b. Annual herbs; leaves herbaceous, base rounded to broadly cuneate, densely dentate with teeth not spinescent or sometimes basal teeth spinescent 12. *D. moldavica*
- 17b. Calyx inconspicuously 2-lipped.
- 21a. Middle tooth of upper lip ± same shape as lateral teeth, nearly as wide as to wider than lateral teeth.
- 22a. Basal leaves absent; cauline leaves many paired, short petiolate, elliptic to ovate-elliptic, 5–6 mm, 1–3-denticulate; calyx teeth 5, subequal; bracts spinescent-serrate 13. *D. psammophilum*
- 22b. Basal leaves present.
- 23a. Cauline leaves many paired, broadly ovate; verticillasters in long spikes 16. *D. nutans*
- 23b. Cauline leaves 2–6-paired, ovate to triangular-ovate; verticillasters crowded in capitula.
- 24a. Calyx minutely papillate hirtellous, glandular 19. *D. rigidulum*
- 24b. Calyx pubescent to silky-villous, margin white ciliate 20. *D. imberbe*
- 21b. Middle tooth of upper lip of calyx wider than lateral teeth, circular-ovate; lateral teeth broadly lanceolate to narrowly triangular.
- 25a. Basal petiole much shorter than blade; blade ovate to broadly ovate, 0.6–2 cm, incised-dentate.
- 26a. Corolla yellowish white, middle lobe of lower lip not spotted 17. *D. nodulosum*
- 26b. Corolla purple, middle lobe of lower lip purple spotted 18. *D. hoboksarensis*
- 25b. Basal petiole slightly shorter to longer than blade.
- 27a. Corolla slightly exserted 22. *D. velutinum*
- 27b. Corolla 1.5–2 × as long as calyx.
- 28a. Middle tooth of upper lip of calyx subtruncate.
- 29a. Middle tooth of upper lip of calyx broadly elliptic, obtuse, short spinescent 26. *D. purdomii*
- 29b. Middle tooth of upper lip of calyx trapeziform, truncate, denticulate 27. *D. truncatum*
- 28b. Middle tooth of upper lip of calyx rounded.
- 30a. Leaves abaxially densely white pubescent 21. *D. wallichii*
- 30b. Leaves abaxially sparsely strigose.
- 31a. Petioles of middle cauline leaves 2–6 cm 29. *D. rupestre*
- 31b. Petioles of middle cauline leaves less than 1.2 cm or obsolete.
- 32a. Floral leaves coarsely dentate; corolla 3.3–4 cm 28. *D. grandiflorum*
- 32b. Floral leaves not coarsely dentate; corolla 2–3.5 cm.
- 33a. Leaves abaxially purplish, sparsely pubescent on veins or glabrous 25. *D. bullatum*
- 33b. Leaves abaxially densely puberulent, sparsely floccose-villous on veins.
- 34a. Bracts subcircular, subentire 24. *D. imbricatum*
- 34b. Bracts obovate to rhombic obovate, margin densely ciliate, 1–3-spinescent-serrate 23. *D. microflorum*

1. *Dracocephalum taliense* Forrest, Trans. Bot. Soc. Edinburgh 27: 93. 1916.

大理青兰 da li qing lan

Rhizomes with thick cylindric roots. Stems few, erect, ca. 20 cm, sparsely pubescent basally, densely retrorse pubescent at apex. Leaves pinnatisect, palmatisect toward stem apex, sessile or subsessile; leaf blade ovate, 0.9–2.6 × 1–2 cm, base broadly cuneate, adaxially glabrous, abaxially dense strigose along veins; segments pairs 3 or 4, opposite or subopposite, 2–6 mm from each other along midrib, obliquely spreading at an obtuse angle, linear, 0.7–1.7 cm × 0.8–1.6 mm, margin entire, revolute when dry, apex obtuse. Verticillasters 2–4-flowered, on 5 or 6 upper nodes; bracts similar to cauline leaves but smaller, ca. 4 mm, with a pair of

lobes at middle, pubescent. Calyx 1.4–1.6 cm, densely pubescent, ciliate, 2-lipped to 1/3 its length; teeth equal, narrowly triangular, apex subulate-acuminate; upper lip 3-toothed, with divisions to 4/5 its length. Corolla blue, 2.6–2.8 cm, densely pubescent. Fl. Aug-Sep.

- Grassy hillsides; 2800 m. Yunnan (Dali Xian, Heqing Xian).

Related to *Dracocephalum tanguticum* but verticillasters few flowered in upper leaf axils.

2. *Dracocephalum calophyllum* Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien. Math.-Naturwiss. Kl. Anz. 17: 4. 1923.

美叶青兰 mei ye qing lan

Dracocephalum forrestii W. Smith var. *calophyllum* (Handel-Mazzetti) Kudô.

Herbs perennial. Stems erect, ca. 35 cm, densely retrorse pubescent, internodes 2–2.5 cm; branches 4–8 cm, upper branches bearing flowers. Leaves pinnatisect, subsessile, triangular-ovate to broadly ovate, 1.5–2.5 × 1.6–2.4 cm, base very short vaginate, adaxially glabrous, abaxially glabrate; segments in 2–4 pairs, obliquely spreading or subpatent, linear, 0.8–1.5 cm × 1–1.8 mm. Verticillasters on 4–9 upper nodes of stems and branches; bracts similar to cauline leaves but smaller, 7–10 mm, apex subulate-acuminate, with a pair of lobes. Calyx purple, ca. 1.5 cm, pubescent, ciliolate, 2-lipped to 1/3 its length; teeth subequal, triangular-lanceolate, apex subulate-acuminate, upper lip teeth divisions to 4/5 its length, lower lip teeth divided to base. Corolla blue-purple, 2.8–3.5 cm, pubescent outside. Fl. Sep.

- Grassy hillsides with *Artemisia*; 3100–3200 m. Sichuan, Yunnan.

A variant from Yunnan with long subulate indumentum was described as var. *smithianum* Keenan (Baileya 5: 31. 1957).

3. *Dracocephalum propinquum* W. Smith, Trans. Bot. Soc. Edinburgh 27: 92. 1916.

多枝青兰 duo zhi qing lan

Herbs perennial, 20–50 cm. Rhizomes thick, with robust fibrous roots. Stems erect, much branched, densely retrorse puberulent especially on angles, internodes 2–4 cm. Leaves pinnatisect, subsessile, ovate, 1.5–3.5 × 0.6–3 cm, glabrous, adaxially shiny, abaxially puberulent especially on veins, yellow glandular; segments in 1–3 (or 4) pairs, linear, 1–2 mm wide, margin strongly involute. Spikes elongated, 2–10 cm, ± interrupted, of 2–4-flowered verticillasters; floral leaves slightly shorter than flowers, leaflike, numerous. Calyx purplish, narrowly funnelform-tubular, slightly curved, densely puberulent, sparsely yellow glandular, ca. 8 mm, to 1 cm in fruit, 2-lipped 1/3–1/2 its length; teeth lanceolate, apex acuminate, upper lip teeth divisions to 3/4 its length. Corolla purple, ca. 1.5 cm, densely villous, upper lip obovate. Nutlets dark brown, narrowly oblong, triquetrous, papillate. Fl. Sep, fr. Oct.

- Rocky, hillside grasslands; (1700–)1800–3000 m. Sichuan, Yunnan.

4. *Dracocephalum tanguticum* Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg, sér. 3, 27: 530. 1881.

甘青青兰 gan qing qing lan

Herbs perennial, fetid. Stems erect, to 55 cm, obtusely 4-angled, retrorse pubescent toward apex, subglabrous basally, internodes 2.5–6 cm. Petiole 3–8 mm; leaf blade pinnatisect, elliptic-ovate to elliptic, 2.6–4(–7.5) × 1.4–2.5(–4.2) cm, base broadly cuneate, adaxially glabrous, abaxially glabrous to densely gray pubescent; segments in 2 or 3 pairs, linear, 0.7–1.9(–3) cm × 1–2(–3) mm, terminal section 1.4–2.8(–4.4) cm, margin entire, involute. Verticillasters 2–6-flowered, in 5–9 upper stem nodes; floral leaves similar to cauline leaves but much reduced, with 1 pair of segments, 5–7 mm, pubescent, ciliate. Calyx purplish, 1–1.4 cm, densely spreading pubescent, golden glandular, split to 1/3 its length; teeth margin ciliate, apex acute; upper lip teeth broadly lanceolate, middle tooth subequal to lateral lobes, lower lip teeth lanceolate. Corolla purple-blue to dark purple, 2–2.7 cm, pubescent, lower lip 2 × as long as upper lip. Fl. Jun-Sep.

- Riverbanks, fields, grassy beaches, dry lake beds, sunny hillsides, pine forest margins; 3200–4700 m. Gansu, Qinghai, Sichuan, Xizang.

- 1a. Stems unbranched; leaves abaxially glabrous 4b. var. *nanum*
- 1b. Stems branched along entire length; leaves abaxially densely hairy.
 - 2a. Stems 35–55 cm; leaves abaxially gray pubescent 4a. var. *tanguticum*
 - 2b. Stems less than 35 cm; leaves abaxially gray tomentulose 4c. var. *cinereum*

4a. *Dracocephalum tanguticum* var. *tanguticum*

甘青青兰 gan qing qing lan

Stems 35–55 cm, branched. Leaves abaxially densely gray pubescent. Verticillasters 4–6-flowered.

- Riverbanks, fields, grassy beaches, pine forest margins. Gansu, Qinghai, Sichuan, Xizang.

Used medicinally.

4b. *Dracocephalum tanguticum* var. *nanum* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 591. 1977.

矮生变种 ai sheng bian zhong

Stems less than 35 cm, unbranched. Leaves glabrous abaxially. Verticillasters few flowered.

- Dry lake beds, sunny hillsides; 4500–4700 m. Xizang.

4c. *Dracocephalum tanguticum* var. *cinereum* Handel-Mazzetti, Acta Horti Gothob. 13: 343. 1939.

灰毛变种 hui mao bian zhong

Stems less than 35 cm, branched along entire length. Leaves densely gray tomentulose abaxially.

- Sunny hillsides; 3200 m. Sichuan (Dawu Xian).

5. *Dracocephalum forrestii* W. Smith, Trans. Bot. Soc. Edinburgh 27: 90. 1916.

松叶青兰 song ye qing lan

Rhizomes robust, short, producing dense, fibrous rootlets and numerous stems. Stems erect, 13–28 cm, ± unbranched, retrorse pubescent, nodes numerous, internodes 1–1.4 cm. Leaves pinnatisect, subsessile, basal sheath less than 1 mm; leaf blade obovate, 1.6–2.2 × 1.4–2 cm, adaxially glabrous, abaxially glabrescent; segments in (1 or) 2 or 3 pairs, inserted near midrib base, suberect at an acute angle, linear, 0.8–2.1 cm × 1–1.2 mm. Verticillasters 2-flowered, on 5–10 upper nodes, crowded; floral leaves similar to cauline leaves but reduced, with 1 pair of sections, 1/2–2/3 as long as calyx. Calyx 1.6–1.8 cm, densely pubescent, ciliolate, 2-lipped 2/5–3/7 its length; teeth lanceolate, apex subulate-acute, upper lip teeth divisions 4/5 its length, teeth subequal but middle tooth slightly longer. Corolla blue-purple, 2.5–2.8 cm, pubescent. Fl. Aug-Sep.

- Rocky, subalpine thickets, grasslands; 2300–3500 m. Yunnan.

6. *Dracocephalum isabellae* Forrest, Notes Roy. Bot. Gard. Edinburgh 8: 211. 1914.

白萼青兰 bai e qing lan

Herbs perennial. Stems erect, 30–50 cm, angles retrorse pubescent, nodes numerous, internodes 3–4 cm. Leaves pinnatisect, subsessile, with a short sheath basally, broadly ovate to rhombic-ovate, 2–2.8 × 2.6–3.8 cm, adaxially glabrous, abaxially sparsely pubescent on veins; segments in 2 or 3 pairs, crowded at midrib base, obliquely spreading at an obtuse angle, linear to oblanceolate-linear, 1.3–2 cm × 1–2.1 mm, middle lobe 1.7–2.4 cm, margin ciliate, revolute when dry, apex obtuse. Verticillasters 4-flowered, inserted on upper 3 stem nodes, loose; bracts obovate, 0.8–1.2 cm, base cuneate, tripartite; sections lanceolate, densely lanate-ciliate, apex acute. Calyx 1.5–2 cm, 2-lipped 1/5–1/4 its length, densely lanate-villous, margin densely ciliate; upper lip teeth divisions to 1.2 cm; teeth equal, ovate-lanceolate, apex subulate-acuminate; lower lip 2-toothed to lip base, teeth lanceolate-triangular. Corolla blue-purple, 3.5–4.2 cm, pubescent. Fl. Jul-Aug.

• Rocky grasslands among forests; 3000–4000 m. Yunnan (Zhongdian Xian).

This is the largest-flowered species in the group of pinnatisect-leaved species.

7. *Dracocephalum hookeri* C. B. Clarke ex J. D. Hooker, Fl. Brit. India 4: 666. 1885.

长齿青兰 chang chi qing lan

Stems slightly scabrid. Leaves sessile, ca. 2.5 cm, pinnatisect, blade sections narrowly linear, few, spreading, margin involute. Verticillasters in dense spikes 5–8 × ca. 2.5 cm, interrupted basally; floral leaves pinnatisect. Flowers sessile. Calyx 1.3–1.9 cm, slightly scabrid, tube erect or curved; teeth equal, ca. as long as tube, lanceolate, apex acute. Corolla 2.5–4 cm, tube narrow, throat moderately dilated. Nutlets oblong, 2.5 mm, smooth.

• Hillsides; 4500 m. Xizang.

Only doubtfully different from *Dracocephalum tanguticum* and often reduced to synonymy.

8. *Dracocephalum bipinnatum* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg 14: 65. 1869.

羽叶枝子花 yu ye zhi zi hua

Dracocephalum bipinnatum var. *biflorum* C. Y. Wu; *D. bipinnatum* var. *brevilobum* C. Y. Wu & W. T. Wang; *D. ruprechtianum* Regel; *D. ruprechtii* Regel.

Rhizomes 5–10 mm in diam. Stems 15–30 cm, sparsely retrorse pubescent, densely so at apex. Mid cauline leaves pinnatisect to pinnately lobed; blade ovate to lanceolate, 1.5–2.5 × 0.7–1.2 cm, papery when dry, sparsely pubescent along veins, base cuneate, apex obtuse; segments in 1–4 pairs, linear, 4–8 mm, terminal lobe 10–14 × ca. 1.5 mm, entire to few lobed. Verticillasters 2–4-flowered, in 2–5 upper stem nodes; bracts obovate-elliptic or lanceolate, 4–8 mm, pubescent, ciliate, base cuneate, margin 2–4-serrulate per side, teeth apex with a spine 1–2 mm. Calyx 1.4–1.7 cm, pubescent, ciliate, golden glandular, 2-lipped to 1/2 its length; upper lip teeth divisions 1/4–1/3 its length, teeth broadly ovate, subequal, apex spinescent, with spines ca. 0.8 mm; teeth of lower lip broadly lanceolate, apex spinescent. Corolla blue-purple, 3–3.8 cm, pubescent. Fl. Aug-Sep.

Rocky crevices near streams, grasslands, hillsides, moraines, semideserts; 1900–2600 m. Xinjiang, Xizang [India (Kashmir), Kazakhstan, Kyrgyzstan, Tajikistan].

9. *Dracocephalum heterophyllum* Benth., Labiat. Gen. Spec. 738. 1835.

白花枝子花 bai hua zhi zi hua

Dracocephalum acanthoides Edgeworth ex Benth.; *D. kaschgaricum* Ruprecht; *D. pamiricum* Briquet.

Stems 10–15(–30) cm, densely retrorse pubescent. Petiole 2.5–6 cm, reduced in upper leaves; leaf blade broadly to narrowly ovate, 1.3–4 × 0.8–2.3 cm, adaxially slightly pubescent or subglabrous, base cordate, margin shallowly crenate or serrate, ciliolate, teeth of upper cauline blades spinescent, apex obtuse to rounded. Verticillasters 4–8-flowered, in apical, abbreviated internodes; bracts obovate-spatulate to oblanceolate, to 8 mm, margin 3–8-spinescent-serrulate per side, with spines 2–4 mm, sparsely minute hairy, ciliolate. Calyx greenish, 1.5–1.7 cm, sparsely pubescent, densely so basally, margin ciliolate, 2-lipped to nearly 1/2 its length; upper lip teeth divisions to 2/3 its length, teeth lanceolate, apex spinescent. Corolla white, (1.8–)2.2–3.4 (–3.7) cm, densely white or yellowish pubescent. Fl. Jun-Aug.

Subspecies *ovalifolium* A. L. Budantzev [Bot. Zhurn. (Moscow & Leningrad) 72: 93. 1987] was described from Shanxi.

10. *Dracocephalum peregrinum* Linnaeus, Cent. Pl. II. 20. 1756.

刺齿枝子花 ci chi zhi zi hua

Dracocephalum politovii Gandoger.

Stems erect, 15–25 cm, minutely retrorse hairy, branched basally. Petiole of cauline leaves 2–3 mm; leaf blade ovate-lanceolate to lanceolate, 1.5–2.2 cm × 3.5–5.5 mm, ± leathery when dry, sparsely minute hairy, base cuneate, margin ciliolate, short spinescent-denticulate with spines 0.4–0.8 mm, apex acute, short spinescent. Verticillasters 4–6-flowered, in 4–7 upper nodes; bracts elliptic-ovate, 3–6 mm, margin 1- or 2-spinescent-denticulate, with spines ca. to 1 mm. Calyx purple, 1–1.3 cm, minutely hairy, ciliolate, conspicuously 2-lipped to ca. 1/2 its length; upper lip teeth divisions 1/4 its length, teeth subequal, triangular-ovate, apex with spines slightly shorter than teeth; lower lip teeth divisions more than 1/2 its length, teeth lanceolate, apex needlelike-acuminate. Corolla blue-purple, 2.2–2.8 cm, sparsely pubescent. Fl. Jun-Aug.

Rocky crevices on alpine grasslands. ? Gansu, Xinjiang (Toli Xian) [Kazakhstan, Mongolia, Russia].

11. *Dracocephalum breviflorum* Turrill, Bull. Misc. Inform. 1922: 154. 1922.

短花枝子花 duan hua zhi zi hua

Stems erect or ascending, minutely hispid. Leaves elliptic-lanceolate, to 3 × 1.4 cm, adaxially minutely hispid, abaxially pilose, lateral veins in 5–7 pairs, base rounded to subcordate, margin crenate-dentate, apex acute to subacute. Verticillasters in spicate capitula ca. 3 cm; bracts ± leafy, margin ± entire; bracteoles linear-lanceolate, 6–11 mm, apex acute, glandular hispidulous. Calyx minutely hispid, glandular, 2-lipped nearly to base, tube ca. 1 mm; upper lip ca. 6.5 mm, teeth lanceolate, ca. 3.5 mm, apex acuminate. Corolla purple, minutely hispid; tube ca. 1 cm, throat dilated;

upper lip with lobes subcircular, ca. 2 mm; lower lip 3-lobed, middle lobe ca. 3×4.5 mm. Fl. Jul.

- Alpine grasslands; 4000 m. Xizang (Mt. Everest?).

Of uncertain affinity; related to *Dracocephalum heterophyllum* in the original description but clearly different from it.

12. *Dracocephalum moldavica* Linnaeus, Sp. Pl. 2: 595. 1753.

香青兰 xiang qing lan

Herbs annual. Stems numerous, (6–)22–40 cm, erect or ascending, minutely retrorse hairy, purplish. Basal cauline leaves withering early; petiole as long as blade, shorter upward; leaf blade ovate-triangular, base cordate, margin remotely crenate, apex rounded; upper blades lanceolate to linear-lanceolate, $1.4\text{--}4 \times 0.4\text{--}1.2$ cm, yellow glandular, veins sparsely minute hairy, base rounded to broadly cuneate, margin triangular-dentate or sparsely serrate, with basal teeth sometimes lobelike, apex long spiny, obtuse. Verticillasters 4-flowered, loose, in 5–12 upper nodes of stems and branches; bracts oblong, shorter to slightly longer than calyx, margin 2- or 3-spinescent-denticulate, with spines 2.5–3.5 mm, sparsely appressed hairy. Pedicel 3–5 mm, horizontal after anthesis. Calyx 8–10 mm, golden glandular, pubescent especially basally, purple veined, 2-lipped to 1/2 its length; upper lip teeth divisions 1/4–1/3 of lip, teeth subequal, triangular-ovate, apex acute. Corolla bluish purple, 1.5–2.5(–3) cm, dilated beyond throat, white pubescent outside; upper lip short navicular, ca. 1/4 as long as tube; middle lobe of lower lip dark purple spotted. Nutlets oblong, ca. 2.5 mm, apex truncate, smooth.

Dry hills, stony riverbanks, valleys; 200–2700 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shanxi [India (Kashmir), Russia, Tajikistan, Turkmenistan; Europe].

Source of an essential oil, sometimes cultivated.

13. *Dracocephalum psammophilum* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 592. 1977.

沙地青兰 sha di qing lan

Dracocephalum fruticosum Stephan subsp. *psammophilum* (C. Y. Wu & W. T. Wang) H. C. Fu & S. Chen.

Rhizomes robust, woody, ca. 1 cm in diam. Stems purplish, erect, 6–7 cm, ca. 1 mm in diam., densely retrorse minute hairy. Cauline leaves petiole ca. 0.3 mm; leaf blade elliptic to ovate-elliptic, $5\text{--}6 \times 2.5\text{--}3.2$ mm, \pm succulent, gray-green when dry, base rounded to obtuse, margin of mid cauline leaves 1–3-denticulate or 1–3-denticulate-serrulate, apex rounded to obtuse. Verticillasters on 3 or 4 upper stem nodes, in 1–1.5 cm spikes; floral leaves bractlike, margin spinescent-denticulate, with spines 2.5–3 mm; bracts elliptic, oblong, or spatulate, 2.5–3 mm, margin 1–3-spinescent-denticulate, with spines 0.5–1.5 mm. Calyx ca. 7.5 mm, campanulate-tubular, densely minute hairy, glandular, margin ciliate, glabrous inside, 2-lipped to 1/3 calyx length, tube ca. 5 mm; upper lip teeth divisions to 2/3 its length, teeth triangular, 1.5–1.8 mm, apex acute, purple when dry, middle tooth of upper lip slightly wider than lateral teeth; lower lip 2-toothed to base, teeth lanceolate-triangular, apex acute.

Corolla blue-purple, 1.3–1.5 cm, densely pubescent; tube slender, ca. 1 mm in diam., abruptly dilated to 3 mm wide; upper lip broadly elliptic, ca. 3 mm, lower lip ca. 3 mm. Fl. Jun.

- Deserts. Ningxia.

A close relative of *Dracocephalum fruticosum* and recently reduced to a subspecies of it.

14. *Dracocephalum fruticosum* Stephan ex Willdenow, Sp. Pl. 3: 152. 1800.

线叶青兰 xian ye qing lan

Dracocephalum linearifolium C. H. Hu.

Rhizomes robust, woody, 8–10 mm in diam. Stems yellowish but base sometimes orange, 6–9 cm, slender, minutely retrorse hairy, especially apically and on nodes. Leaves sessile or subsessile, linear, $5\text{--}7 \times 0.8\text{--}1.2$ mm, margin entire or 1–3-spinescent-denticulate, sparsely minute hairy. Verticillasters on 3–5 upper nodes of stems and branches, in spikes ca. 1 cm; bracts linear to spatulate, ca. 4 mm, margin 2- or 3-spinescent-denticulate, with spines 3–3.5(–4) mm. Pedicel 1–1.4 mm. Calyx purple or purplish, tubular-campanulate, ca. 1.1 cm, minutely retrorse hairy, margin ciliate, sparsely villous inside; tube ca. 7 mm, apical 1/3 slightly curved; limb 2-lipped to ca. 1/3 its length; upper lip teeth divisions nearly to lip base, teeth subequal, triangular, apex acuminate; lower lip teeth divided to lip base, as long as those of upper lip but narrower. Corolla purplish red when dry, white villous; tube slender, exerted portion dilated; upper lip lobes acute; lower lip longer, 3-lobed. Fl. Jun-Jul.

Deserts. Ningxia (Holan Shan) [Mongolia, Russia].

15. *Dracocephalum integrifolium* Bunge, Fl. Altaic. 2: 387. 1830.

全缘叶青兰 quan yuan ye qing lan

Rhizomes ca. 5 mm in diam. Stems purple-brown, numerous, unbranched, erect or prostrate, 17–37 cm, minutely retrorse hairy. Leaves subsessile, lanceolate to ovate-lanceolate, 1.5–3 cm, \pm succulent, glabrous, base broadly cuneate to rounded, margin entire, ciliate, apex obtuse to acute. Verticillasters on 3–6 upper nodes, in capitula; bracts obovate to obovate-lanceolate, 3.5–8 mm, margin ciliate, 4- or 5-spinescent-serrulate, spines 2.5–3 mm. Calyx red-purple, 1–1.7 cm, densely minute hairy at base, sparsely hairy upward, ciliate, 2-lipped to ca. 1/3 its length; teeth subequal, apex short spinescent; middle tooth of upper lip ovate, slightly longer than lateral teeth, ca. $2 \times$ as wide, lateral teeth lanceolate; teeth of lower lip lanceolate, slightly narrower than lateral teeth of upper lip. Corolla blue-purple, 1.4–1.7 cm, densely white villous outside. Nutlets brown, oblong, ca. 2 mm, smooth. Fl. Jul-Aug.

Abies-Picea forests, grasslands; 1400–2500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia].

Used medicinally for bronchitis.

16. *Dracocephalum nutans* Linnaeus, Sp. Pl. 2: 596. 1753.

垂花青兰 chui hua qing lan

Dracocephalum microphyllum Turczaninow; *D. nutans* var. *alpinum* Karelin & Kirilow; *Zornia nutans* (Linnaeus) Moench.

Stems single or numerous, basally unbranched or few branched, 16–55 cm, densely retrorse puberulent at apex, sparsely puberulent or glabrate basally. Petiole 2.5–5 cm; leaf blade broadly ovate, 0.8–23 × 0.8–23 cm, pubescent, base cordate, subtruncate, or broadly cuneate, margin acute serrate or denticulate, apex obtuse or acute. Verticillasters 8–12-flowered, in upper leaf axils; bracts elliptic to obovate, 3–5 mm, margin entire, ciliate, apex acute. Calyx purplish, 9–10 mm, veins pubescent, margin ciliate, indistinctly 2-lipped 1/4–1/3 its length; middle tooth of upper lip obovate, apex short spinescent, 2.5–3 × wider than other teeth, lateral teeth lanceolate; lower lip teeth lanceolate, apex spinescent-acuminate, with spines 1–2 mm. Corolla blue-purple, 1.2–1.9 cm, pubescent, upper lip slightly shorter than lower lip. Fl. Jul-Sep.

Sunny slopes, valleys, *Larix* forests; 1200–2600 m. Heilongjiang, Nei Mongol, Xinjiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan; Europe].

17. *Dracocephalum nodulosum* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg 14: 65. 1869.

多节青兰 duo jie qing lan

Rhizomes ascending or horizontal. Stems ascending, 10–30 cm, purplish at apex, retrorse pubescent. Petiole much shorter than blade; leaf blade broadly ovate to ovate, 0.6–2 × 0.4–1.5 cm, pubescent especially along veins, base abruptly cuneate to shallowly cordate, margin deeply crenate-dentate, apex obtuse. Verticillasters in subellipsoid spikes 2–6 × 2 cm; bracts obtriangular, margin 3–5-spinescent-dentate, with spines 2–4 mm. Calyx ca. 1 cm, middle tooth of upper lip ca. 2 × wider than lanceolate lateral teeth, teeth of lower lip lanceolate. Corolla yellowish white, ca. 1.5 cm, densely pubescent outside. Nutlets oblong, ca. 3 × 1.2 mm. Fl. Jul-Aug.

• Alpine and subalpine rocky slopes; 3300 m. Xinjiang.

18. *Dracocephalum hoboksarensis* G. J. Liu, Bull. Bot. Res. 5(3): 163. 1985.

和布克赛尔青兰 he bu ke sai er qing lan

Herbs perennial. Stems purple-red, 15–25 cm, sparsely white puberulent. Petiole purple, short, leaf blade oblong to ovate, 1.4–2.5 × 1.3–1.8 cm, densely white puberulent, sparsely yellow glandular, base broadly cuneate, apex rounded. Verticillasters in oblong spikes 4–6 cm; bracts obovate, shorter than calyx, apex 4-dentate, sparsely puberulent, purple on teeth, cuneate, base attenuate, apex awned. Calyx purple, tubular, mouth slightly curved, ca. 1.4 cm, densely puberulent, inconspicuously 2-lipped; upper lip middle tooth obovate, ca. 4 × 3 mm, apex short aristate; other teeth lanceolate, ca. 4 × 1.5 mm, apex attenuate-aristate. Corolla purple, ca. 2.2 cm, densely white puberulent; upper lip straight, ca. 3 mm; middle lobe of lower lip reniform, purple spotted at middle. Nutlets unknown. Fl. Jun-Jul.

• Gravelly mountain slopes; 1200 m. Xinjiang (Hoboksar Xian).

Differing from *Dracocephalum nodulosum* by its large purple corollas.

19. *Dracocephalum rigidulum* Handel-Mazzetti, Oesterr. Bot. Z. 88: 306. 1939.

微硬毛建草 wei ying mao jian cao

Rhizomes woody, densely covered by remains of stems and petioles. Stems erect or ascending, 20–30 cm, slender, unbranched, glabrous or sparsely minute hairy along angles. Basal leaves few, ± rosulate; petiole purplish, ca. 2 × as long as blade, densely ciliate, base dilated; leaf blade triangular-ovate to ovate, 0.5–1.8 × 0.5–1.8 cm, papery, adaxially glabrous or sparsely strigose, abaxially densely strigose along elevated veins and margin, base truncate or shallowly cordate, margin crenate or dentate except base, apex rounded to subacute; cauline leaves in 3–6 pairs, short petiolate, upper leaves subsessile, narrowly acicular-triangular toothed. Verticillasters 5–10(–20)-flowered, 2 or 3 in subcapitate spikes; bracts subsessile, lower broadly ovate, upper lanceolate, ca. 1 cm, spinescent-triangular with spines to 5 mm; bracteoles subulate, ca. 1/2 as long as calyx tube, awned. Calyx 1.2–1.5 cm, base narrow, mouth 3–4 mm wide, finely papillate hirtellous, glandular; teeth subequal, ca. 1/2 as long as tube, lanceolate, apex awned-acuminate, 1–1.5 mm. Corolla purple or blue-purple, 2–2.5 cm, white villous; upper lip slightly curved, 2-lobed; lower lip nearly as long as upper lip, 3-lobed. Fl. Jun (specimens not seen).

• Nei Mongol.

20. *Dracocephalum imberbe* Bunge, Verz. Altai Pfl. 50. 1836.

无髭毛建草 wu zi mao jian cao

Rhizomes 3.5–9 mm in diam. Stems erect or ascending, unbranched, ca. 25 cm, sparsely minute hairy and villous, rarely glabrescent basally, densely retrorse hairy and villous at apex. Basal leaves numerous; petioles 3–12 mm, sparsely retrorse pubescent; blade circular-ovate to reniform, 1.7–3.7 × 1.5–4 cm; blade of mid stem leaves ovate to reniform, sparsely pubescent along veins, base cordate, margin undulate-crenate. Verticillasters few, crowded in capitula; bracts spatulate-obovate, ca. 6–7.5 mm, margin 1- or 2-serrate, sparsely pubescent, ciliate, teeth spinescent-triangular to spinescent-lanceolate, with spines 1.5–2.5 mm. Calyx purplish, 1.2–1.5 cm, pubescent to silky-villous, margin white ciliate, 2-lipped to 1/4 its length; upper lip teeth subequal, ovate-triangular, ca. 3 mm, apex acute; lower lip teeth narrower than those of upper lip, ca. 3 mm. Corolla blue-purple, 2.5–2.7 cm, villous. Fl. Jul-Aug.

Grassy slopes; 2400–2500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan].

21. *Dracocephalum wallichii* Sealy, Bot. Mag. 164: t. 9657. 1944.

美花毛建草 mei hua mao jian cao

Rhizomes with robust, fibrous roots. Stems erect or ascending, 24–50 cm, sparsely pubescent basally, densely retrorse pubescent at apex, with 2–4 nodes below dense spikes. Petiole of basal leaves 4.5–9(–22.5) cm, that of cauline leaves as long as blade to sometimes absent; leaf blade ovate to broadly ovate, 2–5.5(–7) × 1.5–4.2(–7) cm, adaxially sparsely pubescent or glabrous, abaxially densely pubescent or occasionally glabrous throughout, base cordate, apex rounded to obtuse. Verticillasters in terminal capitula or interrupted spikes 3–3.5 cm; floral leaves sessile, ovate; bracts green-purple, purple-black veined, rhombic-obovate

to obovate, as long as calyx, margin acute or short spinescent to 3–6-serrate, veins and margin densely villous. Calyx 1.4–1.7 cm, conspicuously purple veined at base, tinged purple black at apex, villous, ciliate, 2-lipped 1/3–1/2 its length; upper lip middle tooth obovate to ovate, slightly wider to 2× as wide as lateral teeth, margin entire to serrulate, apex short acuminate; lateral teeth of upper lip ovate-triangular, apex acute; lower lip teeth lanceolate. Corolla dark purple, 2–3 cm, pubescent, tube 3–6 mm wide; upper lip navicular, ca. 5 mm; lower lip spreading, with dark spots, 3-lobed; middle lobe of lower lip obovate, apex emarginate. Nutlets dark brown, elliptic-obovoid, flattened, ca. 3.5 mm. Fl. Jul-Sep.

• Alpine shrubland margins, meadows, thicket margins; 4000–4700 m. Sichuan, Xizang.

A widespread species in the Himalaya where it is extremely variable. This and the following 8 species (21–29) are all clearly related and not always readily distinguishable.

- 1a. Verticillasters in capitula on stem apices; corolla to 3 cm × 6 mm 21b. var. *platyanthum*
- 1b. Verticillasters in interrupted spikes on stem apices and 2 capitula on apices of 2 lateral branches; corolla 2–2.5 cm × 3–6 mm.
 - 2a. Verticillasters only in interrupted spikes on stem apices; middle tooth of upper lip of calyx ovate, entire 21a. var. *wallichii*
 - 2b. Verticillasters in interrupted spikes on stem apices and capitula on apices of lateral branches; middle tooth of upper lip of calyx elliptic-obovate to obovate, few serrulate 21c. var. *proliferum*

21a. *Dracocephalum wallichii* var. *wallichii*

美花毛建草 mei hua mao jian cao

Dracocephalum calanthum C. Y. Wu, p.p.; *D. speciosum* Benth.

Verticillasters only in interrupted spikes on stem apices. Middle tooth of upper lip of calyx ovate, margin entire. Corolla 2–2.5 cm × 3–6 mm.

• Alpine shrubland margins, meadows; 4700 m. Xizang.

21b. *Dracocephalum wallichii* var. *platyanthum* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 593. 1977.

宽花变种 kuan hua bian zhong

Verticillasters in terminal capitula. Corolla to 3 cm × 6 mm.

• Alpine meadows. Xizang.

21c. *Dracocephalum wallichii* var. *proliferum* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 593. 1977.

复序变种 fu xu bian zhong

Verticillasters in spikes and capitula; spikes interrupted, 4–6 cm, on stem apices; capitula 2.5–3 cm, on apices of lateral branches. Middle tooth of upper lip of calyx elliptic-obovate to obovate, margin few serrulate. Corolla ca. 2× as long as calyx, tube ca. 3 mm wide.

• Thicket margins; 4000 m. Sichuan.

22. *Dracocephalum velutinum* C. Y. Wu & W. T. Wang, Fl. Yunnan. 1: 588. 1977.

绒叶毛建草 rong ye mao jian cao

Rhizomes short, 7–8 mm in diam. Stems ascending to suberect, 10–15 cm, densely retrorse pubescent, with 2 or 3 nodes below inflorescences. Petiole of basal leaves 2–6.7 cm, that of cauline leaves to 2.1 cm; leaf blade ovate to circular-ovate, 1.5–5(–6.5) × 1.8–4 cm, adaxially subglabrous, abaxially densely white tomentulose or silky-pubescent along veins, base cordate to deeply so, margin crenate, apex rounded. Verticillasters in ca. 3 mm capitula; bracts purple-green, rhombic-obovate, to obovate, to 2 cm, densely villous along veins, margin ciliate, acute or short spinescent to 3–5-serrate. Calyx 1.8–2 cm, silky-villous along veins, sparsely villous inside, margin lanate-ciliate, 2-lipped to 1/2 its length; upper lip middle tooth elliptic-obovate or subtrapeziform, 3–4 × as wide as lateral teeth, margin entire or irregularly denticulate-spinescent, apex truncate-rounded to rounded; lateral teeth lanceolate, apex spinescent-acuminate; lower lip teeth similar to lateral teeth of upper lip but narrower. Corolla dark blue, 2–2.4 cm, pubescent; upper lip ca. 5 mm, lower lip ca. 2 × as long as upper lip. Fl. Jul-Aug.

• Grassy sloping valleys, rocky areas; 3400–4000 m. Yunnan.

Related to *Dracocephalum bullatum* but with smaller corollas and ± dense indumentum on abaxial leaf surfaces.

- 1a. Apex of middle tooth of adaxial calyx lip truncate-rounded, margin irregularly denticulate 22a. var. *velutinum*
- 1b. Apex of middle tooth of adaxial calyx lip rounded, margin entire 22b. var. *intermedium*

22a. *Dracocephalum velutinum* var. *velutinum*

绒叶毛建草 rong ye mao jian cao

Dracocephalum calanthum C. Y. Wu, p.p.

Apex of middle tooth of adaxial calyx lip truncate-rounded, margin irregularly denticulate.

• Grassy sloping valleys; 3400–4000 m. Yunnan.

22b. *Dracocephalum velutinum* var. *intermedium* C. Y. Wu & W. T. Wang, Fl. Yunnan. 1: 588. 1977.

圆齿变种 yuan chi bian zhong

Dracocephalum calanthum C. Y. Wu, p.p.

Apex of middle tooth of adaxial calyx lip rounded, margin entire.

• Rocky areas; 3800–3900 m. Yunnan (Deqen Xian).

23. *Dracocephalum microflorum* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 593. 1977.

小花毛建草 xiao hua mao jian cao

Rhizomes 3–6 mm in diam. Stems red-purple, 1 or 2, ascending, 10–15 cm, densely retrorse puberulent, with 1–3 internodes below inflorescence. Basal leaves 2–6; petiole to 5 cm; leaf blade ovate to narrowly ovate, 1.2–3 × 1–2 cm; cauline blades on short petioles, subcircular, smaller, adaxially glabrous, abaxially sparsely appressed white villous, veins slightly elevated abaxially, base cordate, margin densely involute serrate, apex rounded. Verticillasters in terminal capitula 2.5–3.5 cm; bracts obovate to rhombic-obovate,

slightly shorter than calyx, margin densely ciliate, finely spinescent or with 1–3 serrate teeth. Calyx purplish red, ca. 1.2 cm, sparsely villous, ciliate, 2-lipped to nearly its entire length; upper lip middle tooth broadly obovate, ca. $2 \times$ as wide as lanceolate lateral teeth, apex short acuminate; lower lip teeth similar to lateral teeth of upper lip. Corolla blue, 2–2.2 \times 0.3 cm, pubescent; upper lip ca. as long as lower lip; lower lip 3-lobed, middle lobe obcordate, lateral lobes small. Fl. May–Jun.

- Alpine meadows; 4800 m. Sichuan (Muli Xian).

Closely related to *Dracocephalum imbricatum* but with smaller serrate bracts.

24. *Dracocephalum imbricatum* C. Y. Wu & W. T. Wang, Fl. Yunnan. 1: 588. 1977.

覆苞毛建草 fu bao mao jian cao

Rhizomes ca. 5 mm in diam. Stems unbranched, ascending, 12–18 cm, densely retrorse scaly puberulent, sparsely villous along angles. Basal leaves ca. 5; petiole slightly shorter to longer than blade; leaf blade broadly triangular-ovate to narrowly ovate, (0.5–)1.5–3.5 \times 2–2.5 cm, adaxially subglabrous, slightly scabrid, abaxially sparsely white floccose-villous, densely puberulent along veins, base cordate, margin crenate, apex rounded. Verticillasters in terminal spikes 4–5.5 cm; bracts dark purple-blue, overlapping, subcircular, margin subentire, apex rounded but some-times mucronate, subglabrous, margin densely white ciliate, inconspicuously veined. Calyx ca. 1.6 cm, densely villous, ciliate, 2-lipped to ca. 1/2 its length; upper lip middle tooth oblate, to 8 mm wide, apex subtruncate, mucronate, lateral lobes lanceolate, apex acuminate; lower lip teeth similar to lateral teeth of upper lip. Corolla dark purple, ca. 2.5 cm, densely pubescent; lower lip ca. 1 cm, 3-lobed, middle lobe narrowly obovate, to 6 mm, apex emarginate; lateral lobes obliquely triangular, ca. 5 mm, apex somewhat rounded. Fl. Sep.

- Alpine slopes; 4000 m. Yunnan (Zhongdian Xian).

Related to *Dracocephalum wallichii*, but differs in the subcircular overlapping bracts.

25. *Dracocephalum bullatum* Forrest ex Diels, Notes Roy. Bot. Gard. Edinburgh 5: 238. 1912.

皱叶毛建草 zhou ye mao jian cao

Rhizomes short, thick, with thick fibrous rootlets. Stems red-purple, ascending or erect, 9–18 cm, obtusely 4-angled, densely retrorse minute hairy, nearly unbranched. Basal leaves petiole to 4 cm; leaf blade ovate to elliptic-ovate, upper blades ovate to circular-ovate, 2.5–5 \times 1.8–2.5(–4) cm, papery, adaxially glabrous, abaxially purplish, sparsely pubescent along veins or glabrous, veins elevated abaxially, base cordate, margin crenate, apex rounded or obtuse. Verticillasters in terminal, condensed capitula; floral leaves ovate to circular-ovate; bracts obovate to flabellate-obovate, subequal to calyx, margin densely ciliate, 3–6-serrate, teeth obtuse to spinescent. Calyx reddish purple, 1.5–1.8(–2) cm, sparsely villous, ciliate, 2-lipped to ca. 1/3 its length; upper lip middle tooth obovate, ca. $2 \times$ as wide as lateral teeth, apex acute, lateral teeth lanceolate, apex acute; lower lip teeth similar to lateral teeth of upper lip. Corolla blue-purple, 2.8–3.5 \times 1–1.2 cm, villous; upper lip ca. 1/2 as long as lower lip, ca. 1.2 cm wide, 2-lobed; lower lip with dark spots, 3-lobed, middle lobe elongated, ca. 8 mm wide. Fl. Jul–Aug.

- Stony alluvial fans in limestone mountains; 3000–4500 m. Yunnan.

A handsome species with large showy bracts and flowers.

26. *Dracocephalum purdomii* W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 105. 1916.

岷山毛建草 min shan mao jian cao

Dracocephalum grandiflorum Linnaeus var. *purdomii* (W. Smith) Kudô.

Stems 7–15 cm, ascending, villous. Petiole of basal leaves 3–4 cm, cauline leaves 2-paired, similar to basal leaves but smaller, short petiolate or subsessile, sparsely hairy; leaf blade ovate-oblong, to 3 \times 1.5 cm, sparsely strigose, base truncate to cordate, margin crenate, apex subrounded. Verticillasters in terminal capitula ca. 3 cm in diam.; bracts oblanceolate to narrowly oblong, 8–10 mm, margin ciliate, 5-serrate at apex, teeth long spinescent. Calyx 1.1–1.5 cm, glabrous, tube erect, teeth equal; adaxial middle tooth broadly elliptic, ca. 3 mm wide, apex obtuse, short spinescent or sometimes gradually wider with apex irregularly spinescent-serrulate, ciliate; other 4 teeth triangular-lanceolate, apex spinescent-acuminate, sparsely ciliate or glabrous. Corolla dark blue, 2.2–2.5 cm, densely white villous, tube base narrower, to 5–7 mm wide at apex; upper lip 2-lobed; lower lip spotted, 3-lobed, middle lobe elongated. Fl. Jul–Aug.

- Stony areas in alpine valleys; 2300–3300 m. Gansu, Sichuan.

27. *Dracocephalum truncatum* Sun ex C. Y. Wu, Acta Phytotax. Sin. 8: 25. 1959.

截萼毛建草 jie e mao jian cao

Herbs perennial. Stems to 30 cm, sparsely retrorse floccose-pilose, nodes 2–4. Basal leaves numerous, upper leaves subsessile, gradually becoming bracts; petiole of basal leaves slender, 3–4 \times as long as blade; leaf blade triangular-cordate, 2–5 \times 1.5–4.5 cm, adaxially sparsely villous and finely papillate, abaxially \pm purplish, sparsely villous along veins, veins conspicuous abaxially, base cordate, margin crenate, ciliolate, apex subrounded. Verticillasters in terminal capitula; bracts sessile, ovate-lanceolate to subcircular, to 1 cm, margin incised, ciliate, apex short spinescent. Calyx tubular-campanulate, slightly incurved, 1.2–1.5 cm \times 4 mm, sparsely villous, ciliolate outside, glabrous inside, 5-toothed to 1/3 its length; middle tooth of upper lip trapeziform, ca. 4 \times as wide as other teeth, apex \pm truncate, 9-denticulate, slightly spinescent; lateral teeth of upper lip narrowly triangular; teeth of lower lip 2, lanceolate. Corolla ca. 2.5 cm, white floccose-villous; upper lip shorter than lower lip, apex 2-lobed; lower lip to 1 cm, 3-lobed, middle lobe ca. $2 \times$ as wide as lateral lobes. Fl. Jul.

- Rocky crevices in streamside banks; 2700 m. Gansu (Lintao Xian, Xiahe Xian).

Possibly only a form of *Dracocephalum purdomii*; some specimens from Lu-pan Shan (Gansu Province) have extremely variable middle teeth on the adaxial calyx lips.

28. *Dracocephalum grandiflorum* Linnaeus Sp. Pl. 2: 595. 1753.

大花毛建草 da hua mao jian cao

Dracocephalum altaense Laxmann; *D. turkestanicum* Gandoger.

Rhizomes oblique, 5–10 mm in diam. Stems 15–26 cm, unbranched, densely retrorse pubescent, glabrescent basally. Petiole of basal leaves 2.5–6 cm, sparsely spreading villous; leaf blade oblong-elliptic, rarely ovate, 1.8–4.8 × 1.4–3.6 cm, base cordate, margin crenate, apex obtuse; petioles of mid cauline leaves sheathlike, 4–7 cm; leaf blade broadly ovate, 2.2–3.2 cm, sparsely appressed pubescent, base cordate to broadly cuneate, margin crenate-serrate or sometimes serrate. Verticillasters in terminal capitula; floral leaves coarsely dentate; bracts narrowly lanceolate to obovate, ca. 1.5 × 1.2 cm, margin silky ciliate, 1–4-serrate, apex acute-acuminate to spinescent, spines 2–3 mm. Calyx purplish at apex, 1.5–2 cm, villous, golden glandular, 2-lipped to ca. 1/2 its length; upper lip middle tooth semioblong, ca. 1.5 × as wide as lateral teeth, apex obtuse, with spines ca. 0.5 mm; lateral teeth of upper lip lanceolate, apex acute; lower lip 2-toothed to lip base, teeth similar to lateral teeth of upper lip but narrower. Corolla blue, 3–4 × 1–1.2 cm, villous outside; lower lip wide, base dark maculate, white villous. Fl. Jul-Aug.

Grassy slopes; 2200–2900 m. Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan].

29. *Dracocephalum rupestre* Hance, J. Bot. 7: 166. 1869.

毛建草 mao jian cao

Rhizomes to 1 cm in diam. Stems purplish, numerous, ascending, 15–42 cm, unbranched, sparsely retrorse pubescent. Basal leaves numerous, mostly persistent after anthesis; petiole 3–15 cm, white patent-villous; leaf blade triangular-ovate, 1.4–5.5 × 1.2–4.5 cm; mid cauline leaves petiole 2–6 cm, blade 2.2–3.5 cm, sparsely villous, base cordate, margin crenate-serrate, apex obtuse. Verticillasters in terminal capitula or rarely spikes to 9 cm; floral leaves reduced, subsessile or with sheathlike petiole 4–8 mm; bracts lanceolate to obovate, 0.7–1.6 cm, margin sparsely pubescent, ciliate, 2–6-spinescent-serrulate with spines to 2 mm. Calyx purplish, 2–2.4 cm, pubescent, ciliate, 2-lipped to 2/5 its length; upper lip with teeth divisions to lip base, middle tooth obovate-elliptic, ca. 2 × as wide as lateral teeth, apex short acute-acuminate; lateral teeth lanceolate, apex acute-acuminate; lower lip teeth narrowly lanceolate. Corolla purple-blue, 3.8–4 cm, pubescent, middle lobe of lower lip smaller. Fl. Jul-Sep.

• Alpine meadows, grassy slopes, sunny areas in sparse forests; 700–3100 m. Hebei, Liaoning, Nei Mongol, Qinghai, Shanxi.

Used in Hebei and Shanxi as a substitute for tea. Also used as an ornamental herb for its large, purple-blue flowers.

30. *Dracocephalum palmatoides* C. Y. Wu & W. T. Wang, Fl. Reipubl. Popularis Sin. 65(2): 593. 1977.

掌叶青兰 zhang ye qing lan

Rhizomes ca. 3 mm in diam. Stems numerous, densely spreading or retrorse white pubescent, fertile 2–3 cm, sterile 1.2–2 cm. Leaves ± palmately 5-pinnatifid to slightly more than 1/2 its length; petiole slightly shorter to longer than blade, silky villous; leaf blade broadly triangular-ovate, 3–5 × 3.5–6 mm, adaxially silky-pubescent, abaxially densely white sericeous-tomentulous, base cordate to subtruncate; lobes narrowly elliptic, apex rounded to obtuse, margin involute. Verticillasters in terminal capitula 0.9–1.4 cm; bracts purple-red, elliptic to elliptic-obovate, 6–10 × 2.5–4 mm, margin pubescent, ciliate, entire or with 1 or 2 lanceolate to ovate or triangular serrations, apex acute to spinescent-

acuminate with spines 0.5–1 mm. Calyx campanulate-tubular, ca. 8 mm, pubescent, ciliate, 2-lipped to 1/2 its length; upper lip teeth divisions to 2/3 of lip, teeth triangular-ovate, apex acute-acuminate; middle tooth of upper lip to 1.5 × as wide as lateral teeth; lower lip teeth divisions to 3/4 of lip, teeth lanceolate to broadly-lanceolate. Corolla ca. 1.1 cm, densely fine pubescent, apically villous near margin, lower lip glabrous. Fl. Jul.

• Slopes. Xinjiang (Toli Xian).

Related in the original description to *Dracocephalum palmatum* Stephan (Siberia) but apparently closer to the following two species.

31. *Dracocephalum organoides* Stephan ex Willdenow, Sp. Pl. 3: 151. 1800.

铺地青兰 pu di qing lan

Dracocephalum pinnatum Linnaeus var. *songaricum* Lipsky.

Rhizomes ca. 5 mm in diam. Stems purplish, numerous, ascending or suberect, densely retrorse pubescent, fertile 3–7 cm, sterile 2–4 cm. Petiole as long as to longer than blade, pubescent, sometimes intermixed with villous hairs; leaf blade pinnatifid, ovate, 3–5 × 2.5–4.5 mm, adaxially pubescent, abaxially densely white tomentulous, base abruptly broad cuneate to shallow cordate, margin revolute, apex obtuse; segments in 3 pairs, broadly ovate to oblong, basal segment with an oblique reflexed lobe. Verticillasters in axils of apical 2–5 leaf pairs, crowded; bracts obovate-lanceolate, to 8 mm, apex 3-toothed, rarely entire, pubescent, ciliate. Calyx 7–8 mm, pubescent, ciliate, 2-lipped to 1/2 its length; upper lip teeth divisions to beyond 1/2 of lip, middle tooth obovate, lateral teeth broadly lanceolate; lower lip teeth divisions nearly to lip base, teeth spinescent-acuminate, spines less than 1 mm. Corolla blue, to 1.2 cm. Nutlets black, oblong. Fl. Jun-Jul, fr. Aug.

Grassy slopes, dry hillocks in alluvial regions; 1700–2500 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia].

32. *Dracocephalum paulsenii* Briquet, Bot. Tidsskr. 28: 238. 1908.

宽齿青兰 kuan chi qing lan

Herbs procumbent, ± caespitose. Rhizomes ca. 8 mm in diam., woody. Stems numerous, 5–15 cm, densely spreading pubescent. Petiole 2–3 mm; leaf blade pinnatifid, ovate, ca. 3–4 × 3–4 mm, adaxially green, strigose, abaxially white tomentose, blade segments margin involute, apex obtuse. Verticillasters in terminal, globose-ovoid or oblong spikes 2–3 × 1.5 cm; bracts purple or purple-blue, elliptic, pinnatifid, apex somewhat obtuse. Calyx tubular-campanulate, 6–7 mm, spreading pilose; upper lip broadly ovate, 3-toothed; lateral teeth of upper lip narrowly ovate, strongly connate with middle tooth; teeth of lower lip ovate-lanceolate, apex short acuminate. Corolla purple-blue, with dark spots, 1–1.2 cm, densely strigose, exerted portion of tube dilated into wide throat; upper lip short, lower lip reflexed, larger. Fl. Jun-Aug.

Alpine meadows; 3500–4200 m. Xinjiang [Afghanistan, Kyrgyzstan, Pakistan, Tajikistan].

Considered by some as a synonym of *Dracocephalum discolor* Bunge.

33. *Dracocephalum ruyschiana* Linnaeus, Sp. Pl. 2: 595. 1753.

青兰 qing lan

Ruyschiana spicata Miller; *Zornia linearifolia* Moench.

Stems erect, minutely retrorse hairy, sparsely hairy toward base. Leaves sessile or subsessile, linear to lanceolate-linear, 3.4–6.2 cm, sparsely minutely hairy on veins, glabrescent, base narrowly cuneate, apex obtuse. Verticillasters in apical 4–6 nodes, ± crowded; bracts ovate-elliptic, to 1/2 as long as calyx, apex acute, densely ciliate. Calyx 1–1.2 cm, densely pubescent basally, sparsely pubescent at apex, 2-lipped to ca. 2/5 its length; upper lip teeth divisions to 2/3 of lip, middle tooth ovate-elliptic, slightly wider than lateral teeth, lateral teeth triangular to broadly lanceolate; lower lip purplish, with 2 lanceolate, apically acute teeth, margin ciliolate. Corolla blue-purple, 1.7–2.4 cm, pubescent outside. Fl. Jul.

Montane grasslands, stony areas in grasslands. Heilongjiang, Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Turkmenistan; Europe].

Source of an essential oil.

34. *Dracocephalum argunense* Fischer ex Link, Enum. Hort. Berol. Alt. 2: 118. 1822.

光萼青兰 guang e qing lan

Dracocephalum ruyschiana Linnaeus var. *argunense* Nakai; *D. ruyschiana* Linnaeus var. *speciosum* Ledebour; *D. speciosa* Ledebour.

Stems numerous, erect, 35–57 cm, sparsely retrorse minute hairy toward apex, subglabrous toward base. Petiole 1/4–1/3 as long as blade, absent in apical leaves; basal leaf blade oblong-lanceolate, 2.2–4 × 0.5–0.6 cm; upper cauline blade lanceolate-linear, 4.5–6.8 × 0.3–0.6 cm, abaxially sparsely pubescent on veins or subglabrous, base cuneate, apex obtuse. Verticillasters in upper 2–4 nodes, ± crowded; floral leaves lanceolate to ovate-lanceolate; bracts green, elliptic to spatulate-obovate, 7–12 mm, apex acute, ciliate. Calyx 1.4–1.8 cm, densely retrorse minute hairy basally,

subglabrous at apex, 2-lipped to ca. 1/2 its length; upper lip teeth divisions to 2/3 of lip, middle tooth lanceolate-ovate, slightly wider than lateral teeth; lateral teeth of upper lip lanceolate; lower lip teeth lanceolate, apex purplish, acute. Corolla blue-purple, 3.3–4 cm, pubescent. Fl. Jul-Aug.

Grassy slopes, grasslands, sandy and grassy riverbanks, thickets; 200–800 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol [Korea, Russia].

35. *Dracocephalum stamineum* Karelin & Kirilow, Bull. Soc. Imp. Naturalistes Moscou 15: 423. 1842.

长蕊青兰 chang rui qing lan

Dracocephalum pulchellum Briquet; *Fedtschenkiella staminea* (Karelin & Kirilow) Kudrjashev.

Herbs perennial, ± caespitose. Rhizomes oblique, 3–5 mm in diam. Stems purple-red, numerous, ascending, 10–27 cm, unbranched or few branched, retrorse pubescent; internodes below inflorescence 6–9 cm, internodes in inflorescence 0.8–1.5 cm. Petiole 5–6 × as long as basal blade, as long as to longer than blade at mid stem; leaf blade broadly ovate, 0.8–1.3 × 0.7–1.4 cm, sparsely pubescent, abaxially golden glandular, base cordate, margin crenate-dentate, apex obtuse. Verticillasters in uppermost 1–3 stem nodes, crowded in capitula; floral leaves leaflike, serrate with an apical spine to 3.6 mm; bracts elliptic-ovate to obovate, 2–3 mm, densely villous, margin with 4 or 5 teeth terminated in a spine 2.5–4.5 mm. Calyx purple, 6–7 mm, densely lanate, 2-lipped, lip divided to middle of calyx; upper lip teeth divisions to 1/3 its length, teeth subequal, triangular-ovate, apex spinescent-acuminate, sinuses with spinescent appendages; teeth of lower lip lanceolate. Corolla blue-purple, ca. 8 mm, puberulent, lips subequal. Stamens ca. 1.1 cm, much exserted. Nutlets black-brown, oblong, ca. 2 × 1.2 mm.

Hills, grassy slopes, streamsides; 1700–2500 m. Xinjiang, Xizang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan].

The small corollas and clearly exserted stamens make this plant distinct.

24. LALLEMANTIA Fischer & C. Meyer, Index Sem. Hort. Petrop. 6: 52. 1840.

扁柄草属 bian bing cao shu

Plants annual, biennial, or perennial, glabrous or white hairy, herbaceous. Leaves petiolate or sessile, subentire. Verticillasters axillary, 6-flowered; bracts ciliate- or awned-crenate. Pedicel erect, rigid, flattened. Calyx tubular, 15-veined, straight, throat closed after anthesis; teeth 5, subequal, posterior tooth wider than other teeth, tooth sinus with a thickened fold. Corolla with a slender, included to slightly exserted tube, dilated at apex into throat, 2-lipped; upper lip straight, slightly concave, apex emarginate, with 2 longitudinal folds inside; lower lip spreading, 3-lobed, middle lobe reniform, lateral lobes minute, semicircular. Stamens 4, posterior 2 longer; filaments pilose; anther cells 2, divaricate. Style apex 2-cleft, lobes subulate. Nutlets dark brown, oblong, adaxially ribbed, mucilaginous on wetting.

Five species: Afghanistan, China, India, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe; one species in China.

1. *Lallemantia royleana* (Wallich ex Benth) Benth, Prodr. 12: 404. 1848.

扁柄草 bian bing cao

Dracocephalum royleanum Benth, Pl. Asiat. Rar. 1: 65. 1830.

Herbs annual. Stems 15–20.5 cm, densely spreading or retrorse white pubescent. Petiole 5–10 mm; leaf blade ovate, 1.5–2.5 × 0.8–1 cm, sparsely pubescent, base cuneate, margin

crenate, apex obtuse. Verticillasters in terminal spikes 2–18.5 cm; floral leaves short petiolate, ovate to oblong-cuneate, 0.8–1.7 cm × 5–7 mm, margin remotely crenate to 1- or 2-aristate-crenate; bracts obovate-cuneate, 4–7 × 2–5 mm, abaxially yellow glandular, margin 2–4-toothed, aristae 2–6 mm. Calyx tubular, ca. 5 × 1–1.2 mm, spreading pubescent, puberulent, sometimes intermixed with yellow glands, veins conspicuous, throat slightly oblique; posterior teeth ovate, ca. 1.3 mm, covering other 4 teeth in fruit; middle tooth awned; anterior teeth oblong, narrower, ca. 1.5 mm. Corolla purple-blue,

slightly exserted, ca. 5.5 mm, white pilose; upper lip 0.7 mm, slightly concave, 2-lobed, arcuate pleated along margin; middle lobe of lower lip reniform, ca. 1.2 × 2.8 mm, emarginate, margin undulate; lateral lobes minute, circular.

Nutlets dark brown, narrowly oblong, adaxially ribbed, ca. 2.3 × 1 mm, glabrous. Fl. May-Jun, fr. Jul.

Slopes, moist areas along waterways. Xinjiang [India, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

25. PRUNELLA Linnaeus, Sp. Pl. 2: 600. 1753.

夏枯草属 xia ku cao shu

Herbs perennial. Leaves pinnatifid to subentire. Verticillasters 6-flowered, in terminal ovoid or ovoid-globose spikes; bracts broad, membranous, margin ciliate, overlapping; bracteoles minute or absent. Pedicel very short or absent. Calyx tubular-campanulate, ± flattened dorsiventrally, irregularly 10-veined, netted between veins, 2-lipped, base hairy, throat glabrous; upper lip flat, truncate, shortly 3-toothed; lower lip 2-cleft to 1/2 of lip, teeth lanceolate, mouth closed in fruit. Corolla tube gradually dilated on 1 side, exserted, throat slightly constricted, scaly annulate inside, limb 2-lipped; upper lip straight, galeate, margin entire; lower lip 3-lobed, middle lobe largest, concave, denticulate; lateral lobes oblong, reflexed. Stamens 4, anterior 2 longer, ascending to underside of upper lip, parallel, free; filament apex dentate; anther cells 2, divaricate. Ovary glabrous. Style glabrous, apex equally 2-cleft, lobes subulate. Nutlets brown, subglobose, ovoid to oblong, glabrous, smooth or tuberculate, apex rounded.

About seven broadly defined species (15 by some authors): Africa, Asia, Europe, North America; four species (one cultivated) in China.

- 1a. Corolla tube upwardly curved, 2–2.7 cm, ca. 3 × as long as calyx; spike conspicuously long pedunculate; sterile tooth of anterior filaments short, tubercular; adaxial calyx teeth conspicuous; nutlets subglobose, slightly tuberculate, conspicuously grooved on margin and back 4. *P. grandiflora*
- 1b. Corolla with straight tube, less than 2 cm, less than 2 × as long as calyx; spike short pedunculate to sessile; sterile tooth of anterior filaments longer than anther; adaxial calyx teeth inconspicuous; nutlets ovoid to oblong, smooth.
 - 2a. Plants conspicuously hispid throughout; corolla blue-purple, upper lip with a conspicuous hispid belt on back 3. *P. hispida*
 - 2b. Plants sparsely strigose or subglabrous throughout; corolla purple, red-purple, reddish, to white, upper lip glabrous or subglabrous on back.
 - 3a. Plants slender; corolla slightly exserted, ca. 1.3 cm 1. *P. vulgaris*
 - 3b. Plants robust; corolla much exserted, 1.8–2.1 cm 2. *P. asiatica*

1. *Prunella vulgaris* Linnaeus, Sp. Pl. 2: 600. 1753.

夏枯草 xia ku cao

Stems 20–30 cm, ascending, base much branched, purple-red, sparsely strigose or subglabrous. Petiole 0.7–2.5 cm, upper ones shorter; leaf blade lanceolate to ovate, 1.5–6 × 0.6–2.5 cm, glabrous to sparsely villous, base truncate to broadly cuneate-decurrent, margin undulate to entire, apex obtuse to rounded. Spikes 2–4 cm, sessile; floral leaves similar to cauline leaves, sessile or short petiolate, subovate; bracts purplish, broadly cordate, ca. 7 × 11 mm, cuspidate, veins sparsely hispid. Calyx campanulate, ca. 1 cm, sparsely hispid, tube ca. 4 mm; upper lip suboblate, subtruncate; lower lip narrower, teeth acuminate. Corolla purplish or white, ca. 1.3 cm, slightly exserted, glabrous; tube ca. 7 mm, base ca. 1.5 mm wide, gradually dilated to ca. 4 mm wide at throat; upper lip subcircular, ca. 5.5 mm in diam., ± galeate, emarginate; lower lip ca. 1/2 as long as upper lip, middle lobe subobcordate, fringed; lateral lobes oblong, spreading, minute. Anterior stamens very long. Nutlets oblong-ovoid, ca. 1.8 × 0.9 mm, slightly 1-furrowed. Fl. Apr-Jun, fr. Jul-Oct.

Open slopes, grasslands, wet streamsides, forest margins, thickets; to 3200 m. Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; Africa, SW Asia, Europe, North America].

- 1a. Leaves ovate-oblong to ovate, 1.5–6 × 0.7–2.5 cm, inconspicuously undulate to subentire; adaxially hirtellous or subglabrous; abaxially subglabrous 1a. var. *vulgaris*
- 1b. Leaves lanceolate to oblong-lanceolate, 1.5–4 ×

0.6–1 cm, entire, glabrous or sparsely villous

..... 1b. var. *lanceolata*

1a. *Prunella vulgaris* var. *vulgaris*

夏枯草 xia ku cao

Prunella vulgaris var. *elongata* Makino; *P. vulgaris* var. *japonica* Kudô; *P. vulgaris* var. *leucantha* Schur.

Leaves ovate-oblong to ovate, 1.5–6 × 0.7–2.5 cm, margin inconspicuously undulate to subentire, adaxially hirtellous or subglabrous, abaxially subglabrous.

Open slopes, grasslands, wet streamsides; to 3000 m. Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; Africa, SW Asia, Europe, North America].

Used medicinally.

1b. *Prunella vulgaris* var. *lanceolata* (W. P. G. Barton) Fernald, Rhodora 15: 183. 1913.

狭叶变种 xia ye bian zhong

Prunella pennsylvanica Willdenow var. *lanceolata* W. P. G. Barton, Fl. Philadelph. Prod. 64. 1815; *P. vulgaris* var. *elongata* Benth.

Leaves lanceolate to oblong-lanceolate, 1.5–4 × 0.6–1 cm, margin entire, glabrous to sparsely villous.

• Grassy slopes, forest margins, thickets; to 3200 m. Sichuan, Yunnan.

2. *Prunella asiatica* Nakai, Bot. Mag. (Tokyo) 44: 19. 1930.

山菠菜 shan bo cai

Prunella asiatica var. *albiflora* (Koidzumi) Nakai; *P. vulgaris* Linnaeus var. *albiflora* Koidzumi.

Stems purple-red, numerous, ascending, 20–60 cm, pilose especially toward apex. Petiole 1–2 cm; leaf blade ovate to ovate-oblong, 3–4.5 × 1–1.5 cm, adaxially appressed puberulent or subglabrous, abaxially sparsely pilose on veins, base cuneate to attenuate, margin slightly undulate or crenate-serrate, apex obtuse to acute. Spikes terminal, 3–5 cm, sessile; floral leaves subsessile or short petiolate, broadly lanceolate; bracts tinged red, reduced at apex, obovate, 5–8 × 6–8 mm, caudate, veins pilose. Pedicel ca. 2 mm. Calyx ca. 1 cm, apex red or purple, white villous, tube ca. 4 mm, turbinate; upper lip subcircular, ca. 6 mm wide, truncate; lower lip narrower, ca. 3.5 mm, teeth lanceolate, spiny. Corolla purplish or dark purple to white, 1.8–2.1 cm, glabrous; tube ca. 1 cm, abruptly dilated beyond middle; upper lip oblong, ca. 9 × 6 mm, concave, keeled; lower lip ca. 8 × 9 mm, middle lobe subcircular, fringed; lateral lobes oblong, small, pendulous. Anterior stamens very long. Nutlets ovoid, ca. 1.5 × 1 mm, apex rounded, glabrous. Fl. May–Jul, fr. Aug–Sep.

Grassy slopes, wet areas, thickets; to 1700 m. Anhui, Heilongjiang, Jiangsu, Jiangxi, Jilin, Liaoning, Shandong, Shanxi, Zhejiang [Japan, Korea].

Used as a diuretic.

3. *Prunella hispida* Benth, Pl. Asiat. Rar. 1: 66. 1830.

硬毛夏枯草 ying mao xia ku cao

Prunella stolonifera H. Léveillé & Giraudias; *P. vulgaris* Linnaeus var. *hispida* (Benth) Benth.

Stem base prostrate, 15–30 cm, striate, densely hirsute. Petiole 0.5–1.5 cm; leaf blade ovate to ovate-lanceolate, 1.5–3 × 1–1.3 cm, densely hispid, base rounded, margin undulate-serrate to crenate-serrate, apex acute. Spikes 2–3 × 2 cm; floral leaves subsessile; bracts subcordate, 8–10 mm wide,

abruptly acuminate, densely hirsute, margin hispid. Pedicel less than 1 mm. Calyx purple, tubular-campanulate, ca. 1 cm, hispid on veins; upper lip subcircular, ca. 6 × 5 mm; lower lip ca. 3 mm wide, teeth lanceolate, spinescent. Corolla dark purple to blue purple, ca. 1.5(–1.8) cm, glabrous, tube ca. 1 cm, base ca. 1.5 mm, gradually dilated to 4 mm wide at throat; upper lip oblong, ca. 5 × 4 mm, keeled, concave, emarginate, hispid on back; lower lip ca. 5 × 6 mm, with middle lobe subcircular, undulate-lobulate; lateral lobes oblong, minute, pendulous. Anterior stamens very long. Nutlets ovoid, ca. 1.5 × 1 mm, slightly flattened abaxially, apex rounded, glabrous. Fl. and fr. Jun–Jan.

Forest margins, grassy slopes; 1500–3800 m. Sichuan, Xizang, Yunnan [India].

4. *Prunella grandiflora* (Linnaeus) Jacquin, Fl. Austriac. 4: 40. 1776.

大花夏枯草 da hua xia ku cao

Prunella vulgaris Linnaeus var. *grandiflora* Linnaeus, Sp. Pl. 2: 600. 1753; *P. grandiflora* (Linnaeus) Moench.

Stems ascending, 15–60 cm, villous-hirsute. Petiole 2.5–4 cm, hispid; leaf blade ovate-oblong, 3.5–4.5 × 2–2.5 cm, sparsely hirsute, abaxially subglabrous, ciliolate, base subrounded, margin entire, apex obtuse. Spikes ca. 4.5 cm, oblong, pedunculate; floral leaves sessile, oblong-lanceolate; bracts numerous, mucronate, sparsely villous on veins. Pedicel ca. 1 mm. Calyx ca. 8 mm, veins sparsely hirsute, tube ca. 3 mm; upper lip subcircular, ca. 5 × 5 mm, subrounded, with teeth broadly triangular, spinescent, lateral teeth longer; lower lip oblong, ca. 6 × 3 mm, with teeth lanceolate, spinescent. Corolla blue, 2–2.7 cm, tube ca. 9 mm, curved; upper lip oblong, ca. 12 × 7 mm, recurved; middle lobe of lower lip undulate-lobulate; lateral lobes pendulous. Nutlets subglobose, slightly tuberculate, back and margin conspicuously grooved. Fl. Sep, fr. Oct.

Cultivated in Nanjing [C and W Asia, Europe].

26. CHELONOPSIS Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 111. 1865.

铃子香属 ling zi xiang shu

Herbs or shrubs. Leaves crenate to serrate. Verticillasters in axils or upper leaves, 2–10-flowered. Calyx campanulate, membranous, dilated after anthesis, 10-veined, 4- or 5-toothed; teeth triangular, equal or subequal, or conspicuously 2-lipped, with upper lip 3-toothed and lower lip 2-toothed. Corolla white, yellow, or purple-red, 2-lipped; tube dilated in front near base, long exerted, not hairy annulate inside; upper lip short, straight, margin entire or emarginate; lower lip longer, subpatent, 3-lobed; middle lobe largest, emarginate, margin undulate to dentate. Stamens 4, ascending beneath upper corolla lip; filaments complanate, puberulent; anthers with 2-locular, bearded pollen sacs. Ovary glabrous. Style 2-cleft, lobes subulate. Nutlets flattened dorsiventrally, obliquely long winged at apex.

About 16 species: Asia, 13 species in China.

1a. Rhizomatous herbs; calyx conspicuously 2-lipped, with (4–)5 short unequal teeth 13. *C. chekiangensis*

1b. Shrubs or subshrubs; calyx with 5 equal teeth.

2a. Leaves lanceolate to ovate-lanceolate, short petiolate to subsessile; corolla usually creamy white to reddish, purple spotted.

3a. Leaves opposite, membranous; flowers solitary, axillary; calyx sparsely white ciliate outside, teeth lanceolate, slightly longer than tube 3. *C. forrestii*

3b. Leaves in whorls of 3, papery; cymes 1–3-flowered, axillary; calyx white villous, teeth triangular, shorter than tube.

4a. Leaves lanceolate, 3.5–6 × 0.8–1.3 cm; cymes usually 1-flowered; peduncle less than 3 mm; corolla 1.5–2 cm 1. *C. albiflora*

4b. Leaves ovate-lanceolate, 5–6 × 2–2.5 cm; cymes usually 3-flowered; peduncle ca. 1 cm; corolla ca. 3.5 cm 2. *C. souliei*

- 2b. Leaves ovate to ovate-triangular, long petiolate; corolla yellow to purple red.
- 5a. Branchlets pilose or villous, sometimes intermixed with sparse bristly hairs, glandular hairs few.
- 6a. Leaves less than 3 cm; cymes 1-flowered 4. *C. giraldii*
- 6b. Leaves more than 3 cm; cymes rarely 1-flowered.
- 7a. Corolla yellow, middle lobe of lower lip conspicuously dentate or undulate 5. *C. odontochila*
- 7b. Corolla reddish to scarlet, middle lobe of lower lip entire or subentire.
- 8a. Plants densely pilose; leaves slightly corrugate, coarsely crenate-serrate 7. *C. mollissima*
- 8b. Plants sparsely villous; leaves not corrugate, double crenate-serrate 6. *C. rosea*
- 5b. Branchlets densely spreading bristly, short glandular pilose.
- 9a. Calyx teeth acute, wider than long 12. *C. abbreviata*
- 9b. Calyx teeth acuminate, longer than wide.
- 10a. Bracts linear, minute.
- 11a. Leaves 8–12 × 6–7 cm; peduncle to 5 cm; pedicel 1.7–3 cm; corolla yellow 8. *C. lichiangensis*
- 11b. Leaves 6–8 × 3–4 cm; peduncle ca. 2.5 cm; pedicel 2–3 mm; corolla dull purple 9. *C. siccanca*
- 10b. Bracts leaflike, large, conspicuous.
- 12a. Bracts close to calyx, at first covering cymes; pedicel 2–5 mm 10. *C. bracteata*
- 12b. Bracts widely spaced, not covering calyx; pedicel to 2.5 cm 11. *C. pseudobracteata*

1. *Chelonopsis albiflora* Pax & K. Hoffmann ex Limpricht, Repert. Spec. Nov. Regni Veg. Beih. 12: 477. 1922.

白花铃子香 bai hua ling zi xiang

Shrubs 0.5–2 m tall. Stems gray-brown, bark peeling longitudinally; branches brown, puberulent, glabrescent. Leaves often in whorls of 3; petiole ca. 2 mm, puberulent; leaf blade lanceolate, 3.5–6 × 0.8–1.3 cm, sparsely puberulent, adaxially glandular, abaxially pubescent along veins otherwise glandular, base subrounded to broadly cuneate, margin serrulate, apex acuminate. Cymes 1(–3)-flowered; peduncle ca. 3 mm; bracteoles linear, 5–7 × 0.5 mm. Pedicel 1–2 mm. Calyx campanulate, 2–6 cm, pubescent, glandular outside, glabrous inside; teeth 5, narrowly triangular, to 8 mm, apex spinescent. Corolla white, 1.5–2 cm, puberulent outside, glabrous inside; upper lip ovate, ca. 7 mm; lower lip ca. 1.3 cm, middle lobe cordate, emarginate, lateral lobes ovate. Filaments puberulent, apex ± dentate. Style unequally 2-cleft. Fl. Aug.

- Wet thickets; 3400–3700 m. Sichuan, Xizang.

2. *Chelonopsis souliei* (Bonati) Merrill, J. Arnold Arbor. 28: 252. 1947.

轮叶铃子香 lun ye ling zi xiang

Shrubs ca. 1.5 m tall. Stems with peeling bark; branches brown, puberulent. Leaves in whorls of 3; petiole 3–4 mm, puberulent; leaf blade ovate-lanceolate, 5–6 × 2–2.5 cm, sparsely puberulent, densely so along midrib adaxially, glandular and pubescent along veins abaxially, base subrounded, margin serrate, apex acuminate. Cymes (2- or) 3-flowered; peduncle ca. 1 cm; bracteoles linear, ca. 5 mm. Pedicel 1–4 mm. Calyx campanulate, ca. 2 cm, densely pubescent, glandular outside, glabrous inside, tube ca. 1 cm; teeth 5, triangular, apex spinescent-acuminate. Corolla cream yellow, ca. 3.5 cm, puberulent, glandular outside, glabrous inside; tube ca. 2 cm, dilated in throat; upper lip ovate, ca. 1 cm, emarginate, lateral lobes ovate. Style equally 2-cleft at apex. Fl. Aug.

- Hillsides; 3600 m. Sichuan, Xizang.

3. *Chelonopsis forrestii* Anthony, Notes Roy. Bot. Gard. Edinburgh 15: 239. 1927.

大萼铃子香 da e ling zi xiang

Chelonopsis odontochila Diels subsp. *forrestii* (Anthony) Kudô.

Shrubs 1–2 m tall. Stems straw colored, bark peeling; branches sparsely pubescent to subglabrous, yellow-brown when dry. Leaves opposite; petiole ca. 5 mm; leaf blade ovate-lanceolate, 4–7 × 2–2.5 cm, sparsely pubescent adaxially, sparsely white pubescent and glandular abaxially, base slightly asymmetrical, rounded to cordate, margin shallowly serrate to subentire, ciliate, apex acuminate. Cymes 1-flowered; peduncle slender, 1–2.5 cm; bracteoles 2, at midpoint of pedicel, linear, ca. 5 mm. Pedicel ca. 3 mm. Calyx campanulate, ca. 2.3 cm, papery, with sparse white cilia outside, glabrous inside, tube ca. 1 cm; teeth 5, lanceolate, margin white ciliate, apex acuminate, spine tipped. Corolla ca. 3 cm, creamy white, tinged purple or red with purple lines on tube, sparsely pubescent outside, glabrous inside; tube ca. 2.2 cm, gradually dilated at apex; upper lip oblate, ca. 5 × 8 mm, emarginate; middle lobe of lower lip largest, ca. 8 × 7 mm, lateral lobes ca. 5 mm wide. Filaments puberulent. Style equally 2-cleft. Fl. Jul.

- Forests, streamside thickets; 2800–3100 m. Sichuan.

4. *Chelonopsis giraldii* Diels, Bot. Jahrb. Syst. 36, Beibl. 82: 94. 1905.

小叶铃子香 xiao ye ling zi xiang

Shrubs 1–2 m tall. Stems subterete, striate, densely puberulent, much branched; branches slender. Petiole 1–2 cm, densely puberulent; leaf blade ovate to ovate-triangular, 2.5–4 × 1.8–2.5 cm, villous-hispid, base rounded, margin sparsely incised-serrate, occasionally double serrate, apex acute. Cymes 1(–3)-flowered, densely puberulent; peduncle 1–1.4 cm; bracteoles linear-lanceolate, ca. 1 × 1.5 mm, puberulent abaxially. Pedicel ca. 2 mm. Calyx campanulate, ca. 1.8 cm, puberulent outside, glabrous inside, tube ca. 1.5 cm; teeth 5, triangular, ca. 5 mm, apex acuminate. Corolla ca. 3 cm, densely pubescent except at base outside, glabrous inside; tube ca. 2.6 cm, much exerted, dilated at throat; upper lip ovate, ca. 4 mm; middle lobe of lower lip obcordate, emarginate. Filaments puberulent. Style equally 2-cleft. Immature nutlets dark brown, striate. Fl. Oct.

- Thickets in valleys; 800 m. Gansu, Shaanxi.

5. *Chelonopsis odontochila* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 240. 1912.

齿唇铃子香 chi chun ling zi xiang

Shrubs 1–2 m tall. Stems densely pubescent, sometimes also sparsely bristly. Petiole 1.5–2 cm, pubescent; leaf blade ovate, 3–8 × 1.5–5 cm, pilose, base cordate, margin finely crenate-serrate, slightly corrugate, apex subacuminate. Cymes (1–)3-flowered, pubescent; peduncle 1–2 cm; bracteoles leaflike to linear or linear-lanceolate, 4–6 mm, ciliate. Pedicel 5–7 mm. Calyx campanulate, ca. 1 cm in flower, to 1.5 cm in fruit, sparsely pubescent outside, glabrous inside, tube ca. 8 mm; teeth 5, triangular to broadly triangular, equal, ca. 2 mm, apex mucronate-acuminate. Corolla yellow, ca. 3.2 cm, puberulent outside, glabrous inside; tube ca. 2.2 cm, dilated in throat; upper lip ca. 3 mm, emarginate; lower lip larger, middle lobe slightly undulate to conspicuously dentate. Filaments puberulent. Style glabrous, equally 2-cleft. Nutlets black-brown, ovoid-ellipsoid, ca. 1 × 2.5 mm, flattened, winged at apex, striate.

• Dry thickets in valleys; 1400–2500 m. Sichuan, Yunnan.

- 1a. Leaves 3–5 × 1.5–3 cm; bracteoles linear-lanceolate; calyx teeth triangular, mucronate-acuminate; middle lobe of lower corolla lip conspicuously dentate 5a. var. *odontochila*
1b. Leaves to 8 × 5 cm; bracteoles leaflike to linear; calyx teeth broadly triangular, acuminate; middle lobe of lower corolla lip slightly undulate to dentate 5b. var. *smithii*

5a. *Chelonopsis odontochila* var. *odontochila*

齿唇铃子香 chi chun ling zi xiang

Leaves 3–5 × 1.5–3 cm. Bracteoles linear-lanceolate. Calyx teeth triangular, mucronate-acuminate. Middle lobe of lower corolla lip conspicuously dentate. Fl. Sep-Oct, fr. Oct-Nov.

• Dry thickets in valleys; 1400–2000 m. Sichuan, Yunnan.

5b. *Chelonopsis odontochila* var. *smithii* (Kudô) C. Y. Wu, Acta Phytotax. Sin. 8: 29. 1959.

钝齿变种 dun chi bian zhong

Chelonopsis odontochila Diels subsp. *smithii* Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 154. 1929.

Leaves to 8 × 5 cm. Bracteoles leaflike to linear. Calyx teeth broadly triangular, acuminate. Middle lobe of lower corolla lip slightly undulate to dentate.

• Dry thickets in valleys; 1800–2500 m. Sichuan, Yunnan.

6. *Chelonopsis rosea* W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 93. 1916.

玫红铃子香 mei hong ling zi xiang

Chelonopsis odontochila Diels subsp. *rosea* (W. Smith) Kudô.

Shrubs 1–2 m tall. Branches robust, densely villous. Petiole 1–4.5 cm, densely villous; leaf blade broadly ovate, 3–8 × 2–5.5 cm, glandular, villous adaxially, densely so mainly along veins abaxially, base cordate, margin double crenate-serrate, apex short acuminate. Cymes densely villous, usually 3-flowered; peduncle 0.5–1.5 cm; bracteoles ± linear, 5–8 mm, densely villous. Pedicel 3–5 mm. Calyx tubular-

campanulate, 1.2–1.4 cm in flower, 1.5–2.5 cm in fruit, densely pubescent outside, glabrous except for pubescent teeth inside; teeth 5, triangular to narrowly triangular, apex mucronate-acuminate. Corolla rose to purple-red, 3–4 × 0.8–1.2 cm, densely pubescent outside, glabrous inside; upper lip ca. 3 × 7 mm, subentire; middle lobe of lower lip ca. 6 × 10 mm, subentire, lateral lobes ca. 3 × 5 mm. Filaments puberulent. Style subequally 2-cleft. Nutlets brown, oblong, ca. 11 × 4 mm, winged at apex, finely striate. Fl. Sep-Oct, fr. Nov-Dec.

• Open thickets; 1600–3100 m. Yunnan.

7. *Chelonopsis mollissima* C. Y. Wu, Acta Phytotax. Sin. 10: 151. 1965.

多毛铃子香 duo mao ling zi xiang

Shrubs ca. 1 m tall, densely pilose. Branches subterete. Petiole 1.5–2.5 cm; leaf blade ovate-orbicular, 3–5 × 2.5–4.5 cm, base subcordate, margin coarsely crenate-serrate, apex acute. Cymes solitary or paired, or terminal on leafy axillary branchlets, 1–3-flowered; peduncle 4–8 mm; bracteoles ovate to oblanceolate, ca. 7 × 2–3 mm. Pedicel 1–2 mm. Calyx campanulate, ca. 1.5 cm, puberulent inside, accessory teeth slightly enlarged below sinus; teeth 5, narrowly triangular, ca. 7 mm, apex spinescent-acuminate. Corolla rose to red, ca. 3.2 cm, pubescent outside, glabrous inside; tube ca. 2.5 cm, dilated at throat; upper lip ca. 3 × 7 mm, emarginate; lower lip ca. 0.9 × 1.5 cm, middle lobe largest, trapeziform, emarginate, lateral lobes ovate. Filaments finely pilose. Style glabrous, equally 2-cleft. Fl. Nov-Dec.

• Dry thickets on open slopes in valleys; 1200–1700 m. Yunnan.

8. *Chelonopsis lichiangensis* W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 92. 1916.

丽江铃子香 li jiang ling zi xiang

Chelonopsis odontochila Diels subsp. *lichiangensis* (W. Smith) Kudô.

Shrubs 1–3 m tall. Branches robust, striate, densely tawny bristly, finely glandular pilose. Petiole 4–5 cm, robust, bristly, densely glandular pilose; leaf blade ovate, ca. 9 × 6.5 cm, pilose along veins, sparsely bristly adaxially, densely so abaxially, base shallowly cordate, margin coarsely lobulate to double crenate, apex ± acuminate. Cymes solitary or paired, bristly, densely glandular pilose, 3–7-flowered; peduncle 3.5–5 cm; floral leaves gradually reduced; bracteoles ± linear, 1–1.5 cm, villous. Pedicel ca. 1.5 cm. Calyx campanulate, 1.5–1.8 cm in flower, dilated in fruit, bristly, finely glandular pilose outside, glabrous inside; teeth 5, ovate-triangular to narrowly triangular, 5–6 mm, equal, callose acuminate, margin ciliate. Corolla yellow, ca. 3.7 cm, glabrous except for pubescent limb outside; tube ca. 3 cm, dilated at apex, ca. 1 cm wide at throat; upper lip ca. 3 × 8 mm, emarginate; middle lobe of lower lip ca. 8 × 11 mm, margin dentate, apex emarginate, lateral lobes ca. 3 mm. Filaments puberulent. Style subequally 2-cleft. Immature nutlets brown, oblong-ellipsoid, flattened, winged, base attenuate, apex acute, finely striate. Fl. Nov.

• Open slopes in valleys; 1900 m. Yunnan.

9. *Chelonopsis siccania* W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 94. 1916.

干生铃子香 gan sheng ling zi xiang

Shrubs 1–2 m tall. Branches slender, densely glandular pubescent. Petiole 2.5–4 cm, sparsely puberulent, densely glandular pubescent; leaf blade ovate to ovate-lanceolate, 6–8 × 3–4 cm, sparsely puberulent, adaxially ciliate along veins, abaxially glabrous or subglabrous, base shallowly cordate, margin crenate-serrate, apex acuminate. Cymes glandular pubescent, usually 3-flowered; peduncle to 2.5 cm; bracts linear, 5–10 mm, pubescent. Pedicel 2–3 mm. Calyx 1–1.5 mm, sparsely pubescent, glandular pubescent at base; teeth 5, triangular, 3–4 mm, apex mucronate-acuminate. Corolla dark purple-red, ca. 3 × 1 cm at throat, apex puberulent outside, subglabrous inside; upper lip ca. 3 mm, slightly emarginate; middle lobe of lower lip narrowly elliptic, more than 1 cm, lateral lobes circular. Filaments glabrous. Style glabrous, 2-cleft (specimens not seen).

- Dry thickets in valleys; 2000 m. Yunnan.

10. *Chelonopsis bracteata* W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 92. 1916.

具苞铃子香 *ju bao ling zi xiang*

Chelonopsis odontochila Diels subsp. *bracteata* (W. Smith) Kudô.

Shrubs 0.5–1.5 m tall. Branches densely spreading bristly, finely glandular pilose. Petiole 3–5 cm, robust, bristly, finely glandular pilose; leaf blade ovate to lanceolate-ovate, with 1–3 lobes at base, 7–10 × 3.5–6 cm, sparsely bristly, finely pilose along veins adaxially, base shallowly cordate, margin crenate-serrate, apex acuminate. Cymes bristly, finely glandular pilose, solitary or paired, 3-flowered; peduncle 3–5 cm; bracts green or reddish, conspicuous, leaflike, lanceolate, to 2.5 cm, bristly, nearly covering calyx in flower. Pedicel 2–5 mm. Calyx ca. 2 cm, densely fine glandular pilose, sparsely bristly; teeth 5, triangular, 5–6 mm, subequal, apex mucronate-acuminate. Corolla dark rose, 2.5–3 × 1.2 cm wide at throat, subglabrous outside; upper lip ca. 2 × 4 mm; middle lobe of lower lip ca. 6 × 7 mm, margin undulate, lateral lobes ca. 4 × 5 mm. Filaments puberulent. Ovary dark brown, glabrous. Style equally 2-cleft. Fl. Oct–Nov.

- Dry thickets in valleys; 2000–2400 m. Sichuan, Yunnan.

11. *Chelonopsis pseudobracteata* C. Y. Wu & H. W. Li Acta Phytotax. Sin. 10: 152. 1965.

假具苞铃子香 *jia ju bao ling zi xiang*

Chelonopsis pseudobracteata var. *rubra* C. Y. Wu & H. W. Li.

Shrubs 0.5–1.5 m tall. Branches robust, striate, densely bristly, finely glandular pilose. Petiole 4–5 cm, robust, densely bristly, finely glandular pilose; leaf blade ovate, 6–8 × 3.5–5 cm, sparsely bristly, finely white pilose along veins adaxially, base shallowly cordate, margin callose crenate to sometimes double callose crenate, apex acuminate. Cymes axillary or subterminal, densely bristly, finely glandular pilose, solitary or paired, 3–7-flowered; peduncle 2–4 cm; bracts leaflike, linear to lanceolate, 1–3 cm, bristly, not covering cymes. Pedicel 1–2.5 cm. Calyx campanulate, ca. 1.6 cm in flower, to 2.3 cm in fruit, pilose along veins outside and on throat inside; teeth 5, narrowly triangular, anterior 2 slightly larger, 6–7 mm, apex cuspidate-acuminate, reflexed. Corolla yellow or reddish to scarlet, ca. 3.6 cm, projected, slightly saccate above middle, ca. 1 cm wide at throat, finely pilose at apex outside, glabrous inside; upper lip ca. 3 mm,

entire; middle lobe of lower lip ca. 5 mm, emarginate, lateral lobes ca. 2 mm. Posterior filaments finely pilose, anterior filaments puberulent only at base. Style subequally 2-cleft. Nutlets brownish, ellipsoid, ca. 10 × 5 mm, winged, flattened, finely veined. Fl. Sep–Nov, fr. Nov.

- Forests, grassy areas, thickets in valleys, forest margins; 1300–2300 m. Sichuan, Yunnan.

12. *Chelonopsis abbreviata* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 153. 1965.

缩写铃子香 *suo xu ling zi xiang*

Shrubs erect. Branchlets striate, densely, tawny bristly, finely glandular pilose. Petiole 0.5–2.8 cm, densely bristly, finely glandular pilose; leaf blade ovate, 6–8 × 4–4.5 cm, reduced at apex, glandular, finely pilose adaxially and along veins abaxially, sparsely pubescent abaxially, base cordate, margin coarsely double incised crenate, apex acuminate. Cymes bristly, finely glandular pilose, solitary or paired, 3- to many flowered; peduncle subsessile to 1.8 cm; bracts leaflike, oblanceolate, ca. 8 mm, widely spaced 1- or 2-serrate to subentire, finely pilose, glandular. Pedicel 2–4 mm. Calyx campanulate, ca. 1.3 cm, finely pilose along veins and margin outside, glabrous inside; teeth 4 or 5, deltoid, equal, ca. 3 mm, callose acute. Corolla pale yellow, to 3.5 cm in flower, ca. 8 mm wide at throat, limb finely pilose outside, glabrous inside; upper lip ca. 4 × 7 mm, apex rounded; lower lip ca. 0.8 × 1.5 cm, middle lobe largest, ca. 6 × 7 mm, emarginate; lateral lobes ovate, ca. 4 mm wide. Filaments finely pilose. Ovary black-brown, glabrous. Style equally 2-cleft.

- Valleys. Yunnan.

13. *Chelonopsis chekiangensis* C. Y. Wu, Acta Phytotax. Sin. 8: 26. 1959.

浙江铃子香 *zhe jiang ling zi xiang*

Herbs erect, rhizomatous, ca. 60 cm tall. Stems obtusely 4-angled, grooved, glabrous or ± hirsute. Leaves gradually reduced upward, lanceolate, 3–15 × 1.5–4.5 cm, strigose along veins, sparsely hirsute adaxially, inconspicuously glandular along veins abaxially, base cuneate-attenuate, margin irregularly callose serrate, apex acuminate. Cymes sparsely strigose, 3–5-flowered; peduncle 1–1.5(–2) cm; bracteoles lanceolate, longer than pedicel. Pedicel to 5 mm. Calyx campanulate, 2-lipped, 8–10 mm in flower, saccate-dilated, to 2 × 1.5 cm in fruit, sparsely strigose, glabrescent outside, with conspicuous transverse veins at apex; teeth 4 or 5, unequal, deltoid, obtuse. Corolla purple, 3–4 cm, obscurely 2-lipped, finely papillate outside, puberulent at base of upper lip inside; tube projected, gradually dilated; upper lip ca. 7 mm, entire; lower lip as long as adaxial, middle lobe largest, margin entire or undulate. Filaments puberulent basally. Nutlets brown, narrowly ellipsoid, ca. 1 cm, winged, finely striate. Fl. Aug, fr. Sep–Oct.

- Slopes at low elevations. Anhui, Guangdong, Jiangxi, Zhejiang.

- 1a. Peduncle 1–1.5(–2) cm 13a. var. *chekiangensis*
1b. Peduncle 2–4 mm 13b. var. *brevipes*

13a. *Chelonopsis chekiangensis* var. *chekiangensis*

浙江铃子香 *zhe jiang ling zi xiang*

Peduncle 1–1.5(–2) cm.

• Slopes at low elevations. Anhui, Jiangxi, Zhejiang.

短梗变种 duan geng bian zhong

13b. *Chelonopsis chekiangensis* var. *brevipes* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 154. 1965.

Peduncle 2–4 mm.

• Slopes; 1600 m. Guangdong.

27. **NOTOCHAETE** Bentham, Edward's Bot. Reg. 15: t. 1289. 1829.

钩萼草属 gou e cao shu

Herbs erect. Rhizomes robust. Stems stellate or hirsute, becoming subglabrous. Leaves long petiolate; petiole flattened laterally; leaf blade ovate to circular. Cymes in upper leaf axils, subglobose in outline, many flowered; bracts linear, rigid, apex hooked, longer than corolla. Calyx tubular, ± conspicuously 5-veined; teeth 5, with apical or subapical hooked spine. Corolla reddish, yellow, or white, small; tube straight, included, glabrous, or glabrous outside but ± villous at throat inside, 2-lipped; upper lip erect, galeate, entire, densely villous outside, glabrous inside; lower lip subequally 3-lobed, villous outside, glabrous inside. Stamens 4, didynamous, anterior 2 longer, ascending beneath upper lip of corolla; filaments puberulent basally; anthers close together in pairs, with 2 divergent cells. Ovary glabrous or stellate at apex. Style filiform, subequally 2-cleft. Nutlets triquetrous, oblong, apex truncate.

Two species: Bhutan, China, India (Sikkim), Myanmar, Nepal; both in China.

- 1a. Leaf base broadly cuneate to roundish; bracts ca. 1 cm; calyx 5–7 mm; corolla reddish or yellow; nutlets glabrous 1. *N. hamosa*
- 1b. Leaf base shallowly cordate to cordate; bracts 1.3–1.5 cm; calyx 1.3–1.6 cm; corolla white; nutlets stellate at apex 2. *N. longiaristata*

1. *Notochaete hamosa* Bentham, Edward's Bot. Reg. 15: t. 1289. 1829.

钩萼草 gou e cao

Stems 1–2.5 m tall, to 6 mm in diam. at base; branches and stems striate, sparsely stellate, glabrescent. Petiole 3–7 cm; leaf blade ovate, 5–14 × 2.5–8 cm, densely hirtellous, slightly scabrid adaxially, sparsely stellate abaxially, base broadly cuneate to rounded, margin densely serrulate-crenulate near base, apex acuminate. Verticillasters ca. 2.5 cm in diam. in flower, to 3.5 cm in fruit, shorter than petiole; bracts ca. 1 cm, villous, stellate abaxially. Calyx ca. 5–7 mm, stellate on basal half outside, glabrous inside, densely villous at throat; teeth deltoid, ca. 4 mm including spine, to 6 mm in fruit, with subterminal hooked spine abaxially. Corolla reddish or yellow, ca. 6 mm; tube erect, ca. 5 mm. Nutlets brown, ca. 4 × 2 mm, glabrous. Fl. Aug–Sep, fr. Oct.

Margins of subtropical evergreen forests, valleys; 1200–2500 m. Yunnan [Bhutan, India (Sikkim), Myanmar, Nepal].

2. *Notochaete longiaristata* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 154. 1965.

长刺钩萼草 chang ci gou e cao

Stems 35–80 cm tall, grooved, to 8 mm in diam. at base, retrorse hirsute, glabrescent. Petiole 2–8 cm, sparsely hirsute; leaf blade ovate-orbicular, 3.5–10 × 3–9 cm, adaxially sparsely hirsute, densely so on margin, abaxially glabrous, sparsely hirsute and stellate on veins, base shallowly cordate to cordate, margin serrate-crenate, apex acute. Verticillasters 3 or 4, ca. 2.5 cm in diam. in flower, to 4 cm in diam. in fruit, much shorter than petiole; bracts 1.3–1.5 cm, glabrous. Calyx apex sparsely stellate outside, glabrous inside; tube ca. 7 mm including spines in flower, to 1 cm in fruit; lobes deltoid, apex extending directly into a long hooked spine. Corolla white; tube ca. 5 mm, ± villous at throat inside; upper lip erect, galeate, entire, densely villous; lower lip spreading, villous outside, glabrous inside. Ovary densely stellate. Nutlets brownish, ca. 4 × 2.5 mm, truncate, apex stellate. Fl. Oct–Nov, fr. Nov.

• Streamsides in dense forests; 2000–2400 m. Xizang, Yunnan.

28. **EREMOSTACHYS** Bunge, Fl. Altaic. 2: 414. 1830.

沙穗属 sha sui shu

Herbs perennial, erect. Basal leaves largest, margin coarsely serrate to incised-pinnatifid. Verticillasters many flowered, widely spaced or in long robust spikes, densely lanate-villous or glabrous. Flowers sessile. Calyx tubular-campanulate to broadly funnelform, 5-toothed, sometimes limb dilated, 5-apiculate; teeth short, broadly truncate, rounded, ovate or triangular, apex spiny; sinuses between teeth with ovate-triangular appendages. Corolla 2-lipped; tube mostly included, narrow; upper lip narrow, galeate or falcate, concave, narrowed at base, bearded or villous inside and on margin; lower lip spreading, 3-lobed, middle lobe largest. Stamens 4, anterior 2 longer; some filaments with comblike-fimbriate appendages at base; anther cells 2, divaricate. Style unequally 2-cleft, anterior lobe larger. Nutlets obovoid, triquetrous, subtruncate, densely bearded at apex.

About 60 species (or only five in the strict sense): Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan; SW Asia; five species in China.

Several botanists have recently rearranged the generic placings of *Eremostachys* and *Phlomis* (cf. Adylov, Kamelin, & Makhmedov, Novosti Sist. Vyssh. Rast. 23: 110–114, 1986; Vvedensky, Conspect. Fl. As. Med. 9: 74–113, 1987). By adopting their concepts species 1 and 2 would be placed in *Phlomoides* along with all but one species of *Phlomis* recorded from China, species 3 and 4 in *Paraeremostachys* and only *E. moluccelloides* would remain in *Eremostachys*.

- 1a. Calyx funnelform, dilated at apex, especially in fruit, membranous 5. *E. moluccelloides*

- 1b. Calyx tubular or tubular-campanulate, not dilated at apex, not membranous.
- 2a. Basal leaves pinnatipartite to bipinnatipartite 1. *E. speciosa*
- 2b. Basal leaves not pinnatipartite, irregularly shallow serrate or crenate.
- 3a. Bracts leaflike, separated at base; leaves irregularly shallow serrate 2. *E. fulgens*
- 3b. Bracts spinescent, united at base in 3s; leaves crenate.
- 4a. Plants sparsely white hairy; calyx teeth with long soft spines 3. *E. phlomooides*
- 4b. Plants densely white hairy; calyx teeth with robust rigid spines 4. *E. desertorum*

1. *Eremostachys speciosa* Ruprecht var. ***viridifolia*** Popov, Nov. Mem. Moskovsk. Obsc. Isp. Prir. 19: 100. 1940.

绿叶美丽沙穗 lü ye mei li sha sui

Roots robust, laterals with fusiform segments, crown lanate. Stems 20–25 cm tall, ± purplish when dry, densely white lanate. Petiole 9–10 cm, ± clasping, densely white lanate to villous; basal leaf blade ovate, ca. 10 × 6 cm, bipinnatipartite; segments ovate, sparsely pubescent adaxially, white lanate to villous abaxially, margin irregularly crenate; upper leaves to as long as verticillasters. Spikes oblong-ellipsoid to globose, 6–8 cm, mostly densely white lanate-villous; verticillasters 4- or 5-flowered; floral leaves subsessile, ovate, base cuneate, margin crenate, apex obtuse; bracts linear, ca. 10 × 1 mm. Flowers sessile. Calyx tubular, ca. 2 cm, lanate outside, glabrous inside; teeth truncate, with spines ca. 1 mm. Corolla yellow, 4–4.5 cm, with equal lips; tube glabrous outside, hairy at middle inside; upper lips ovate, ca. 1.8 × 1 cm, erect, apically arcuate, concave, white villous outside, bearded inside and on margin; lower lip flabellate, ca. 1.8 × 2.2 cm, villous outside, glabrous inside, margin undulate; middle lobe reniform, ca. 0.9 × 1.5 cm; lateral lobes circular, ca. 8 mm in diam. Filaments cobwebby at middle, appendages comblike-fimbriate; anthers oblong. Fl. May–Jun.

- Grassy slopes; 1800 m. Xinjiang.

Variety *speciosa* is native to Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and SW Asia.

2. *Eremostachys fulgens* Bunge, Mém. Acad. Acad. Imp. Sci. Saint Pétersbourg 21(1): 80. 1873.

光沙穗 guang sha sui

Lateral roots tuberous. Stems 30–35 cm tall, glabrous or sparsely stellate, glandular hairy. Petiole 2–7 cm, glandular hairy; basal leaf blade oblong-elliptic, 8–20 × 8–10 cm, stellate, glandular hairy, base cuneate to rounded, margin irregularly shallow serrate, rarely pinnatisect at base. Spikes dense; verticillasters many flowered; bracts linear to subulate, 8–10 mm, 1/5 as long as calyx, stellate, margin lanate. Flowers sessile. Calyx tubular, slightly dilated at apex, 1.7–1.8 cm, basally stellate, glandular hairy outside; teeth straight, triangular, apex short acuminate. Corolla yellow, 3.5–4 cm, pubescent outside, glabrous inside; upper lip falcate, margin dentate, densely bearded inside; lower lip flabellate, middle lobe obreniform, lateral lobes broadly obovate. Filaments with comblike-fimbriate appendages at base. Fl. May.

- Slopes; 1600 m. Xinjiang (Tekes Xian) [Kyrgyzstan; SW Asia].

3. *Eremostachys phlomooides* Bunge, Fl. Altaic. 2: 414. 1830.

糙苏沙穗 cao su sha sui

Paraeremostachys phlomooides (Bunge) Adylov, Kamelin, & Makhmedov.

Roots napiform, crown tomentose-lanate. Stems 15–30 cm tall, densely white pilose especially on nodes, branched above base. Petiole 4–7 cm, dilated at base; basal leaf blade ovate to broadly oblong-ovate, 5–8 × 3–4 cm, white pilose, base cordate or rounded, margin coarsely crenate, apex obtuse; stem leaves short petiolate, blade smaller than that of basal leaf, base cuneate, margin crenate, apex acuminate. Spikes interrupted at base; verticillasters 2–6(–8)-flowered; bracts subulate, 1–1.4 cm, united at base in 3's, pilose, apex acuminate. Calyx tubular-campanulate, 1.4–1.8 cm, pilose outside; teeth broadly subulate, 4–7 mm, with a rigid apical spine 3–4 mm. Corolla ca. 2 cm; tube included, rarely slightly exerted, villous annulate inside; upper lip white, densely villous inside and at margin; lower lip yellow, middle lobe obcordate, ca. 1 cm wide, lateral lobes ovate. Filaments slightly dilated at base, posterior 2 with short comblike-fimbriate appendages at base, anterior 2 without appendages. Fl. May.

- Slopes; 1100 m. Xinjiang (Toli Xian).

4. *Eremostachys desertorum* Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 9: 563. 1886.

沙生沙穗 sha sheng sha sui

Paraeremostachys desertorum (Regel) Adylov, Kamelin, & Makhmedov.

Roots robust, napiform. Stems 20–30 cm tall, robust, sparsely white pilose, glandular hairy especially on nodes, branched almost from base. Basal and stem leaves sessile to short petiolate; basal leaf blade circular-ovate to ovate, 4–6 cm in diam., white pilose especially on veins abaxially, corrugate adaxially, base rounded, margin irregularly crenate to partly short serrate, apex obtuse. Spikes interrupted toward base; verticillasters many flowered; floral leaves narrowly elliptic, base cuneate, apex acute; bracts subulate, 1.7–1.8 cm, densely pilose, glandular hairy. Calyx campanulate, 1.7–2.4 cm; teeth triangular-lanceolate, 8–11 mm, with a soft apical spine 5–6 mm. Corolla 2.2–2.5 cm; tube included, villous annulate inside; upper lip white, densely white villous inside and on margin, narrowly falcate, as long as lower lip; lower lip yellow, middle lobe obcordate, apex dentate; lateral lobes shorter, broadly ovate. Posterior filaments with broadly lamellate comblike-fimbriate appendages, anterior filaments with dentate appendages at base. Fl. and fr. Jun.

- Slopes; 1100 m. Xinjiang (Toli Xian).

5. *Eremostachys moluccelloides* Bunge, Fl. Altaic. 2: 415. 1830.

沙穗 sha sui

Eremostachys macrophylla Montbret & Aucher-Éloy.

Roots napiform, crown white lanate-villous. Stems robust, 25–30 cm tall; densely glandular lanate, villous,

sparsely so on internodes. Petiole 2–4 cm; basal leaf blade elliptic, 5–7 × 3–3.5 cm, sparsely villous adaxially, densely lanate-villous abaxially, base subrounded, margin acutely serrate, apex obtuse; stem leaf blade ca. 4.5 × 2.5 cm, margin crenate. Spikes long; verticillasters (2–)4(–6)-flowered; floral leaves sessile, 1.5–3.5 cm × 2–4 mm, margin entire or serrate, apex acute; bracteoles linear, 8–10 mm. Calyx funnelliform, ca. 2.3 cm in flower, to 3.5 cm in fruit, villous, glandular outside; limb pubescent inside, rotate-dilated, conspicuously net veined in fruit; teeth circular to broadly triangular, 2–2.5 mm, with apical spines ca. 1 mm. Corolla to 2.1 cm, glabrous

outside, villous annulate inside; upper lip yellow, ca. 1.5 × 0.5 cm, falcate, sparsely pilose outside, margin bearded inside; lower lip orange, middle lobe obcordate, ca. 3 × 10 mm; lateral lobes ovate, ca. 2 × 3 mm. Filaments cobwebby, posterior appendages comblike-fimbriate, anterior appendages scaly. Style subequally 2-cleft. Nutlets black, apex densely villous-barbate. Fl. Jun-Jul, fr. Jul.

Gravelly and sandy deserts; 400 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; SW Asia, Europe].

29. LEUCAS R. Brown, Prodr. 504. 1810.

绣球防风属 xiu qiu fang feng shu

Herbs or subshrubs. Leaves entire or dentate. Verticillasters few to many flowered, widely spaced, uniform or reduced in size at end of branches. Calyx tubular to obconical, rarely dilated, 10-veined, straight or curved, truncate or oblique at throat, projected on posterior side; teeth 8–10, usually equal in size. Corolla usually white, rarely yellow, purple, brownish, or scarlet, 2-lipped, tube included; upper lip straight, galeate, densely villous outside; lower lip longer, 3-lobed, middle lobe largest. Stamens ascending beneath upper lip of corolla, close together in pairs; anther cells 2, ovoid, divaricate, apex confluent, often orange. Style unequally 2-cleft at apex, posterior lobe short or obsolete. Nutlets ovoid, triquetrous, subtruncate at apex.

About 100 species: Africa, Asia, Australia, Pacific Islands, two naturalized in South America; eight species in China.

- 1a. Verticillasters terminal, solitary; bracts lanceolate, overlapping to largely conceal flowers; calyx teeth very short 8. *L. cephalotes*
- 1b. Verticillasters usually more than 1 per stem; bracts not concealing flowers; calyx teeth well developed.
 - 2a. Calyx mouth not oblique.
 - 3a. Calyx densely villous inside throat; teeth spreading in fruit; leaves lanceolate to ovate-lanceolate, 6–9 × 1–3 cm; plants hirsute, densely covered with golden yellow hairs 3. *L. ciliata*
 - 3b. Calyx appressed silky to puberulent or subglabrous inside throat; teeth straight in fruit; leaves ovate; entire plant densely white tomentose.
 - 4a. Leaves ovate-orbicular, 1–2.5(–3) × 0.8–1.5 cm, appressed silky to tomentose 1. *L. chinensis*
 - 4b. Leaves ovate, 2.5–4 cm × 1–2.5 cm, villous-tomentose (subglabrous in var. *scaberula*) 2. *L. mollissima*
 - 2b. Calyx mouth oblique, constricted or enlarged, reflexed or erect.
 - 5a. Leaves ovate to ovate-lanceolate, coarsely crenate-serrate; calyx mouth constricted, reflexed in fruit 6. *L. martinicensis*
 - 5b. Leaves linear, oblong, to oblong-lanceolate, entire or sparsely serrate; calyx mouth enlarged, straight.
 - 6a. Plants slightly pubescent; calyx prominently oblique at mouth, teeth irregular or obsolete, apical tooth largest; leaves subtire to remotely undulate-serrate 7. *L. lavandulifolia*
 - 6b. Plants hispid; calyx slightly oblique at mouth, teeth regular, spinescent; leaves remotely serrate.
 - 7a. Verticillasters ca. 1.5 cm in diam., few flowered; calyx tube not conspicuously ribbed adaxially 4. *L. zeylanica*
 - 7b. Verticillasters 2–2.5 cm in diam., many flowered; calyx tube conspicuously ribbed adaxially 5. *L. aspera*

1. *Leucas chinensis* (Retzius) R. Brown, Prodr. 504. 1810.

滨海白绒草 bin hai bai rong cao

Phlomis chinensis Retzius, Observ. Bot. 2: 19. 1781.

Shrubs 20–30 cm tall; mostly densely appressed white silky-tomentose. Stems robust, branched at base; branches erect or spreading. Leaves sessile to subsessile; leaf blade ovate-orbicular, 8–13 × 6–10 mm, base broadly cuneate to subcordate, margin crenate-serrate above base, apex obtuse; lateral veins 2 or 3 pairs, impressed adaxially. Verticillasters axillary, 3–8-flowered, 1–2 cm in diam.; bracts linear, 2–3 mm. Calyx tubular-campanulate, ca. 5 mm, densely appressed silky on upper 1/3 inside, veins conspicuously elevated outside; teeth 10, triangular-subulate, ca. 1 mm. Corolla white, ca. 1.1 cm; tube slender, slightly enlarged at throat, ca. 7 mm, glabrous outside, obliquely villous annulate slightly above middle inside; lower lip spreading, middle lobe largest, reniform. Filaments slightly bearded. Nutlets unknown. Fl. Nov-Dec, fr. Dec.

- Sunny waste areas along seashores. Hainan, Taiwan.

2. *Leucas mollissima* Wallich ex Benth, Pl. Asiat. Rar. 1: 62. 1830.

白绒草 bai rong cao

Herbs erect, 0.5–1.5 m tall. Stems slender, twisted, appressed tomentose-villous, much branched; internodes long. Petiole to 1 cm, densely tomentose; leaf blade ovate, 1.5–4 × 1–2.3 cm, gradually reduced at apex, densely villous-tomentose, corrugate adaxially, greenish white abaxially, base broadly cuneate to cordate, margin crenate-serrate, apex acute. Verticillasters axillary, widely spaced, 2–8(–10)-flowered. Calyx tubular, ca. 6 mm, truncate at mouth, densely pubescent outside, posterior part puberulent, anterior glabrous inside; veins conspicuous, villous; teeth 10, triangular-subulate, subequal, ca. 1 mm. Corolla white, yellowish, or reddish, ca. 1.3 cm, tube ca. 7 mm, puberulent near throat outside, obliquely villous-annulate on middle inside; lower lip spreading, ca. 1.5 × as long as upper lip; middle lobe largest,

obcordate; lateral lobes oblong, pilose at base outside, glabrous inside. Nutlets dark brown, ovoid, triquetrous. Fl. May-Oct, fr. Oct-Nov.

Roadsides, grasslands, streamsides, sunny thickets, evergreen forests; 0–2700 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Taiwan, Yunnan [India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

Keng (Fl. Males. 8: 340. 1978) includes this species in *Leucas flaccida* R. Brown.

- 1a. Leaves glabrous; calyx hispid 2c. var. *scaberula*
1b. Leaves villous-tomentose; calyx densely villous.
2a. Calyx teeth subequal; leaves abaxially densely villous-tomentose 2a. var. *mollissima*
2b. Calyx teeth alternately long and short; leaves abaxially sparsely villous-tomentose 2b. var. *chinensis*

2a. *Leucas mollissima* var. *mollissima*

白绒草 bai rong cao

Leaves densely villous tomentose. Calyx densely villous, teeth subequal.

Roadsides, grasslands, shaded wet sites, streamsides, sunny thickets; 800–2000 m. Guangxi, Guizhou, Yunnan [India, Indonesia, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

Used medicinally as a tonic.

2b. *Leucas mollissima* var. *chinensis* Benth. Prodr. 12: 525. 1848.

疏毛变种 shu mao bian zhong

Leaves densely villous tomentose adaxially, sparsely so adaxially. Calyx densely villous, teeth 5 long and 5 short.

Dry, sunny areas; 0–2700 m. Fujian, Guangdong, Guizhou, Hubei, Hunan, Sichuan, Taiwan, Yunnan [Japan].

2c. *Leucas mollissima* var. *scaberula* J. D. Hooker, Fl. Brit. India 4: 682. 1885.

糙叶变种 cao ye bian zhong

Leaves glabrous. Calyx hispid.

Tropical evergreen forests, thickets; 500–800 m. Yunnan [India (Sikkim), Myanmar, Nepal, Thailand].

3. *Leucas ciliata* Benth. Pl. Asiat. Rar. 1: 61. 1830.

绣球防风 xiu qiu fang feng

Herbs 30–80(–100) cm tall, hairs yellowish to golden yellow. Stems slender, usually branched at apex, sometimes branched basally, appressed or retrorse hirsute. Petiole 6–10 mm, densely hirsute; leaf blade lanceolate, 6–9 × 1–3 cm, adaxially appressed pubescent, abaxially sparsely puberulent, base broadly cuneate to subrounded, margin remotely, shallow serrate, apex acute; lateral veins 3–5 pairs, densely pubescent. Verticillasters axillary, few, widely spaced, many flowered, globose, 1.5–2.5 cm in diam.; bracts linear, at least as long as calyx tube, hirsute adaxially, glabrous abaxially. Calyx tubular, ca. 1 cm, apically enlarged, slightly curved, densely hispid, base sparsely hispid or subglabrous outside, throat densely villous, veins conspicuous, mouth truncate or slightly oblique; teeth spinescent, spreading starlike in fruit, ca. 3 mm, hirsute. Corolla white or purple, ca. 2.8 cm; tube ca. 1 cm, glabrous except for puberulent throat outside,

bearded annulate inside; upper lip oblong, densely villous outside, glabrous inside; lower lip ca. 1.5 × as long, spreading, middle lobe trapeziform, 2-lobed, lateral lobes ovate. Nutlets brown, ovoid. Fl. Jul-Oct, fr. Oct-Nov.

Roadsides, streamsides, grasslands, thickets; 500–2800 m. Guangxi, Guizhou, Sichuan, Yunnan [Bhutan, India (Sikkim), Laos, Myanmar, Nepal, Vietnam].

Used medicinally.

4. *Leucas zeylanica* (Linnaeus) R. Brown, Prodr. 504. 1810.

绉面草 zhou mian cao

Phlomis zeylanica Linnaeus, Sp. Pl. 2: 586. 1753.

Herbs erect, ca. 40 cm tall. Stems hispid-villous or villous-hirsute. Petiole ca. 5 mm; leaf blade oblong-lanceolate, 3.5–5 × 0.5–1 cm, sparsely strigose, densely so on veins and densely yellowish glandular abaxially, base cuneate-attenuate, margin remotely crenate-serrate above base, apex acuminate, lateral veins 3 or 4 pairs. Verticillasters ca. 1.5 cm in diam., subequal, few flowered, sparsely hispid; bracts linear, mostly shorter than calyx tube, apex somewhat spinescent. Calyx tubular-campanulate, slightly curved, basally glabrous, slightly corrugate, sparsely hispid at apex outside, minutely hispid inside, veins inconspicuous, not hispid; mouth oblique, slightly constricted; teeth 8 or 9, spinescent, ca. 1 mm. Corolla white or white with purple spots, ca. 1.2 mm; tube slender, straight, slightly enlarged, densely villous near throat, subglabrous at base outside, villous annulate inside; lower lip ca. 2 × as long as upper lip, spreading, lateral lobes ovate; middle lobe largest, elliptic, undulate on margin. Nutlets chestnut brown, ellipsoid, subtriquetrous, shiny. Fl. and fr. year round.

Seashores, fields, roadsides, sunny waste slopes; 0–300 m. Guangdong, Guangxi, Hainan [India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka].

Used medicinally for coughs, toothaches, and abdominal pains.

5. *Leucas aspera* (Willdenow) Link, Enum. Hort. Berol. Alt. 2: 113. 1822.

蜂巢草 feng chao cao

Phlomis aspera Willdenow, Enum. Pl. 621. 1809.

Herbs annual, 20–40 cm tall. Stems hispid. Petiole short to obsolete, densely hispid; leaf blade linear or oblong-linear, 2.5–6 × 0.8–1.5 cm, strigose especially on veins abaxially, base cuneate-decurrent, margin sparsely crenate or sometimes subentire, apex obtuse, lateral veins ca. 3 pairs. Verticillasters globose, 2–2.5(–3) cm in diam., many flowered, densely hispid; bracts linear, as long as calyx, margin hispid ciliate, apex slightly spinescent. Calyx tubular, ca. 1 cm, slightly constricted at apex, slightly hispid or subglabrous at base, otherwise densely hispid outside; mouth oblique, erect; teeth straight, broadly triangular, apex spinescent. Corolla white, slightly longer than calyx tube, ca. 1.2 cm; tube ca. 8 mm; lower lip spreading, middle lobe largest. Nutlets brown, oblong, triquetrous, ca. 2 mm, shiny. Fl. and fr. year round.

Fields, open wet areas, sandy grasslands; 100 m. Guangdong, Guangxi, Hainan [India (Sikkim), Indonesia, Malaysia, Philippines, Thailand].

6. *Leucas martinicensis* (Jacquin) R. Brown, Prodr. 504. 1810.

卵叶白绒草 luan ye bai rong cao

Clinopodium martinicense Jacquin, Enum. Syst. Pl. 25. 1760.

Herbs annual, erect, to 60 cm tall. Stems retrorse pubescent. Petiole 0.7–1.5 cm; leaf blade ovate to lanceolate, 4–6 × 1.5–3 cm, reduced upward, densely pubescent, base rounded to cuneate, margin coarsely crenate-serrate, apex acuminate, lateral veins 5 pairs. Verticillasters 1.5–2 cm in diam. in flower, ca. 3 cm in diam. in fruit, many flowered; bracts subulate, ciliate, spinescent. Calyx membranous in fruit, ca. 1 cm, densely villous outside, glabrous inside, veins conspicuous, distinctly net veined; throat enlarged, mouth constricted, oblique; teeth unequal, spinescent, upper teeth longest. Corolla white tinged red, slightly exerted, slender, ca. 8 mm; tube ca. 7 mm, slightly dilated in throat, not villous annulate inside; lower lip subpatent, lobes oblong. Nutlets dark brown, oblong-ovoid, ca. 1.5 mm, shiny. Fl. Sep-Oct, fr. Nov.

Grassy areas, waste land near habitations; 1100–1500 m. Yunnan [India, Myanmar; Africa, North America, South America].

The plants have a strong minty odor and are burned to repel mosquitos. An infusion of leaves is used for gastrointestinal troubles.

7. *Leucas lavandulifolia* Smith, Cycl. 20, sect. 2, pt. 40. 1812.

线叶白绒草 xian ye bai rong cao

Leonurus indicus N. Burman; *Leucas linifolia* (Roth) Sprengel; *Phlomis linifolia* Roth.

Herbs erect, 0.2–1 m tall, much branched from base, mostly gray pubescent. Stems slender. Petiole short to almost absent; leaf blade oblong-linear, linear-lanceolate, or linear, 2.5–7 × 1.5–1.2 cm, pubescent, base cuneate-attenuate,

margin entire or sparsely undulate-serrate, apex obtuse, lateral veins 2 or 3 pairs. Verticillasters many flowered, 1.5–2.5 cm in diam.; bracts linear, shorter than calyx tube, apex spinescent. Calyx obovoid, ca. 0.5 mm, densely pubescent outside, glabrous except for apex inside, veins inconspicuous, mouth oblique; teeth irregular, upper tooth largest. Corolla white, ca. 1.5 cm; tube ca. 9 mm, villous near enlarged throat outside, slightly villous annulate inside; lower lip horizontal, ca. 2 × as long as adaxial, slightly villous at base outside, glabrous inside, lateral lobes small. Nutlets brown, ovoid. Fl. Oct-Dec, fr. Dec-Jan.

Dry sunny areas, roadsides, riverbanks, thickets at forest margins; 0–1000(–1400) m. Guangdong, Yunnan [India, Indonesia, Malaysia, Philippines, Thailand; Africa].

8. *Leucas cephalotes* (Roth) Sprengel, Syst. Veg. 2: 743. 1825.

头序白绒草 tou xu bai rong cao

Phlomis cephalotes Roth, Nov. Pl. Sp. 262. 1821; *Leucas capitata* Desfontaines.

Herbs annual, to 90 cm tall. Stems hispid. Leaf blade ovate to lanceolate, 5–10 cm, membranous, pubescent, base cuneate, margin crenate-serrate, apex acute. Verticillasters terminal, globose, many flowered, to 5 cm in diam.; bracts narrow lanceolate, overlapping, concealing calyces. Calyx tubular, ca. 2 cm, slightly curved, softly pubescent; teeth very short, subulate.

Open areas; 1700 m. Xizang [Afghanistan, Bhutan, India, Nepal].

30. PHLOMIS Linnaeus, Sp. Pl. 2: 584. 1753.

糙苏属 cao su shu

Herbs perennial. Leaves corrugate; floral and stem leaves similar, gradually reduced upward. Verticillasters axillary. Flowers usually sessile. Calyx tubular or tubular-campanulate, throat not oblique; veins 5, 10, or 11, elevated; teeth 5, equal, sinuses between them often expanded into triangular, sometimes emarginate teeth. Corolla yellow, purple, or white, 2-lipped; tube included or slightly exerted, usually villous annulate inside; upper lip straight or galeate, concave or folded/keeled, rarely narrowly falcate, entire or fringed-denticulate, tomentose or villous; lower lip spreading, 3-lobed, middle lobe wider than lateral lobes. Stamens didynamous, anterior 2 longer, ascending to upper lip of corolla; posterior 2 often with appendages at base; anthers close together in pairs, with 2, divaricate, apically confluent cells. Style lobes subulate, posterior usually to 1/2 as long as anterior, rarely equal. Nutlets ovoid, triquetrous, apex obtuse, rarely truncate.

More than 100 species: Africa, Asia, Europe; 43 species in China, particularly diverse in Sichuan and Yunnan.

Adylov, Kamelin, and Makhmedov (Novosti Sist. Vyssh. Rast. 23: 110–114, 1986) and Vvedensky (Conspect. Fl. As. Med. 9: 74–113, 1987) believe that species 2–43 in this account should be transferred to *Phlomoidea* along with 2 Chinese species of *Eremostachys*.

- 1a. Upper lip of corolla laterally compressed, orange pubescent on inside margin; middle lobe of lower lip broadly ovate, lateral lobes smaller, lanceolate 1. *P. fruticosa*
- 1b. Upper lip of corolla galeate, not compressed, densely long barbate on inside margin; lateral lobes of lower lip of corolla only slightly smaller than middle lobe, obtuse.
 - 2a. Style equally 2-cleft at apex 2. *P. cuneata*
 - 2b. Style unequally 2-cleft at apex.
 - 3a. Plants with basal rosette of leaves.
 - 4a. Posterior filaments without appendages at base.
 - 5a. Plants less than 5 cm tall; leaves ovate to lanceolate, stellate hairy 22. *P. pygmaea*
 - 5b. Plants more than 5 cm tall.
 - 6a. Plants glabrous leaf and calyx margin ciliate; corolla purple-black to pink; nutlets glabrous 23. *P. atropurpurea*
 - 6b. Plants uniformly hairy.
 - 7a. Bracts densely brown ciliate; verticillasters close together or separate; nutlets glabrous 18. *P. tibetica*
 - 7b. Bracts densely white villous (except in *P. oreophila* var. *evillosa* with bracts stellate pannose).

- 8a. Stems retrorse appressed villous; all verticillasters approximate; nutlets stellate puberulent at apex 5. *P. oreophila*
- 8b. Stems stellate puberulent; at least basal verticillasters separate; nutlets glabrous 6. *P. chinghoensis*
- 4b. Posterior filaments with appendages at base.
- 9a. Nutlets hairy.
- 10a. Floral leaves subverticillate, ovate to broadly triangular-ovate; plants ca. 10 cm tall 14. *P. uniceps*
- 10b. Floral leaves not arranged as above; plants taller.
- 11a. Abaxial leaf surface with unbranched hairs or subglabrous.
- 12a. Leaves cordate, crenate, with unbranched hairs on both surfaces 3. *P. alpina*
- 12b. Leaves triangular to ovate, cordate at base, irregularly coarsely crenate, adaxially sparsely hispid or glabrous, abaxially glabrous or hispid on veins, or hispid on both surfaces.
- 13a. Verticillasters 1, terminal; spines of calyx teeth 4–5.5 mm 12. *P. kansuensis*
- 13b. Verticillasters 3–10, on upper part of stems and branches; spines of calyx teeth 1.8–2.5 mm 10. *P. tuberosa*
- 11b. Abaxial leaf surface with stellate hairs.
- 14a. Leaves with stellate hispid and simple hairs, or with stellate strigose and simple hairs.
- 15a. Basal leaves lanceolate-oblong to narrowly oblong, adaxially with stellate strigose and simple hairs, abaxially stellate tomentulose 8. *P. younghusbandii*
- 15b. Basal leaves ovate-triangular to triangular-lanceolate, adaxially stellate hispid with long central arms and simple hairs, or sparsely hispid to subglabrous, abaxially sparsely to densely stellate pilose 13. *P. mongolica*
- 14b. Leaves with simple hairs adaxially.
- 16a. Bracts lanceolate or narrow lanceolate 15. *P. maximowiczii*
- 16b. Bracts linear, needlelike, or linear-subulate.
- 17a. Stems simple or branched; bracts slightly shorter than calyx; calyx densely stellate puberulent outside 11. *P. agraria*
- 17b. Stems many branched; bracts subequal to calyx; calyx sparsely stellate puberulent to hispid outside 17. *P. medicinalis*
- 9b. Nutlets glabrous.
- 18a. Basal leaves early deciduous; stem leaves hastate-ovate, appressed pilose 21. *P. pararotata*
- 18b. Basal leaves persistent; stem leaves narrowly to broadly ovate.
- 19a. Basal leaves broadly cordate, ca. 14 × 12 cm, sparsely strigose and corrugate adaxially ... 7. *P. koraiensis*
- 19b. Leaves smaller, triangular, triangular-ovate, cordate-ovate to ovate-lanceolate.
- 20a. Corolla reddish pink.
- 21a. Stem hairs with unequal arms; leaves narrowly ovate to oblong-lanceolate 9. *P. betonicoides*
- 21b. Stem hairs with longer central arms; leaves triangular to triangular-ovate 16. *P. dentosa*
- 20b. Corolla purple-red or dark purple; leaves cordate-ovate.
- 22a. Corolla dark purple; leaves broadly ovate to circular-ovate, apex rounded, base cordate, sparsely strigose 20. *P. fimbriata*
- 22b. Corolla purple-red; leaves acute to obtuse at apex, shallowly cordate at base.
- 23a. Leaves cordate-ovate or ovate-oblong, stellate pilose and with simple hairs on both surfaces or abaxially stellate pubescent 4. *P. pratensis*
- 23b. Leaves ovate or triangular-ovate, adaxially densely hispid, abaxially densely stellate pilose 19. *P. milingensis*
- 3b. Plants without basal leaf rosette, only stem leaves present.
- 24a. Corolla more than 3 cm.
- 25a. Corolla yellow 24. *P. megalantha*
- 25b. Corolla dark purple 25. *P. ornata*
- 24b. Corolla less than 3 cm.
- 26a. Verticillasters conspicuously pedunculate.
- 27a. Posterior filaments without appendages at base.
- 28a. Bracts as long as or slightly longer than calyx; stems sparsely retrorse minute hispid, sometimes stellate pubescent at apex 42. *P. umbrosa*
- 28b. Bracts ca. 1/2 as long as calyx; stems densely tawny stellate pubescent 43. *P. szechuanensis*
- 27b. Posterior filaments with appendages at base.
- 29a. Calyx gray stellate pannose outside; bracts leaflike, linear-lanceolate, rarely lanceolate, 4–13(–22) × 1.5–3(–5.5) mm 35. *P. likiangensis*
- 29b. Calyx with other types of hairs kind; bracts usually smaller, narrower.
- 30a. Verticillasters rather loose, usually 1, rarely 2 at apex of stem or branch; flowers long pedicellate; calyx indehiscent 40. *P. pedunculata*
- 30b. Verticillasters rather compact, usually 2–5(–9) at apex of stem or branch; flowers short pedicellate; calyx dehiscent 31. *P. congesta*
- 26b. Verticillasters sessile.
- 31a. Bracts ca. 1/2 as long as calyx or absent.

- 32a. Calyx ca. 1.5 cm 38. *P. longicalyx*
 32b. Calyx 0.8–1 cm.
 33a. Corolla purple 36. *P. franchetiana*
 33b. Corolla yellow 37. *P. ambigua*
 31b. Bracts more than 1/2 as long as calyx.
 34a. Leaves cordate to broadly ovate, 11–14 × 7–13 cm; posterior filaments with reflexed, hooked, long-spurred appendage at base far above pilose annulus of corolla tube inside 28. *P. paohsingensis*
 34b. Leaves of different shapes.
 35a. Leaves abaxially densely stellate tomentose, triangular to triangular-ovate, irregularly deeply crenate-dentate 39. *P. muliensis*
 35b. Leaves abaxially without hairs as above.
 36a. Posterior filaments with a reflexed slender appendage at base.
 37a. Leaves strigose adaxially and along margin abaxially, with elevated glands abaxially 26. *P. melanantha*
 37b. Leaves sparsely minutely hispid adaxially, abaxially stellate pilose, densely and finely spreading setose along veins 27. *P. forrestii*
 36b. Posterior filaments with an upwardly curved appendage at base.
 38a. Leaves adaxially sparsely short bristly, abaxially pilose, with simple hairs on both surfaces; stems much branched; posterior filaments with a short spurred appendage far above pilose annulus of corolla tube inside 41. *P. jeholensis*
 38b. Leaves adaxially with simple and/or stellate hairs, abaxially with stellate and simple hairs.
 39a. Calyx indehiscent, veins elevated.
 40a. Stems sparsely retrorse minutely hispid; calyx tube densely stellate puberulent, veins spreading bristly, teeth with an apical spine 2–3 mm 29. *P. setifera*
 40b. Stems stellate pubescent or densely tawny stellate tomentulose; calyx tube stellate pubescent (and spreading hirsute in var. *hirticalyx*) 30. *P. tatsienensis*
 39b. Calyx irregularly dehiscent, veins not elevated.
 41a. Leaves ± leathery, sparsely strigose or subglabrous, margin ciliate, abaxially subglabrous or stellate strigose and hairs with a long central arm 33. *P. strigosa*
 41b. Leaves herbaceous, adaxially sparsely strigose or stellate pubescent, abaxially stellate pubescent or dense stellate pilose.
 42a. Stem leaves ovate; bracts linear 32. *P. inaequalisepala*
 42b. Stem leaves sagittate-oblong; bracts subulate 34. *P. ruptilis*

1. *Phlomis fruticosa* Linnaeus, Sp. Pl. 2: 584. 1753.

橙花糙苏 cheng hua cao su

Stems woody, 25–45 cm tall, gray, densely appressed stellate tomentose; branches spreading. Petiole of basal stem leaves 1–2.5 cm; upper stem leaves sessile, ovate, corrugate, with simple and pilose stellate hairs adaxially, densely gray-white stellate tomentose abaxially, base rounded-cuneate, shallowly crenate. Verticillasters 10–15-flowered, 1 or 2 inserted at apex of stems; bracts oblong-lanceolate to linear-lanceolate, 1.0–1.4 cm × 2–4 mm, appressed to flowers, sparsely ciliate inside, stellate tomentose and densely ciliate near margin outside. Calyx 1.5–1.7 cm, densely stellate tomentose and with simple hairs outside; teeth 1.5–2.5 mm, apex subtruncate, with spines ca. 1.5 mm. Corolla orange, densely orange stellate villous outside, ca. 2 × as long as calyx, upper lip shorter than lower lip, orange pubescent on inside margin near apex; middle lobe of lower lip broadly ovate, emarginate; lateral lobes lanceolate. Posterior filaments with a long, oblique, reflexed appendage at base and far above hairy annulus of corolla tube inside. Nutlets glabrous.

Cultivated in Shaanxi [Russia; Africa, SW Asia, Europe].

An ornamental plant.

2. *Phlomis cuneata* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 594. 1977.

楔叶糙苏 xie ye cao su

Stems sparsely and minutely hispid, densely so on nodes, branched. Petiole 7–10 mm; leaf blade of apical stem leaves triangular, 7–9.5 × 6–7 cm, adaxially densely short appressed setose, abaxially densely gray stellate villous, base broadly cuneate, margin irregularly crenate-dentate, apex acute. Verticillasters ca. 20-flowered; floral leaves ovate to lanceolate, margin irregularly crenate-dentate, much longer than verticillasters; bracts linear, 1–1.2 cm, ciliate, stellate puberulent. Calyx 1–1.1 cm, gray stellate pilose outside, basally sparsely ciliate on inside, sinus of teeth with a tuft of villous hairs; teeth ca. 2 mm, with aristae 2–3 mm. Corolla ca. 1.2 cm, tube hairy annulate inside, upper lip densely long bearded on margin. Filaments without appendages, glandular grooved between base of anterior and posterior pairs. Ovary glabrous. Style equally 2-cleft at apex. Fl. Sep.

- Forests. Xizang (Tsuijila Shan).

3. *Phlomis alpina* Pallas, Acta Acad. Sci. Imp. Petrop. 2: 265. 1783.

高山糙苏 gao shan cao su

Roots ropelike. Stems \pm erect, 20–50 cm tall, simple, glabrous or short pilose basally, retrorse villous or stellate hairy at apex. Petiole of basal leaves longer than blade, those of floral leaves shorter; basal leaf blade ovate, 13–15 \times 10 cm; upper leaf blades ca. 10 \times 3–4 cm, ovate-oblong to linear-lanceolate, sparsely hairy, much longer than verticillasters, margin crenate or entire. Verticillasters many, separate basally, contiguous at apex; bracts narrowly linear, 0.9–1.1 cm, spreading long hairy. Calyx campanulate, pubescent with long hairs; teeth ovate, with spines 2–3 mm. Corolla reddish, ca. 2 \times as long as calyx, simple and stellate hairy with unequal arms, glabrous inside; upper lip irregularly dentate, bearded inside on margin; lower lip with oblate middle lobe, lateral lobes oblong-orbicular. Filaments included, with short, spurred appendages at base. Nutlets apex hairy.

Xinjiang [Kazakhstan, Russia].

4. *Phlomis pratensis* Karelin & Kirilow, Bull. Soc. Imp. Naturalistes Moscou 15: 426. 1842.

草原糙苏 cao yuan cao su

Stems villous, also stellate hairy from middle upward. Petioles of basal and lowermost stem leaves 3–22 cm, others 1–3 cm; basal and lower stem leaf blades cordate-ovate to ovate-oblong, 10–17 \times 3.5–12 cm, adaxially sparsely pilose, sometimes also stellate pilose, abaxially stellate pilose sometimes mixed with simple hairs, base shallowly cordate, margin crenate, apex acute to obtuse, mid and upper stem leaf blades circular and smaller. Verticillasters short pedunculate to subsessile; floral leaves sessile, ovate-oblong, margin dentate to subentire; bracts linear-subulate, 0.8–1.5 cm, stellate pilose or tufted-pilose. Calyx tubular, 1–1.5 cm, thick veined, pilose or stellate pilose outside; teeth emarginate, with 2–3 mm aristae. Corolla purple-red, 1.5–2 \times as long as calyx, villous outside; tube glabrous at base, obliquely pilose annulate inside; upper lip irregularly serrate, densely bearded inside; middle lobe of lower lip broadly obovate; lateral lobes shorter, ovate. Posterior filaments curved downward, appendage far above annulus; anthers slightly exerted. Nutlets glabrous.

Alpine meadows; 1500–3000 m. Xinjiang [Kazakhstan, Kyrgyzstan].

5. *Phlomis oreophila* Karelin & Kirilow, Bull. Soc. Imp. Naturalistes Moscou 15: 426. 1842.

山地糙苏 shan di cao su

Stems erect, 30–80 cm tall, retrorse appressed villous. Petiole of basal leaves 6–15 cm, others 2–6 cm; basal leaf blade ovate to broadly ovate, 6.5–13 \times 5–10 cm, base cordate, margin crenate, apex obtuse; stem leaf blade circular, 6–11 \times 3.2–7 cm, adaxially densely strigose, abaxially densely pilose. Verticillasters close together; floral leaves sessile, ovate-lanceolate to lanceolate-linear, 3–6 \times 0.4–2 cm, upper ones narrower, subentire, longer than verticillasters; bracts ca. 1.5 cm, filiform, densely villous to stellate pannose, sometimes also glandular villous. Calyx tubular, ca. 1.2 cm, stellate pannose or densely stellate puberulent except for finely villous veins; teeth broadly ovate, apex subulate-acuminate, 1.5–2 mm. Corolla purple, ca. 2 \times as long as calyx, densely pubescent and villous on upper lip and basal part of tube outside, villous annulate inside; upper lip bearded inside, margin irregularly dentate; lower lip with broadly obovate-cordate middle lobe, lateral lobes broadly ovate.

Filaments inserted on corolla throat, villous, without appendages. Nutlets apex stellate puberulent.

Grassy slopes; 2100–3000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan].

- 1a. Bracts densely villous or sometimes intermixed with glandular villous hairs; calyx stellate puberulent, finely villous on veins outside 5a. var. *oreophila*
1b. Bracts and calyx stellate pannose 5b. var. *evillosa*

5a. *Phlomis oreophila* var. *oreophila*

山地糙苏 shan di cao su

Bracts densely villous or sometimes intermixed with glandular villous hairs. Calyx stellate puberulent, finely villous on veins outside.

Grassy slopes; 2200–3000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan].

5b. *Phlomis oreophila* var. *evillosa* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 594. 1977.

无长毛变种 wu chang mao bian zhong

Bracts and calyx stellate pannose.

- Elevated grassy slopes; 2100 m. Xinjiang.

6. *Phlomis chinghoensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 594. 1977.

清河糙苏 qing he cao su

Stems 20–50 cm tall, densely stellate puberulent, unbranched. Petiole of basal leaves 6–15 cm, others 3–3.5 cm. Lower stem leaf blade sagittate-ovate, 8–12.5 \times 5–7 cm, other stem leaf blades 5.5–7 \times 2–3 cm, stellate puberulent. Lower verticillasters widely spaced, upper approximate; lower floral leaves short petiolate to subsessile, ovate-oblong to oblong-lanceolate, 4.5–7 \times 2–3 cm, margin crenate; upper floral leaves linear-lanceolate to linear, margin obtusely dentate to subentire, much longer than verticillasters; bracts 7–12 mm, needlelike, densely white villous. Calyx campanulate, ca. 9 mm, white villous at apex and on veins, densely white puberulent outside, minutely hispid on apical half inside; teeth circular-ovate, ca. 2.5 mm, apex spinescent. Corolla ca. 2 \times as long as calyx, white lanate except for subglabrous tube outside, villous annulate inside; upper lip ca. 8 mm, bearded inside, margin irregularly dentate; lower lip ca. 6 \times 6 mm, middle lobe largest, oblong, lateral lobes ovate. Stamens included; posterior filaments without appendages. Nutlets glabrous. Fl. Aug.

• Mixed *Larix-Pinus* forests, grassy slopes; 2000–2200 m. Xinjiang.

7. *Phlomis koraiensis* Nakai, Bot. Mag. (Tokyo) 31: 106. 1917.

长白糙苏 chang bai cao su

Stems ca. 44 cm tall, \pm terete, finely retrorse pilose, densely so on nodes. Petiole of basal leaves 8–11.5 cm, others ca. 2.5 cm; basal leaf blades broadly ovate, ca. 14 \times 12 cm, adaxially corrugate, sparsely strigose, abaxially densely stellate and finely pilose on veins, base deeply cordate, margin crenate, apex obtuse or acute; stem leaf blades cordate, 5.5–8 \times ca. 5 cm, margin crenate. Verticillasters ca. 8-flowered; floral leaves short petiolate to subsessile, ovate to lanceolate, 2.5–4.5 \times 0.7–2.7 cm, base shallowly cordate to

broadly cuneate, margin irregularly dentate-crenate or shallowly serrate, apex obtuse to acuminate; bracts bristlelike, 0.9–1.1 cm, densely stellate puberulent, ciliate. Calyx campanulate, 1.1–1.2 cm, densely stellate puberulent outside; teeth bearded, broad at base, subtruncate or emarginate, apical spines 2–3 mm. Corolla red-purple, ca. 2.2 cm, densely pubescent on limb, glabrous except on back outside, villous annulate inside; upper lip ca. 9 mm, deeply incised, bearded inside on margin; lower lip ca. 8 × 7 mm, middle lobe obcordate, ca. 5 × 6 mm, apex emarginate; lateral lobes ovate, ca. 2.5 mm. Stamens included; filaments villous, appendage long, reflexed at base above villous annulus of tube. Nutlets glabrous.

Alpine meadows; 2200 m. Jilin (Changbai Shan) [Korea].

8. *Phlomis younghusbandii* Mukerjee, Notes Roy. Bot. Gard. Edinburgh 19: 307. 1938.

螃蟹甲 pang xie jia

Phlomis kawaguchii Murata.

Taproots fusiform, to 2.5 cm in diam., lateral roots with globose swellings. Rhizomes cylindrical, neck with dense, persistent petiole bases. Stems unbranched, 15–20 cm tall, sparsely appressed stellate tomentulose. Petiole of basal leaves 2–5 cm, others 0.4–1.3 cm; basal leaf blades lanceolate-oblong to narrowly oblong, 5–9 × 2–3.5 cm, base cordate, margin crenate, apex obtuse to rounded; stem leaves ovate-oblong to oblong, 2–3.5 × 1.2–2 cm, adaxially bullate, sparsely stellate hispid and simple hairy, abaxially sparsely stellate tomentulose, base broadly cuneate, margin crenate. Verticillasters 3–5, many flowered, basally widely spaced; floral leaves short petiolate to subsessile, 1.8–3.5 × 0.6–1.2 cm, margin dentate to entire; bracts bristlelike, ciliate, stellate puberulent, nearly as long as calyx. Calyx tubular, 9–10 × ca. 4 mm, densely stellate and glandular puberulent; teeth circular, ca. 1.3 mm, apex spinescent, spines ca. 1.2 mm. Corolla ca. 1.5 cm, tube glabrous, limb densely villous and villous annulate inside; upper lip ca. 5 mm, bearded inside, dentate; lower lip ca. 8 × 6.5 mm, middle lobe obcordate, ca. 3.5 × 3.5 mm, emarginate; lateral lobes ovate, ca. 2.5 mm. Stamen appendage hooked, at base above villous annulus. Nutlets apex granular hairy. Fl. Jul.

• Slopes, fields, thickets; 4300–4600 m. Xizang.

Roots used medicinally for cough and bronchitis.

9. *Phlomis betonicoides* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 241. 1912.

假秦韭 jia qin jiu

Phlomis betonicoides Diels f. *alba* C. Y. Wu.

Roots moniliform. Stems erect, 30–80 cm, densely stellate hispid, unbranched. Petiole of basal leaves 3–15 cm, others (0.3–)1–3 cm; basal leaf blade narrowly ovate to triangular, 7.5–14 × 5–7.5(–10) cm, adaxially densely stellate strigose or with simple hairs, abaxially stellate and with simple hairs on veins, base rounded to cordate, margin crenate to dentate, apex obtuse to acute; stem leaves 5–9 × 2–4.5 cm, with similar indumentum. Verticillasters many flowered; floral leaves sessile, 2.5–6 × 1–2 cm; bracts dark purple, bristlelike, ciliate, nearly as long as calyx. Calyx tubular-campanulate, ca. 1 cm, bristly at apex and on veins, base sparsely puberulent; teeth bristlelike, 1.8–4 mm, rigid, spreading, margin double dentate, densely ciliate. Corolla

reddish to white, ca. 1.8 cm, densely stellate hispidulous outside, villous annulate inside; upper lip ca. 8 mm, bearded inside, margin irregularly denticulate; lower lip 6–7 mm, middle lobe largest, obovate-elliptic, lateral lobes subcircular, margin irregularly denticulate. Stamens included; filaments villous, appendage short spurred at base. Nutlets apex slightly scaly, glabrous at maturity. Fl. Jun-Aug, fr. Sep-Oct.

• Grassy slopes, forested grassland, forests; 2700–3000 m. Sichuan, Xizang, Yunnan.

Roots used as a medicine for colds and diarrhea.

10. *Phlomis tuberosa* Linnaeus Sp. Pl. 2: 586. 1753.

块根糙苏 kuai gen cao su

Phlomidopsis tuberosa (Linnaeus) Link; *Phlomoides tuberosa* (Linnaeus) Moench.

Roots enlarged, tuberous. Stems erect, 40–150 cm tall, subglabrous upward, sparsely pilose basally, sometimes purple-red. Petiole of basal leaves 4–25 cm, others 1.5–3.5 cm; basal leaf blades triangular, 5.5–19 × 5–13 cm, base deeply cordate, margin coarsely crenate, apex obtuse to acute; blade of mid stem leaves triangular-lanceolate, 5–9.5 × 2.2–6 cm, adaxially sparsely hispid to subglabrous, abaxially glabrous or sparsely bristly on veins only, base cordate, margin coarsely dentate, rarely undulate. Verticillasters ca. 3–10, widely spaced, many flowered; floral leaves short petiolate to sessile, lanceolate, reduced upward to slightly longer than verticillasters, margin dentate; bracts linear-subulate, ca. 1 cm, ciliate. Calyx tubular-campanulate, 8–10 mm, sparsely bristly near teeth otherwise glabrous outside; teeth semi-circular, 0.5–0.7 mm, apex emarginate, spine 1.8–2.5 mm. Corolla purple-red, 1.2–2 cm, tube glabrous; limb densely stellate tomentose outside, villous annulate inside; upper lip densely bearded inside, margin irregularly denticulate; lower lip ovate, ca. 6 × 5 mm; middle lobe largest, obcordate; lateral lobes ovate. Posterior filament appendages reflexed, short spurred. Nutlets apex stellate pubescent. Fl. and fr. Jul-Sep.

Wet grasslands, valleys; 1200–2100 m. Heilongjiang, Nei Mongol, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia; SW Asia, Europe].

11. *Phlomis agraria* Bunge, Fl. Altaic. 2: 411. 1830.

耕地糙苏 geng di cao su

Roots thickened, ropelike. Stems erect, 40–60 cm tall, appressed or retrorse hairy, flowering parts glandular hairy. Petiole of basal leaves 5–8 cm, others 2–2.5 cm; leaf blade simple hairy, also stellate abaxially, margin obtusely crenate-dentate; basal blades triangular-cordate, 8–10 × 4–6 cm, lower stem leaf blades 5.5 × 3–3.5 cm; upper stem leaves sessile, 1.5 × 6–8 mm, apex acuminate. Verticillasters 10–12-flowered, shorter than basal floral leaves; bracts linear-subulate, 8–9 mm, spreading hairy, spinescent. Calyx tubular-campanulate, 1–1.2 cm, glandular hairy outside; teeth semicircular to circular, stellate puberulent, apex spinescent-acuminate. Corolla reddish, rarely white, ca. 2 × as long as calyx; tube glabrous, hairy below throat and on limb outside; upper lip ovate, densely bearded inside, margin denticulate; lower lip with reniform-cordate middle lobe, lateral lobes ovate. Posterior filament appendages short spurred. Nutlets apex hairy (specimens not seen).

Grasslands, thickets. Xinjiang [Kazakhstan, Mongolia, Russia].

12. *Phlomis kansuensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 595. 1977.

甘肃糙苏 gan su cao su

Stems ca. 36 cm tall, sparsely retrorse bristly, densely bristly on nodes and just below flowers. Leaves sparsely bristly. Petiole of basal leaves 1–6 cm, others 0.6–1.1 cm, sparsely retrorse bristly; basal leaf blade ovate-triangular to ovate, 3–5 × 2.8–3.3 cm, base cordate, margin deeply crenate or dentate, apex rounded to acute; stem leaves 1-paired, blade ovate-lanceolate, ca. 4 × 2 cm, base broadly cuneate, margin irregularly dentate, apex acute. Verticillasters solitary, apical, many flowered; floral leaves lanceolate, ca. 4.5 × 1.2 cm, base cuneate, margin irregularly remote dentate, apex acuminate; bracts linear-subulate, 6–10 mm, margin ciliate, spinescent. Calyx tubular-campanulate, ca. 14 × 6 mm, dusty puberulent outside except for sparsely bristly veins; teeth spines spreading, 4–5.5 mm; sinus teeth tufted hairy, apex puberulent. Corolla reddish, ca. 1.9 cm, pilose; tube glabrous outside, villous annulate inside; upper lip ca. 9 mm, margin denticulate, pilose outside, densely bearded inside; lower lip ca. 7 × 8 mm, middle lobe largest, broadly obovate; lateral lobes circular-ovate. Stamens included, puberulent; posterior filament appendages reflexed, lingulate. Nutlets sparsely scaly. Fl. Jun.

- Montane steppes; 2600 m. Gansu.

13. *Phlomis mongolica* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 24(2): 406. 1851.

串铃草 chuan ling cao

Taproots woody, thick, lateral roots globose to fusiform. Stems 15–70 cm tall, few branched, pilose or spreading bristly; nodes densely bristly. Petiole 1–6 cm; basal leaf blades triangular, 4–13.5 × 2.7–7 cm, adaxially stellate setose and simple hairy or sparsely bristly to subglabrous, abaxially ± pilose or tufted setose, rarely bristly, base cordate, margin crenate, apex obtuse, stem leaves similar but smaller. Verticillasters many flowered, numerous, separate; floral leaves with petiole 6–11 mm, blade triangular to ovate-lanceolate, gradually reduced to shorter than verticillasters; bracts linear-subulate, as long as calyx, rigid, spreading ciliate, spinescent. Calyx tubular, ca. 14 × 6 mm, dusty puberulent outside except for bristly veins; teeth circular, ca. 1.2 mm, margin pilose, apex emarginate, with spines 2.5–3 mm. Corolla purple, ca. 2.2 cm; tube stellate pubescent above middle, glabrous at base outside, villous annulate inside; upper lip ca. 1 cm, stellate bearded inside, margin fringed; lower lip ca. 1 × 1 cm, middle lobe largest, circular-obovate, ca. 6 × 7 mm, apex emarginate; lateral lobes ovate, margin irregularly denticulate. Stamens included, hairy; posterior filament appendages reflexed, short spurred. Nutlets apex hairy. Fl. May-Sep, fr. Jul-Oct.

- Grassy slopes; 800–2200 m. Gansu, Hebei, Nei Mongol, Shaanxi, Shanxi.

- 1a. Plants 40–70 cm tall; verticillasters numerous, axillary, inserted on upper part of stems 13a. var. *mongolica*
- 1b. Plants ca. 15 cm tall; verticillasters solitary, terminal or axillary, sometimes inserted at base of stems 13b. var. *macrocephala*

13a. *Phlomis mongolica* var. *mongolica*

串铃草 chuan ling cao

Plants 40–70 cm tall. Verticillasters numerous, axillary, inserted on apical part of stems.

- Grassy slopes; 800–2200 m. Gansu, Hebei, Nei Mongol, Shaanxi, Shanxi.

Used as an ornamental. Plants are poisonous.

13b. *Phlomis mongolica* var. *macrocephala* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 595. 1977.

大头变种 da tou bian zhong

Plants ca. 15 cm tall. Verticillasters solitary, terminal or axillary, sometimes inserted at base of stem, many flowered, subglobose.

- Grassy slopes. Nei Mongol.

14. *Phlomis uniceps* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 595. 1977.

单头糙苏 dan tou cao su

Roots thick. Stems ca. 10 cm tall, densely stellate pannose. Petiole 1–6 cm; basal and stem leaf blades ovate-triangular, 3–5 × 1.3–2.6 cm, adaxially stellate pubescent and simple hairy, abaxially stellate tomentulose, base cordate, margin crenate, apex rounded. Verticillasters apical, solitary, ca. 16-flowered; floral leaves subverticillate, petiole 6–11 mm, densely stellate pannose, blade ovate to broadly cuneate; bracts subulate, 9–10 mm, slightly rigid, densely stellate ciliate, puberulent. Calyx teeth semicircular, apex truncate or emarginate, with spines 1–2 mm, puberulent except for apical pilose tuft inside. Corolla purple, ca. 2.2 cm, tube glabrous basally, stellate tomentulose near throat outside, villous annulate inside, limb densely white stellate tomentulose except for bearded back of upper lip outside; upper lip ca. 8 mm, margin denticulate, bearded inside; lower lip ca. 6 × 8 mm, middle lobe largest, obcordate, ca. 4 × 6 mm; lateral lobes ovate, margin irregularly denticulate. Stamens included, glabrous; posterior filament appendages at base far above annulus. Nutlets apex densely stellate tomentose. Fl. Sep.

- Valley grasslands. Gansu (Yongchang Xian).

15. *Phlomis maximowiczii* Regel, Trudy Imp. S. Peterburgsk. Bot. Sada 9: 594. 1886.

大叶糙苏 da ye cao su

Stems erect, 80–100 cm tall, sparsely minute retrorse hispid, branched toward apex. Petiole of lower stem leaves 7–9 cm, others 2–3 cm; basal leaf blades ovate, 9–15 × 8–10 cm, adaxially sparsely minute hispid, abaxially sparsely stellate pilose, base shallowly cordate, margin serrate or dentate, apex acuminate; upper stem leaves much reduced. Verticillasters many flowered, separate; peduncle 1–2 mm; basal floral leaves sessile, longer than verticillasters, ovate-lanceolate; upper floral leaves 2–3 × 1–2 cm, margin entire or dentate, sometimes equal to verticillasters; bracts lanceolate, 9–10 mm, margin ciliate. Calyx tubular, slightly enlarged at apex, 8–10 mm, spreading bristly outside on veins; teeth truncate, puberulent except for apical tuft inside, apex spinescent. Corolla reddish, ca. 2 cm; tube glabrous except for apex white pilose on back outside, villous annulate inside; upper lip ca. 9 mm, margin irregularly denticulate, densely bearded inside, densely lanate and stellate tomentose outside, hairs with a long central arm; lower lip ca. 5 × 7 mm, pilose outside,

middle and lateral lobes ovate. Stamens included; filaments apex villous, posterior filament appendages obliquely spreading, short spurred at base above annulus. Ovary lobes apex pubescent. Fl. Jul-Aug.

- Forest margins, riverbanks. Hebei, Jilin, Liaoning.

Roots used as a febrifuge, to reduce swelling, and for furunculosis. Nutlet oil content is 20–34%.

16. *Phlomis dentosa* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 6: 123. 1883.

尖齿糙苏 jian chi cao su

Stems erect, to 80 cm tall, stellate pannose, strigose, or hispidulous. Petiole 2.5–10 cm; leaf blade triangular to triangular-ovate, 5.5–10 × 3–6 cm, adaxially minutely hispid or stellate strigose, rarely stellate pubescent, abaxially densely stellate pubescent, base cordate, margin irregularly crenate, apex rounded. Verticillasters many flowered, numerous; floral leaves short petiolate to sessile, ovate-triangular to lanceolate, margin remotely dentate, basally much longer than verticillasters; bracts needlelike, 7–10 mm, densely stellate puberulent and stellate ciliolate (hairs with long central arms). Calyx tubular-campanulate, ca. 9 × 6 mm, densely stellate tomentulose, veins stellate hispidulous outside; teeth ca. 1 mm, margin dentate, apical spines 4–5 mm, marginal teeth apex tufted villous inside. Corolla reddish, ca. 1.6 cm; tube mostly glabrous, apex pubescent outside, villous annulate inside; upper lip ca. 8 mm, reflexed, densely stellate pubescent, villous outside, margin irregularly denticulate; lower lip ca. 6 × 7 mm, densely stellate pubescent outside, middle lobe broadly obovate, lateral lobes ovate. Stamens exerted; filaments hairy, posterior filament appendages short spurred at base above annulus. Nutlets glabrous. Fl. May-Oct, fr. Sep-Oct.

- Grassy slopes; 0–2500 m. Gansu, Hebei, Nei Mongol, Qinghai.

- 1a. Plants stellate hairy throughout 16a. var. *dentosa*
1b. Stems sparsely minutely hispid to subglabrous;
leaves subglabrous; bracts and calyx sparsely bristly
and dusty puberulent 16b. var. *glabrescens*

16a. *Phlomis dentosa* var. *dentosa*

尖齿糙苏 jian chi cao su

Stems stellately pannose, strigose, or hispidulous. Leaves hispidulous or stellate strigose, rarely stellate pubescent. Bracts stellately puberulent, ciliolate. Calyx densely stellately tomentulose, hispidulous.

- Grassy slopes; 0–2500 m. Gansu, Hebei, Nei Mongol, Qinghai.

16b. *Phlomis dentosa* var. *glabrescens* Danguy, Bull. Mus. Hist. Nat. (Paris) 17: 345. 1911.

渐光变种 jian guang bian zhong

Stems sparsely hispidulous to subglabrous. Leaves subglabrous. Bracts and calyx sparsely setose, dusty puberulent.

- Slopes; 0–1200 m. Gansu, Hebei, Nei Mongol, Qinghai.

17. *Phlomis medicinalis* Diels, Bot. Jahrb. Syst. 29: 554. 1900.

萝卜秦非 luo bo qin jiu

Phlomis wangii Hu & Tsai.

Herbs perennial. Stems 20–75 cm tall, purple-red, stellate pilose. Petiole of basal leaves 6–23 cm, others 0.8–7 cm; basal leaf blades ovate to ovate-oblong, 4.5–14 × 4–11 cm, base deeply cordate, margin coarsely crenate, apex rounded; stem leaf blades 5–6 × 2.5–4 cm, adaxially strigose, abaxially densely stellate pubescent, base ± truncate, margin coarsely dentate, apex acute or obtuse, longer than verticillasters. Verticillasters 1–4, many flowered, widely spaced; bracts linear-subulate, 6–10 mm, spinescent, ciliate, glandular puberulent, outer bracts reflexed, others ± spreading. Calyx tubular-campanulate, ca. 9 × 5 mm, sparsely stellate puberulent, bristly outside; teeth triangular, ca. 2 mm, margin puberulent, double dentate, tufted villous inside, apical spines 3–5 mm, obliquely reflexed or spreading. Corolla purple-red or reddish, ca. 2 cm, base glabrous; limb densely stellate tomentose, silky outside, villous annulate inside; upper lip ca. 1 cm, margin irregularly denticulate, bearded inside; lower lip spreading, ca. 8 × 6 mm, red lineate; middle lobe obovate, ca. 5 mm in diam.; lateral lobes small, broadly ovate. Posterior filament appendages reflexed, lingulate, at base above annulus. Nutlets apex scaly. Fl. May-Jul.

- Slopes; 1700–3600 m. Sichuan, Xizang.

18. *Phlomis tibetica* Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 218. 1929.

西藏糙苏 xi zang cao su

Stems 18–52 cm tall, densely strigose to sparsely puberulent. Petiole of basal leaves 5–15 cm, others 3.5–14 cm; basal leaf blades ovate-cordate, 4.5–7 × 4–5 cm, adaxially stellate strigose (hairs with unequal arms) or simple hairy, abaxially densely stellate pilose and simple hairy, base cordate, margin crenate to coarsely crenate, apex obtuse; stem leaf blades similar to basal, 6.5–8 × 6 cm, base shallowly cordate to truncate-cuneate. Verticillasters 1–3 (or 4), many flowered; floral leaves with petiole 0–5 mm, blade ovate-lanceolate to lanceolate, 2–5.5 × 1–2.7 cm, margin shallowly crenate; bracts subulate, 0.8–1.2 cm, densely purple-brown ciliate. Calyx tubular-campanulate, 1.0–1.2 cm × ca. 7 mm, puberulent and/or stellate puberulent, veins purple-brown setose outside, throat bristly inside; teeth 1–1.5 × 2–2.8 mm, truncate to emarginate, apical spine 1–1.8 mm. Corolla purple to deep wine red or pink, 1.8–2.2(–3) cm; tube retrorse pilose or subglabrous outside, villous annulate inside; limb densely stellate tomentose outside, upper lip ca. 8 mm, margin denticulate, gray-black or gray barbate inside; lower lip ca. 6 × 7 mm, middle lobe circular, ca. 3.5 mm in diam., margin irregularly undulate; lateral lobes shorter, semicircular. Filaments without basal appendages. Nutlets glabrous. Fl. Jul.

- Open alpine meadows, streamsides, forests, grassy slopes, cultivated areas; 3400–4500 m. Xizang.

- 1a. Leaves ovate-cordate; upper corolla lip stellate
tomentose outside 18a. var. *tibetica*
1b. Leaves cordate to broadly oblong; upper corolla lip
densely villous outside 18b. var. *wardii*

18a. *Phlomis tibetica* var. *tibetica*

西藏糙苏 xi zang cao su

Leaf blade ovate-cordate, margin crenate or coarsely crenate. Upper corolla lip stellate tomentose outside.

• Open alpine meadows, streamsides, forests; 3900–4500 m. Xizang.

18b. *Phlomis tibetica* var. *wardii* Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 219. 1929.

毛盔变种 mao kui bian zhong

Leaf blade cordate to broadly oblong, margin coarsely crenate. Upper corolla lip densely villous outside.

• Grassy slopes, cultivated areas; 3400–3600 m. Xizang.

19. *Phlomis milingensis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 595. 1977.

米林糙苏 mi lin cao su

Rhizomes oblique, rooting at nodes. Stems erect, 15–40 cm tall, minutely retrorse hispid. Petiole of basal leaves to 7 cm, others 1–4.5 cm; basal leaf blades triangular-ovate, 5.5–7 × 4–5.5 cm, base cordate, margin crenate, apex obtuse to acute; stem leaves ovate to triangular-ovate, ca. 7.5 × 6 cm, adaxially hispid, abaxially stellate pilose, base shallowly cordate, margin coarsely crenate, apex acute. Verticillasters 1 or 2, ca. 10-flowered, widely spaced; floral leaves petiole 0–4 mm, blade 2.5–4 × 1.5–2.5 cm; bracts linear-subulate, ca. 8 mm, purple-brown ciliate, spinescent. Calyx tubular, ca. 13 × 5 mm, 10-veined, glabrous except for purple-brown ciliate veins outside, throat bristly; teeth ca. 2.5 × 2 mm, subtruncate or emarginate, apical spine ca. 1.5 mm. Corolla purple-red, (2–)2.5–2.8(–3) cm; tube 1.5–1.8 cm, ca. 7 mm wide at throat, apex pilose outside, pilose annulate inside; upper lip subcircular, ca. 1 cm in diam., margin denticulate, gray villous outside, gray barbate inside; lower lip ca. 8 × 8 mm, pilose outside, glabrous inside; middle lobe ca. 3.5 mm in diam.; lateral lobes shorter, semicircular. Filaments pilose at middle, posterior 2 with a basal, hooked, reflexed appendage. Nutlets glabrous. Fl. Jul.

• *Picea* forests, thickets; 3400–4400 m. Xizang.

20. *Phlomis fimbriata* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 596. 1977.

裂唇糙苏 lie chun cao su

Stems 20–30 cm tall. Petiole 4.5–14 cm, basal ones persistent, minutely retrorse hispid or puberulent; basal and stem leaf blades broadly ovate to circular-ovate, 2.5–10 × 2.5–7.5 cm, sparsely strigose, base cordate, margin crenate, apex rounded. Verticillasters 1 or 2, (2–)7–9-flowered; floral leaves subsessile, ovate-oblong, 2–6 × 0.7–2.7 cm; bracts few, subulate, 5–8 mm, ciliate at apex, rarely along entire margin. Calyx tubular-campanulate, ca. 1.4 cm × 7 mm, sparsely minutely hispid outside; teeth obliquely triangular, ca. 1.5 mm, margin puberulent, double toothed, apex emarginate, short spinescent, tufted setose inside. Corolla dark purple, ca. 2.6 cm; tube ca. 1.6 cm, puberulent on back outside, pilose annulate, apex sparsely puberulent inside; upper lip ca. 1 × 1.5 cm, densely pilose outside, margin denticulate, densely bearded inside; lower lip ca. 7 × 8 mm, puberulent outside; middle lobe oblate, ca. 5 × 7 mm, margin denticulate; lateral lobes subcircular, ca. 3 mm in diam., margin denticulate. Stamens included; filaments finely

pilose, posterior 2 with a slightly reflexed basal appendage. Nutlets glabrous. Fl. Aug.

• Grassy slopes; 3500 m. Yunnan.

21. *Phlomis pararotata* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 44. 1966.

假轮状糙苏 jia lun zhuang cao su

Stems more than 35 cm tall, unbranched, pilose. Basal leaves early deciduous; petiole of stem leaves 1–9 cm; stem leaf blades hastate-ovate, 4.5–11 × 5.3–11 cm, appressed pilose, base cordate, margin irregularly crenate, apex rounded. Verticillasters 1 (or 2), many flowered; floral leaves sessile, ovate, 4–7 × 2.2–7 cm, base rounded, apex acute; bracts few, linear-subulate, 6–12 mm, densely ciliate. Calyx tubular-campanulate, 1.1–1.2 cm × 6–7 mm, puberulent, veins sparsely minutely hispid outside; teeth double toothed at margin, puberulent, apex emarginate, with spines ca. 0.7 mm. Corolla red, ca. 1.8 cm; tube ca. 1.1 cm, glabrous except for puberulent back outside, pilose annulate inside; upper lip ca. 9 mm, densely appressed pubescent outside, margin denticulate, bearded inside, lower lip ca. 8.5 × 7 mm, puberulent outside; middle lobe obovate, ca. 5 × 4 mm, margin denticulate; lateral lobes ovate, ca. 3 × 2.5 mm. Stamens included; posterior filaments with a slender basal appendage. Nutlets glabrous. Fl. Aug, fr. Sep.

• Hills; 4000 m. Yunnan.

22. *Phlomis pygmaea* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 596. 1977.

矮糙苏 ai cao su

Roots thick, woody. Stems tufted, basal petioles persistent, ca. 5 cm tall, densely gray stellate pannose. Petiole 0.8–2.5 cm; basal and stem leaf blades ovate to lanceolate, 2–4 × 1.4–2.5 cm, appressed gray stellate pubescent, gray dusty hairy, base rounded to broadly cuneate, margin crenate, apex rounded. Floral leaves subsessile to short petiolate, ovate-lanceolate to spatulate, 1–1.2 cm × 5 mm. Calyx tubular-campanulate, ca. 6.5 × 4 mm, white dusty hairy, veins sparsely villous outside; teeth semicircular, ca. 1 mm, spinescent, margin pilose. Corolla purple, ca. 1.3 cm; tube ca. 8 mm, appressed gray pubescent near throat outside, pilose annulate inside; upper lip ca. 6 mm, densely appressed pubescent outside, bearded inside, margin denticulate; lower lip ca. 6 × 6 mm, appressed pubescent outside; middle lobe obcordate, ca. 2.5 × 3.5 mm; lateral lobes triangular-ovate. Stamens included; filaments without basal appendages. Nutlets glabrous. Fl. Jul.

• Terraces; 5000 m. Xizang.

23. *Phlomis atropurpurea* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 169. 1913.

深裂糙苏 shen lie cao su

Roots thick. Stems 20–60 cm tall, subglabrous or retrorse pilose toward apex. Petiole (1–)2–28 cm; basal and stem leaf blades ovate, rarely ovate-oblong to oblong-lanceolate, 2.5–11 × 1.5–8 cm, base cordate, margin crenate, apex obtuse. Verticillasters (1 or 2) 2–4, many flowered; floral leaves sessile or short petiolate, 1.5–4 × 0.4–2.2 cm, margin serrate or subentire, slightly shorter to longer than verticillasters; bracts linear-subulate, 3–10 × to 2 mm, sparsely ciliate to

subglabrous. Calyx tubular-campanulate, ca. 10×6 mm, veins sparsely bristly outside; teeth triangular, margin double toothed, apex emarginate, spinescent, tufted setose inside, spines 2–2.5 mm. Corolla purple with purple-black upper lip, rarely purplish to white, 1.7–1.8(–2) cm; tube 1–1.2 cm, appressed puberulent near throat outside, pilose annulate inside; upper lip 6–8 mm, densely appressed white pubescent outside, margin irregularly denticulate, white barbate inside; lower lip ca. 7×9 mm, puberulent outside; middle lobe oblong, ca. 6×5 mm; lateral lobes small, ovate. Stamens included; filaments without appendages at base. Nutlets glabrous.

• Marshy meadows; 2800–3900 m. Yunnan (Zhongdian Xian, Lijiang Xian).

24. *Phlomis megalantha* Diels, Bot. Jahrb. Syst. 36, Beibl. 82: 95. 1905.

大花糙苏 da hua cao su

Taproots woody, with numerous, rigid, woody lateral roots. Stems 15–45 cm tall, sparsely retrorse minute hispid. Petiole 1.5–10 cm; stem leaf blades circular-ovate to ovate-oblong, 5–17.5 \times 4.2–11 cm, adaxially corrugate, appressed ciliolate, abaxially pilose on veins, base cordate to subtruncate, margin deeply crenate, apex acute or obtuse, rarely acuminate. Verticillasters 1 or 2, few to many flowered, sometimes \pm approximate; floral leaves longer than verticillasters; bracts linear-subulate, (6–)10–15(–20) \times 2(–4) mm, densely ciliate. Calyx tubular-campanulate, 1.8–2.8 \times ca. 8 mm, veins pilose outside; teeth double toothed at margin, puberulent, apex emarginate, tufted-pilose inside, spines ca. 2 mm. Corolla yellowish to white, 3.7–5 cm; tube apex pubescent, basally glabrous outside, without hairy annulus inside; upper lip 1.2–1.4 cm, base truncate, margin denticulate, densely pubescent outside, bearded inside; lower lip ca. 1.7 \times 1.3 cm, pubescent outside; middle lobe circular-ovate, ca. 9 \times 7 mm, margin irregularly undulate; lateral lobes triangular. Filaments long hairy, without basal appendages. Nutlets glabrous. Fl. Jun-Jul, fr. Aug-Nov.

• *Abies* forests, thickets, grassy slopes; 2400–4200 m. Hubei, Shaanxi, Shanxi, Sichuan.

25. *Phlomis ornata* C. Y. Wu, Fl. Yunnan. 1: 610. 1977.

美观糙苏 mei guan cao su

Taproots thick, with numerous woody lateral roots. Rhizomes woody, slender. Stems tufted, 40–60 cm tall, unbranched, erect or ascending, sparsely bristly. Petiole 2.5–21 cm, basal ones persistent; stem leaf blades broadly ovate, 9–15.5 \times 6.5–12.2 cm, adaxially sparsely setose, abaxially densely setose, occasionally intermixed with a few stellate hairs, base cordate, margin mucronate dentate-crenate, apex acute to acuminate. Verticillasters 1 or 2, many flowered; floral leaves longer than verticillasters, with petiole 1–1.5 cm, blade 6–10 \times 3–5 cm, margin serrate, apex short acuminate; bracts subulate, 6–13 mm, \pm spinescent, densely bristly. Calyx tubular, 2–2.5 \times ca. 0.9 cm, purplish, glandular puberulent or stellate puberulent, veins hispid outside; teeth double toothed at margin, puberulent, apex emarginate, tufted hairy inside, spines 3–4 mm. Corolla dark purple, to 4.7 cm, tube to 3.3 cm, white or purplish tomentulose on back outside, otherwise glabrous; limb densely white or purplish tomentulose outside, glabrous inside; upper lip to 1.6 cm, margin denticulate, apical half bearded inside; lower lip to 1.7 \times 1.6 cm, middle lobe oblate, ca. 7 \times 9 mm, constricted at base, margin

denticulate, concave; lateral lobes ovate. Filaments long hairy, without appendages. Nutlets glabrous. Fl. Jun-Sep, fr. Jul-Nov.

• *Abies* forests, grasslands; 3000–3700 m. Sichuan, Yunnan.

26. *Phlomis melanantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 242. 1912.

黑毛糙苏 hei mao cao su

Phlomis melanantha Diels var. *angustifolia* C. Y. Wu.

Roots woody, thick. Stems 60–90 cm tall, subglabrous. Petiole 1.2–6 cm; stem leaf blades broadly ovate to ovate-oblong, 4.5–12 \times (1.9–)2.5–9.5 cm, reduced upward, adaxially strigose, abaxially with scattered elevated glands, base cordate, margin serrate-dentate to dentate, sometimes crenate, apex acute to long acuminate. Verticillasters numerous, many flowered; floral leaves similar to stem leaves; bracts rigid, subulate, 1–1.2 cm, spinescent, sparsely ciliolate. Calyx purple, ca. 12 \times 6 mm, dusty puberulent, sometimes veins very sparsely bristly outside; teeth double toothed at margin, puberulent, apex emarginate, tufted hairy inside, spines 2–3 mm. Corolla purple-red, limb dark purple or reddish, ca. 2.2 cm, silky pilose outside; tube ca. 1.4 cm, glabrous outside, pilose on posterior, pilose annulate inside; upper lip ca. 8 mm, margin irregularly dentate, bearded inside; lower lip ca. 6 \times 9 mm, middle lobe oblate, ca. 4 \times 6 mm; lateral lobes ovate. Posterior filaments each with a slender reflexed basal appendage. Nutlets glabrous. Fl. Jun-Sep, fr. Jul-Oct.

• *Picea* forests, mixed forests, grasslands; 3000–3300 m. Sichuan, Yunnan.

27. *Phlomis forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 241. 1912.

苍山糙苏 cang shan cao su

Phlomis forrestii Diels var. *taronensis* C. Y. Wu.

Taproots thick, succulent. Stems 30–90 cm tall, stellate pilose. Petiole 2.5–15 cm; stem leaf blades ovate to elliptic, 10–19.5 \times 4–14.5 cm, adaxially sparsely minutely hispid, abaxially stellate pilose, veins spreading minutely hispid, base cordate, margin crenate or serrate-crenate, apex acute to acuminate. Verticillasters many flowered; floral leaves similar to stem leaves; bracts subulate, herbaceous, 5–12 \times ca. 1.5 cm, ciliate. Calyx tubular-campanulate, ca. (7–)12 \times 6 mm, stellate puberulent outside, veins spreading bristly; teeth double toothed, densely puberulent at margin, apex emarginate, tufted pilose inside, spines ca. 2 mm. Corolla purplish, 2–2.3 cm; tube 1.1–1.2 cm, minutely tomentose near throat outside, pilose annulate inside; upper lip ca. 8 mm, margin denticulate, bearded inside; lower lip ca. 1.2 \times 1.1 cm, middle lobe ovate, ca. 8 \times 7 mm, margin irregularly undulate. Filaments long hairy, posterior 2 with a slender reflexed appendage at base. Nutlets black, globose, glabrous. Fl. Aug, fr. Sep.

• *Pinus* and *Abies* forests; 2700–4000 m. Yunnan.

28. *Phlomis paohsingensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 598. 1977.

宝兴糙苏 bao xing cao su

Roots woody, robust. Stems 0.9–1.2 m tall, basally glabrous, apex minutely retrorse hispid, brownish. Petiole 4–

10 cm; stem leaf blades cordate, 11–14 × 7–13 cm, adaxially spreading bristly, abaxially stellate pilose, base cordate to round, margin dentate to deeply crenate, apex acute to caudate-acuminate. Verticillasters apical, many flowered; floral leaves with petiole 0–10 mm, blade 4.5–7 × 1.2–2.8 cm, base cuneate, margin dentate, apex long acuminate; bracts subulate, 6–10 mm, ciliate, puberulent. Calyx tubular, ca. 1.4 × 0.7 cm, dusty puberulent outside, veins bristly; teeth semicircular, margin puberulent, apex tufted hairy inside, spines ca. 2 mm. Corolla purplish; tube ca. 1.1 cm, glabrous except for silky pilose back outside, pilose annulate inside; upper lip ca. 8 mm, margin fringed-denticulate, densely silky pilose outside, long barbate inside; lower lip brown with dark purple spots, ca. 8 × 8 mm, silky pilose, glabrous near margin; middle lobe ovate, ca. 5 × 4 mm; lateral lobes ovate. Stamens included; filaments long hairy, posterior 2 with a hooked reflexed basal appendage. Nutlets glabrous. Fl. Jul.

- Thickets on slopes; 3100 m. Sichuan (Baoping Xian).

29. *Phlomis setifera* Bureau & Franchet, J. Bot. (Morot) 5: 149. 1891.

刺毛糙苏 ci mao cao su

Stems 30–50 cm tall, sparsely retrorse minutely hispid. Petiole persistent, 4.5–13 cm; stem leaf blades triangular-ovate, 14–19 × 7.5–11.5 cm, adaxially stellate hispidulous (hairs with long central arms), abaxially stellate pubescent, with scattered elevated glands, base obliquely cordate, margin dentate, apex acuminate. Verticillasters 1 or 2, 10–18-flowered; floral leaves with petiole ca. 8 mm, blade ca. 6.5 × 3 cm, base shallowly cordate, apex long acuminate; bracts linear-subulate, 4–6 mm, bristly glandular puberulent. Calyx campanulate, ca. 10 × 5.5 mm, densely stellate puberulent outside, veins spreading bristly; teeth semicircular, 1–1.5 mm, margin hirsute, apical spines rigid, 2–3 mm. Corolla yellow-white, ca. 1.4 cm; tube ca. 7 mm, glabrous except for partly pubescent back outside, pilose annulate inside; upper lip ca. 7 mm, margin denticulate to subentire, white villous outside; lower lip ca. 6 × 8 mm, margin pubescent; middle lobe obovate, ca. 5 × 4 mm, apex slightly undulate; lateral lobes ovate. Stamens included; filaments long hairy, posterior 2 with a long, reflexed, apically hooked basal appendage. Nutlets glabrous. Fl. Jul-Sep.

- *Abies* forests; 3600–3900 m. Sichuan, Xizang, Yunnan.

30. *Phlomis tatsienensis* Bureau & Franchet, J. Bot. (Morot) 5: 149. 1891.

康定糙苏 kang ding cao su

Roots thick. Stems 30–100 cm tall, stellate pubescent or densely yellow stellate tomentulose. Petiole 1–13 cm; stem leaf blades ovate, 5–23 × 2.5–17 cm, adaxially stellate hispidulous, abaxially stellate pilose or tawny stellate tomentulose, base cordate to rounded, margin crenate to serrate, apex acute to long acuminate. Verticillasters numerous, 6–14-flowered; floral leaves with petiole 3–5 mm, blade 1–3 × 0.5–1.3 cm, margin serrate, upper floral leaves shorter than to as long as verticillasters; bracts few, linear, herbaceous, 3–6 mm, stellate pubescent. Calyx tubular-campanulate, ca. 8 × 5 mm, stellate pubescent outside; teeth double toothed, puberulent at margin, apex subtruncate or emarginate, tufted hairy, spines ca. 1.5 mm. Corolla white with purplish lower lip, ca. 1.3 cm; tube ca. 7 mm, glabrous outside, white tomentose near throat, pilose annulate inside; upper lip ca. 5 mm, margin denticulate, white tomentose

outside, bearded inside; lower lip ca. 6 × 7 mm, white tomentose except for margin outside, ovate lobed; middle lobe ca. 4.5 × 3.5 mm. Stamens included; filaments hairy, posterior 2 with a long, upwardly curved, short-spurred basal appendage. Nutlets glabrous. Fl. May-Jul, fr. Jul-Aug.

- Grassy slopes, forests; 2500–3400 m. Sichuan, Yunnan.

1a. Bracts and calyx stellate pubescent only

..... 30a. var. *tatsienensis*

1b. Bracts and calyx densely stellate pubescent,

spreading hirsute 30b. var. *hirticalyx*

30a. *Phlomis tatsienensis* var. *tatsienensis*

康定糙苏 kang ding cao su

Phlomis souliei H. Léveillé.

Bracts and calyx stellate pubescent.

- Grassy slopes, forests; 2500–3400 m. Sichuan.

30b. *Phlomis tatsienensis* var. *hirticalyx* (Handel-Mazzetti) C. Y. Wu, Fl. Yunnan. 1: 612. 1977.

毛萼变种 mao e bian zhong

Phlomis franchetiana Handel-Mazzetti var. *hirticalyx* Handel-Mazzetti, Symb. Sin. 7: 921. 1936.

Bracts and calyx densely stellate pubescent, patently hirsute.

- Grassy slopes, forests; 2700–3000 m. Yunnan.

31. *Phlomis congesta* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 598. 1977.

乾精菜 qian jing cai

Stems 30–80 cm tall, much branched, densely stellate pubescent near apex, otherwise glabrous, shiny. Petiole 1.5–7 cm; stem leaf blade ovate-oblong to ovate-lanceolate, 4.5–12.5 × 3.2–9 cm, adaxially subglabrous or sparsely stellate pubescent and minutely hispid, abaxially glabrous to stellate pubescent, base cordate to cuneate, margin coarsely dentate, apex acute to long acuminate. Verticillasters many flowered, conspicuously pedunculate; floral leaves reduced toward stem apex, always longer than verticillasters; bracts linear-lanceolate, rarely subulate, (3–)6–11 cm, stellate puberulent. Calyx tubular, ca. 12 × 5 mm, splitting longitudinally, outside densely stellate puberulent, sometimes also stellate pilose with central arms of hairs very long; teeth circular, margin double toothed, apex tufted pilose inside, spines 1–1.5 mm. Corolla white, ca. 1.8 cm, glabrous outside, densely silky tomentose on upper lip, pilose on lower lip and back of tube; upper lip ca. 7 mm, margin denticulate, long barbate inside; lower lip 7–9 × 6–8 mm, middle lobe obovate, ca. 6 × 5 mm, margin undulate; lateral lobes ovate. Stamens included; filaments hairy, posterior 2 with a hooked reflexed basal appendage. Nutlets glabrous. Fl. Jul-Aug, fr. Sep.

- Forest margins, grassy slopes; 1900–3300 m. Sichuan, Yunnan.

32. *Phlomis inaequalisepala* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 598. 1977.

斜萼糙苏 xie e cao su

Stems 70–80 cm tall, subglabrous, shiny toward base, densely pilose toward apex. Leaves herbaceous; petiole 3.5–5 cm; upper stem leaf blades ovate, 10–14 × 6.5–9 cm,

adaxially sparsely strigose, abaxially stellate pubescent, base shallowly cordate, margin coarsely serrate, apex caudate-acuminate. Verticillasters 3–5, many flowered; floral leaves similar to stem leaves, with petiole 5–10 mm, blade 1.5–7 × 1–4 cm; bracts linear, herbaceous, 4–7 mm, sparsely pilose, glandular puberulent. Calyx tubular, ca. 10 × 4.5 mm, sparsely pilose and glandular puberulent outside, splitting longitudinally; teeth circular, apex tufted hairy inside, spine ca. 1 mm. Corolla ca. 1.8 cm, tube ca. 1 cm, glabrous outside, gray pubescent on back near throat, pilose annulate inside; upper lip ca. 8 mm, gray pubescent outside, margin denticulate, bearded inside; lower lip ca. 6 × 8 mm, gray pubescent outside; middle lobe largest, obovate; lateral lobes ovate. Filaments hairy, posterior 2 with a hooked, reflexed basal appendage. Nutlets glabrous. Fl. Jul.

- Grassy slopes; 2400 m. Sichuan.

33. *Phlomis strigosa* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 599. 1977.

糙毛糙苏 cao mao cao su

Stems 55–100 cm tall, strongly grooved, shiny, tawny stellate strigose near apex and sometimes on nodes. Petiole 1–5.2 cm; stem leaf blades ovate, 7–14 × 4–11 cm, adaxially sparsely strigose or subglabrous, abaxially subglabrous or veins stellate strigose with central arms of hairs very long, base cordate, margin crenate-serrate, ciliolate, apex caudate-acuminate. Verticillasters 1–3, many flowered; floral leaves with petiole 3–10 mm, blade 1.5–5.8 × 0.7–3 cm; bracts linear-lanceolate to subulate, 5–8 mm, stellate, margin stellate ciliate. Calyx tubular-campanulate, ca. 9 × 5.5 mm, splitting irregularly, densely stellate outside; teeth circular, apex tufted hairy inside, spine ca. 1.8 mm. Corolla white, ca. 2 cm; tube ca. 1 cm, glabrous outside, apex densely pilose on back, pilose annulate inside; upper lip ca. 1 cm, margin fringed, densely lanate outside, bearded inside; lower lip ca. 8 × 7 mm, densely pilose except on margin outside, middle lobe obovate, lateral lobes ovate. Filaments hairy, posterior 2 with a long, upwardly curved basal appendage. Nutlets glabrous. Fl. Jul.

- Alpine meadows, sparse forests; 2300–2500 m. Yunnan.

34. *Phlomis rutilis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 599. 1977.

裂萼糙苏 lie e cao su

Stems much branched, striate, densely stellate pilose. Petiole 0.8–7.5 cm; upper stem leaf blades sagittate-oblong, 9–17 × 5–8.5 cm, adaxially sparsely stellate pubescent and hairs with longer central arms, abaxially densely gray stellate pilose, base sagittate-cordate, margin coarsely crenate-serrate, apex acute. Verticillasters 3–5, many flowered, widely spaced; peduncle obscure; floral leaves with petiole 1–5 mm, blade longer than verticillasters, (2.5–)3–6 × 1.2–4 cm; bracts subulate, 3–8 mm, herbaceous, with stellate hairs. Calyx tubular, ca. 11 × 4 mm, conspicuously veined, with stellate hairs, yellow-brown near margin when dry, splitting longitudinally; teeth semicircular, apical spine 1–2 mm. Corolla yellow, ca. 1.8 cm; tube ca. 1 cm, glabrous outside, apex pilose on back, pilose annulate inside; upper lip ca. 8 mm, margin subentire or denticulate, densely stellate lanate outside, bearded inside; lower lip ca. 8 × 8 mm, densely stellate lanate except on margin outside, middle lobe obovate, lateral lobes ovate. Stamens included; filaments hairy,

posterior 2 with a long, upwardly curved basal appendage. Nutlets glabrous. Fl. Sep.

- Grassy slopes; 3200–3500 m. Yunnan.

35. *Phlomis likiangensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 599. 1977.

丽江糙苏 li jiang cao su

Roots thick. Stems 0.6–1.5 m tall, robust, striate, apex densely stellate tomentulose, basally sparsely stellate pilose. Petiole 7–13 cm; stem leaf blades cordate to ovate, 7–18 × 6–15 cm, adaxially sparsely stellate pubescent and simple hairy, abaxially densely stellate pubescent, base cordate to rounded, margin dentate, apex acute or caudate-acuminate. Verticillasters 2–10-flowered; peduncle 1–3 mm; floral leaves petiole 0.5–5.5 cm, longer than verticillasters; bracts leaflike, linear-lanceolate, 4–13(–22) × 1.5–3(–5.5) mm. Calyx tubular, ca. 13 × 5 mm, gray stellate pannose outside; teeth 1.5–2.5 mm, apex gray pannose, tufted pilose inside, spine ca. 2.5 mm. Corolla white or yellow, ca. 2.1 cm, white lanate except for glabrous tube outside, pilose annulate inside; upper lip ca. 1 cm, margin fringed, bearded inside; lower lip ca. 8 × 10 mm; lobes ovate, middle lobe ca. 6 × 4 mm, lateral lobes smaller. Stamens included; filaments hairy, posterior 2 with a hooked, reflexed basal appendage. Nutlets glabrous. Fl. Jul.

- Dry grasslands; 3500 m. Yunnan (Lijiang Xian).

36. *Phlomis franchetiana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 242. 1912.

大理糙苏 da li cao su

Phlomis franchetiana var. *aristata* C. Y. Wu; *P. franchetiana* var. *leptophylla* C. Y. Wu.

Stems 60–90 cm tall, much branched, densely tawny stellate pubescent. Petiole 0.5–9 cm; stem leaf blades broadly ovate to oblong, 3.5–18 × 1.7–11.5 cm, reduced apically, adaxially slightly corrugate, stellate hispidulous, abaxially densely stellate pilose, base strongly cordate, margin crenate-serrate to crenate or subentire, apex acuminate. Verticillasters numerous, 4–14-flowered; floral leaves with petiole 2–5 mm, blade 1.5–4 × 0.7–2.3 cm, longer than verticillasters; bracts 1–1.5 mm. Calyx tubular, ca. 10 × 5 mm, stellate pubescent outside; teeth ca. 1 mm, apex tufted hairy inside, spine 3–4 mm. Corolla purple to white, ca. 1.4 cm, silky-tomentulose except for glabrous tube outside, pilose annulate; upper lip ca. 6 mm, margin denticulate, bearded inside; lower lip ca. 6 × 8 mm, lobes ovate, middle lobe ca. 4 × 3.5 mm. Stamens included; filaments long hairy, posterior 2 with an upwardly curved, short-spurred basal appendage. Nutlets glabrous. Fl. Jun-Sep, fr. Oct.

- Grassy slopes; 1900–2500 m. Yunnan.

37. *Phlomis ambigua* Handel-Mazzetti, Symb. Sin. 7: 920. 1936.

沧江糙苏 cang jiang cao su

Roots robust. Stems robust, ca. 7 mm in diam. at base, stellate strigose, glabrous toward base. Petiole ca. 1/2 as long as blade, densely tufted pubescent; mid stem leaf blades ovate, to 16 × 7 cm, adaxially sparsely minute hispid, densely so on veins, abaxially densely tufted pubescent, base truncate to shallowly oblique cordate, margin mucronate-crenate, apex acute to rounded. Verticillasters compact, 5–8-flowered, widely spaced; floral leaves short petiolate, upper ones

circular, ca. 1 cm in diam; bracts lanceolate, 1–2 mm, appressed stellate pilose, spinelike. Flowers sessile or very short pedicellate. Calyx narrowly funnelform, 8–9 mm, stellate tomentose, 11-veined; teeth broadly circular, apical spine 0.5–1 mm. Corolla yellowish, reddish on upper lip, 1.5–1.8 cm, silky-pilose outside; upper lip 6–7 mm, bearded inside, apex 2-lobed; lower lip lobes entire, lateral lobes slightly narrower and shorter than middle lobe.

- Thickets; 1900 m. Yunnan.

38. *Phlomis longicalyx* C. Y. Wu, Fl. Yunnan. 1: 617. 1977.

长萼糙苏 chang e cao su

Stems shiny, very sparsely stellate pubescent, much branched. Stem leaf blades ovate, 13–15 × 9–11 cm, adaxially sparsely hispidulous, stellate and hairs with longer central arms, abaxially sparsely stellate pubescent, base shallowly oblique cordate, margin dentate, apex caudate-acuminate. Verticillasters numerous, 4–16-flowered, widely spaced; peduncle 2–5 mm; rachis distinctly branched; bracts needlelike, 2–6(–10) mm. Calyx tubular, ca. 1.5 × 6 mm, dusty stellate puberulent outside, veins sparsely bristly; lobes double toothed, spines 3–4 mm, marginal teeth tufted hairy inside. Corolla ca. 2.5 cm; tube ca. 1.7 cm, glabrous except for sparsely villous back outside, pilose annulate inside; upper lip ca. 8 mm, margin denticulate, very densely villous outside, bearded inside; lower lip densely villous except for glabrous margin outside, ca. 8 × 8 mm; lobes ovate, middle lobe ca. 5 × 3 mm. Stamens included; filaments hairy, posterior 2 with a slender, short-spurred basal appendage. Nutlets glabrous. Fr. Oct.

- Bamboo forests; 3700 m. Yunnan.

39. *Phlomis muliensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 599. 1977.

木里糙苏 mu li cao su

Stems 60–100 cm tall, reddish green, densely yellow stellate tomentose. Petiole 1–11.5 cm; stem leaf blades triangular-ovate, adaxially yellow-green, densely stellate, abaxially densely stellate tomentose, base cordate to cuneate, margin irregularly crenate to dentate, apex obtuse to acute. Verticillasters usually 2, 8–10-flowered; bracts needlelike, herbaceous, ca. 6 mm, densely stellate tomentose and setose, hairs with very long central arms. Calyx tubular-campanulate, ca. 7 × 5 mm, stellate tomentose outside, veins stellate setose; lobes double toothed, tufted hairy inside, spines ca. 2 mm. Corolla white, ca. 1.4 cm, tube hairy annulate inside; upper lip ca. 7 mm, margin denticulate, densely white lanate outside, bearded inside; lower lip ca. 6 × 5 mm, white lanate except for glabrous margin; middle lobe obovate-orbicular, ca. 3 × 3 mm; lateral lobes ovate. Stamens included; filaments hairy at middle, posterior 2 with a short-spurred basal appendage. Nutlets glabrous. Fl. Oct.

- Grassy slopes; 2500 m. Sichuan.

40. *Phlomis pedunculata* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 45. 1966.

具梗糙苏 ju geng cao su

Lateral roots fusiform. Rhizome woody. Stems erect, 50–80 cm tall, slender, mostly glabrous, stellate puberulent apically and on nodes. Petiole 1–7 mm; stem leaf blades

elliptic to ovate-lanceolate, 7–12.5 × (3–)5–6.5(–8) cm, adaxially simple hairy or stellate hispid and hairs with very long central arms, abaxially very sparsely stellate pubescent, base slightly unequally rounded to shallowly cordate, margin coarsely dentate, apex acuminate. Verticillasters (6–)8–14(–34)-flowered; floral leaves with petiole less than 1 cm, blade 2–4.5 × 1–3 cm; bracts 2–15 × 1–2(–5) mm, sparsely stellate ciliate, margin pubescent. Pedicel to 2 mm. Calyx tubular, ca. 1.1 × 5.5 mm, densely stellate tomentulose outside; lobes double toothed, spines slightly hooked, 2.5–3 mm; teeth triangular, tufted hairy inside. Corolla white or purplish, ca. 1.9 cm; tube ca. 1.1 cm, glabrous except for pubescent outside of apex back, pilose annulate inside; upper lip obovate, ca. 8 × 7.5 mm, margin denticulate, densely silky villous outside, bearded inside; lower lip ca. 8 × 9 mm, middle lobe obovate ca. 6 × 4 mm; lateral lobes ovate to oblong, ca. 4 mm. Stamens included; filaments hairy, posterior 2 with a hooked basal appendage. Nutlets glabrous. Fl. Jul–Aug, fr. Aug–Oct.

- Thickets, grassy slopes; 1300–3200 m. Sichuan.

41. *Phlomis jeholensis* Nakai & Kitagawa, Rep. First Sci. Exped. Manch. IV, 1: 48. 1934.

口外糙苏 kou wai cao su

Stems ca. 75 cm tall, spreading bristly, much branched toward apex. Petiole 0.3–4 cm; stem leaf blades ovate, 2–12 × 1.2–7.5 cm, spreading bristly, adaxially minutely hispid, abaxially pilose, base shallowly cordate to rounded, margin coarsely dentate-serrate, apex acuminate to acute. Verticillasters numerous, 6–16-flowered; floral leaves subsessile, 2.1–13 × 1–8 cm, spreading bristly; bracts linear-subulate, rigid, 0.9–1.5 cm, subequal to calyx, densely spreading bristly. Calyx tubular, ca. 11 × 6 mm, subglabrous outside, veins sparsely spreading bristly; lobes double toothed, spines rigid, ca. 1.5 mm; teeth broadly triangular, tufted hairy inside. Corolla white, ca. 1.9 cm; tube ca. 1.1 cm, glabrous outside, pilose annulate inside; upper lip ca. 8 mm, margin denticulate, densely silky-tomentose outside, bearded inside; lower lip ca. 7 × 8 mm, middle lobe obovate, ca. 5 × 3.5 mm; lateral lobes ovate. Stamens included; posterior filaments with a short-spurred appendage. Fl. Aug–Sep.

- Hillsides, wet areas. Hebei.

42. *Phlomis umbrosa* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 13: 76. 1840.

糙苏 cao su

Roots to 30 × 1 cm, lateral ones succulent. Stems 0.5–1.5 m, sparsely retrorse hispidulous, sometimes stellate pubescent toward apex, purplish red, much branched. Petiole 1–12 cm, densely minutely hispid; leaf blade circular-ovate to ovate-oblong, 5.2–12 × 2.5–12 cm, pilose and/or stellate, base cordate to rounded, margin serrate-dentate to irregularly crenate, apex acute to acuminate. Verticillasters numerous, 4–8-flowered, pedunculate; floral leaves with petiole 2–3 mm, blade 1–3.5 × 0.6–2 cm, margin coarsely serrate-dentate; bracts purple-red. Calyx tubular, ca. 8–10 × 3–3.5 mm, densely stellate hairy outside, veins sometimes sparsely pilose; lobes double toothed, spines ca. 1.5 mm; teeth small, tufted hairy inside. Corolla reddish to purple-red, rarely white with red spots on lower lip, ca. 1.7 cm; tube ca. 1 cm, glabrous except for pubescent back outside, pilose annulate on basal 1/3 inside; upper lip ca. 7 mm, margin irregularly denticulate, silky-villous outside, bearded inside; lower lip ca.

5 × 6 mm, densely silky-villous except for glabrous margin outside, glabrous inside; lobes ovate to subcircular, middle 1 largest. Stamens included; filaments glabrous, without basal appendages. Nutlets glabrous. Fl. Jun-Sep, fr. Sep.

• Forests, grassy slopes, streamsides, thickets, wet areas; 700–3200 m. Anhui, Gansu, Guangdong, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan.

- 1a. Bracts linear-oblong to obovate-oblong, much shorter than calyx, 5–7 × 1.8–2.5 mm 42d. var. *latibracteata*
- 1b. Bracts linear-subulate to linear-lanceolate, longer or rarely slightly shorter than calyx, 8–14 × 1–2 mm.
- 2a. Verticillasters conspicuously pedunculate, lax; flowers pedicellate; calyx ca. 8 × 3 mm 42c. var. *stenocalyx*
- 2b. Verticillasters inconspicuously pedunculate, compact; flowers sessile or subsessile; calyx ca. 10 × 3.5 mm.
- 3a. Leaves ovate, subcuneate to shallowly cordate, stellate pubescent, rarely abaxially stellate tomentulose; calyx densely stellate pubescent outside 42e. var. *ovalifolia*
- 3b. Leaves circular-ovate to ovate-oblong, sparsely pilose or sometimes abaxially densely pilose and stellate pilose; calyx stellate puberulent except sometimes pilose on veins.
- 4a. Leaves membranous, crenate-serrate, terminal tooth sometimes very long; bracts soft, linear-lanceolate, slightly shorter than calyx 42b. var. *australis*
- 4b. Leaves papery, serrate-dentate or irregularly crenate, terminal tooth not very long; bracts rigid, linear-subulate, mostly longer than calyx 42a. var. *umbrosa*

42a. *Phlomis umbrosa* var. *umbrosa*

糙苏 cao su

Leaf blade papery, orbicular-ovate to ovate-oblong, sparsely pilose or sometimes abaxially densely pilose and stellate pilose, margin serrate-dentate or irregularly crenate, terminal tooth not very long. Verticillasters inconspicuously pedunculate, compact; bracts rigid, linear-subulate, mostly longer than calyx. Flowers sessile or subsessile. Calyx ca. 10 × 3.5 mm, stellate puberulent except sometimes pilose on veins.

• Sparse forests, grassy slopes; 2000–3200 m. Gansu, Guangdong, Guizhou, Hebei, Hubei, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan.

Used medicinally.

42b. *Phlomis umbrosa* var. *australis* Hemsley, J. Linn. Soc., Bot. 26: 306. 1890.

南方变种 nan fang bian zhong

Leaves long petiolate; leaf blade membranous, margin crenate-serrate, terminal tooth sometimes very long. Bracts soft, linear-lanceolate, slightly shorter than calyx.

31. LAMIOPHLOMIS Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 210. 1929.

独一味属 du yi wei shu

• Hillsides, grasslands, streamsides, thickets; 1600–3200 m. Anhui, Gansu, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

Used medicinally.

42c. *Phlomis umbrosa* var. *stenocalyx* (Diels) C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 477. 1977.

狭萼变种 xia e bian zhong

Phlomis stenocalyx Diels, Bot. Jahrb. Syst. 29: 555. 1900.

Leaves papery. Verticillasters conspicuously pedunculate, loose; bracts very slender. Flowers pedicellate. Calyx ca. 8 × 3 mm.

• Hillsides, grassland, wet areas, forests; 800–1500 m. Gansu, Shaanxi.

42d. *Phlomis umbrosa* var. *latibracteata* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 46. 1966.

宽苞变种 kuan bao bian zhong

Bracts linear-oblong to obovate-oblong, shorter than calyx, 5–7 × 1.8–2.5 mm, entire.

• Hillsides, forests; 700–2000 m. Henan.

42e. *Phlomis umbrosa* var. *ovalifolia* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 601. 1977.

卵齿变种 luan chi bian zhong

Leaf blade ovate, base subcuneate to shallowly cordate, stellate pubescent, abaxially rarely stellate tomentulose. Calyx densely stellate pubescent, teeth longer.

• Hillsides, forests. Anhui, Jiangsu.

43. *Phlomis szechuanensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 65(2): 601. 1977.

柴续断 chai xu duan

Stems finely striate, densely tawny stellate pubescent, much branched. Petiole 2–5 cm; upper stem leaf blades ovate, 6.5–11 × 3–8 cm, adaxially densely stellate pubescent, very sparsely stellate strigose, hairs with longer central arms, abaxially densely stellate pilose, base broadly truncate-cuneate, margin serrate, apex acute. Verticillasters 2–5, many flowered, conspicuously pedunculate; upper floral leaves almost as long as verticillasters; bracts linear, 3–7(–9) mm, herbaceous. Calyx tubular, ca. 11 × 3 mm, densely stellate pubescent; lobes double toothed, spines ca. 1.2 mm, teeth tufted hairy inside. Corolla white, ca. 2 cm; tube ca. 1.3 cm, apex silky-villous outside, pilose annulate inside; upper lip ca. 6.5 mm, margin fringed, very densely silky-villous outside, bearded inside; lower lip ca. 6 × 6 mm, silky-villous except for margin outside, middle lobe obovate, lateral lobes ovate. Filaments hairy, without basal appendages. Nutlets glabrous. Fl. Aug.

• Grasslands; 2000 m. Sichuan (Qingchuan Xian).

Herbs stemless, perennial, rhizomatous. Leaves in a rosette, prostrate; petiole broadly complanate, ± clasping; leaf blade corrugate, herbaceous, margin dentate, with ± flabellate veins. Verticillasters in compact, short pedunculate, capitate, spicate, or sometimes short paniculate inflorescences; bracteoles needlelike, spinescent. Calyx cylindrical, 10-veined; teeth 5, broadly triangular, spinescent, tufted hairy inside. Corolla tube ± cylindrical, densely puberulent, without distinct hairy annulus inside; limb 2-lipped; upper lip denticulate, densely villous inside; lower lip 3-lobed. Stamens 4, anterior 2 longer, slightly exserted; filaments complanate, puberulent on upper half, without appendages at base; anther cells 2, divaricate, apex confluent. Ovary glabrous. Style apex equally 2-cleft. Nutlets brownish, obovoid, triquetrous, glabrous.

Monotypic: Bhutan, China, India (Sikkim), Nepal.

Perhaps best regarded as a specialized species of *Phlomis*, especially as the differences noted between the genera seem to be quantitative only.

1. *Lamiophlomis rotata* (Bentham ex J. D. Hooker) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 211. 1929.

独一味 du yi wei

Phlomis rotata Bentham ex J. D. Hooker, Fl. Brit. India 4: 694. 1885.

Herbs 2.5–10 cm tall. Rhizome elongate, to 1 cm in diam. Leaves 4(–6), decussate; petiole of basal leaves to 8 cm, upper ones shorter to obsolete; leaf blade rhombic-orbicular to rhombic, flabellate, or reniform, (4–)6–13 cm × (4.4–)7–12 mm, adaxially bullate, densely white pilose, abaxially sparsely pubescent on veins, base shallowly cordate to broadly cuneate-decurrent, margin crenate, apex obtuse to acute; lateral veins 3 pairs, subbasal, flabellate due to secondary branching on 1 side. Inflorescences 3.5–7 cm;

rachis densely pubescent; bracts lanceolate, oblanceolate, or linear, 1–4 cm × 1.5–6 mm, reduced upward, base decurrent, margin entire, apex acuminate, ciliate; bracteoles ca. 8 × 0.5 mm. Calyx ca. 10 × 2.5 mm, purplish brown when dry, veins pilose; teeth broadly triangular, spine ca. 2 mm. Corolla purplish, red-purple, or reddish brown, ca. 1.2 cm; tube ca. 1.3 mm wide at base, to 2 mm wide at throat; upper lip subcircular, ca. 5 mm wide; lower lip puberulent except for entire margin outside, glabrous; middle lobe bearded inside, elliptic, ca. 4 × 3 mm; lateral lobes ca. 2.5 × 2 mm. Fl. Jun–Jul, fr. Aug–Sep.

Weathered alpine alluvial fans, stony alpine meadows, floodplains; 2700–4900 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan [Bhutan, India (Sikkim), Nepal].

Used medicinally for traumatic injury.

32. GALEOPSIS Linnaeus, Sp. Pl. 2: 579. 1753.

鼬瓣花属 you ban hua shu

Herbs annual. Stems erect or ascending, divaricate branched. Leaves petiolate; leaf blade ovate-lanceolate or lanceolate, margin dentate. Verticillasters 6- to many flowered, remote or crowded upward; bracts minute, linear or lanceolate. Flowers sessile. Calyx tubular-campanulate, 5–10-veined; teeth 5, equal or posterior ones longer, rigidly subulate-spinescent. Corolla white, yellowish, or purple, spotted, 2-lipped; tube straight, exserted, funnelform, without hairy annulus inside, throat enlarged; upper lip erect, concave, ovate, margin entire or dentate, hairy outside; lower lip spreading, 3-lobed; middle lobe obcordate, emarginate, or subrounded, dentate at junction with lateral lobes; lateral lobes ovate. Stamens 4, parallel, ascending beneath upper lip; anther cells 2, dorsifixed, dehiscing transversely by 2 valves, inner valves smaller, ciliate, outer valves larger, glabrous. Style apex 2-cleft, lobes subulate, subequal. Disc truncate at apex or anterior lobe swollen. Nutlets broadly obovoid, nearly flattened abaxially, smooth, obtuse at apex.

About ten species: mainly in Europe, Asia; one species in China.

1. *Galeopsis bifida* Boenninghausen, Prodr. Fl. Monast. Westphal. 178. 1824.

鼬瓣花 you ban hua

Galeopsis bifida var. *emarginata* Nakai; *G. tetrahit* Linnaeus var. *bifida* (Boenninghausen) Kudô; *G. tetrahit* var. *parviflora* Bentham.

Stems erect, 20–60(–100) cm tall, robust; nodes enlarged when fresh, shrivelled when dry, bristly; internodes bristly, appressed pubescent, apically sometimes also glandular pubescent. Petiole 1–2.5 cm, pubescent; stem leaf blades ovate-lanceolate or lanceolate, 3–8.5 × 1.5–4 cm, adaxially appressed bristly, abaxially sparsely puberulent, glandular, base attenuate to broadly cuneate, margin crenate-serrate, apex acute or acuminate. Verticillasters solitary, crowded; bracts linear to lanceolate, 3–6 mm, base ± membranous,

margin bristly, apex spinescent. Calyx ca. 1 cm, spreading bristly outside, puberulent inside; teeth subequal, almost as long as tube, narrowly triangular, apex long spinescent. Corolla white and/or yellow, rarely purplish red, ca. 1.4 cm, tube ca. 8 mm; upper lip obtuse, margin denticulate, bristly; middle lobe of lower lip oblong, ca. 2 mm wide, emarginate, purple spotted to margin, slightly constricted at base; lateral lobes oblong, entire, slightly wider than middle lobe. Filaments pubescent toward base. Nutlets brown, obovoid, triquetrous, scaly. Fl. Jul–Sep, fr. Sep.

A widespread weed growing on forest margins, roadsides, field margins, grasslands, waste areas, open thickets; to 4000 m. Gansu, Guizhou, Heilongjiang, Hubei, Jilin, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan [Japan, Kyrgyzstan, Korea, Mongolia, Russia; Europe, North America].

33. LAMIUM Linnaeus, Sp. Pl. 2: 579. 1753.

野芝麻属 ye zhi ma shu

Herbs annual or perennial. Stem leaf blades circular or reniform to ovate-lanceolate, margin coarsely crenate or dentate-serrate. Verticillasters 4–14-flowered; floral leaves similar, much longer than verticillasters; bracts ± linear, early deciduous. Calyx tubular-campanulate to campanulate, 5- or 10-veined, ± hairy outside, throat slightly oblique or regular; teeth 5, subequal, subulate, as long as or longer than tube. Corolla purple-red, reddish, yellowish, to dirty white, 2-lipped, 2(–3) × as long as calyx, hairy outside; tube straight or incurved, cylindrical or widened above annulus, subsaccate; upper lip erect, oblong, rounded or emarginate, ± galeate; lower lip spreading, 3-lobed; middle lobe obcordate, emarginate or 2-lobed; lateral lobes semicircular, margin crenate or dentate. Stamens 4, hairy, anterior 2 longer, ascending beneath upper lip; anther cells 2, divaricate. Ovary lobes apically truncate, glabrous or tuberculate, sometimes with a membranous margin. Style apex subequally 2-cleft.

About 40 species: Africa, Asia, Europe, introduced in North America; four species in China.

- 1a. Corolla tube straight, cylindrical, without hairy annulus inside; leaves circular to reniform, coarsely crenate to shallowly ± palmately lobed 1. *L. amplexicaule*
- 1b. Corolla tube with hairy annulus near base inside, subsaccate beyond hairy annulus; leaves ovate to ovate-lanceolate.
 - 2a. Corolla purple or dark purple; ovary lobes glabrous, with a membranous margin at apex 4. *L. maculatum*
 - 2b. Corolla white or yellowish; ovary lobes glabrous or tuberculate, without membranous margin at apex.
 - 3a. All floral leaves sessile 2. *L. album*
 - 3b. Lower floral leaves petiolate 3. *L. barbatum*

1. *Lamium amplexicaule* Linnaeus, Sp. Pl. 2: 579. 1753.

宝盖草 bao gai cao

Galeobdolon amplexicaule (Linnaeus) Moench;
Lamiopsis amplexicaulis (Linnaeus) Opiz; *Pollichia amplexicaulis* (Linnaeus) Willdenow.

Herbs annual or biennial. Stems to 30 cm, much branched at base, ascending, subglabrous. Upper leaves sessile; petiole of basal leaves at least as long as blade; leaf blade circular to reniform, 1–2 × 0.7–1.5 cm, sparsely strigose, base truncate to broadly truncate-cuneate, semi-clasping, margin deeply crenate to almost palmately lobed, apex rounded. Verticillasters 6–10-flowered; bracts ca. 4 × 0.3 mm, ciliate. Calyx tubular-campanulate, 4–5 × 1.7–2 mm, densely villous, glabrous except for white villous apically inside; teeth lanceolate-subulate, 1.5–2 mm, margin ciliate. Corolla purple-red or reddish, ca. 1.7 cm, puberulent; tube ca. 1.3 cm, throat ca. 3 mm wide, annulus absent; upper lip densely purple-red pubescent on outside, straight, oblong, ca. 4 mm, apex slightly curved; lower lip slightly longer; middle lobe obcordate, 2-lobulate. Filaments glabrous; anthers hirsute. Nutlets grayish yellow, obovoid, triquetrous, constricted at base, ca. 2 × 1 mm, white tuberculate. Fl. Mar-May, fr. Jul-Aug.

Roadsides, forest margins, marshes, sometimes weed in fields; 0–4000 m. Anhui, Fujian, Gansu, Guizhou, Henan, Hubei, Hunan, Jiangsu, Qinghai, Shaanxi, Sichuan, Xinjiang, Xizang, Yun-nan, Zhejiang [Japan, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

Used medicinally for traumatic injury.

2. *Lamium album* Linnaeus, Sp. Pl. 2: 579. 1753.

短柄野芝麻 duan bing ye zhi ma

Lamium petiolatum Royle ex Benth.

Herbs perennial. Stems 30–60 cm, bristly to subglabrous. Basal leaves smaller; petiole of upper leaves 1–6 cm; upper leaf blade ovate to ovate-lanceolate, 2.5–6 × 1.5–4 cm, adaxially sparsely appressed, minutely hispid, especially near margin, base cordate, margin dentate-serrate, apex acute to cuspidate-acuminate. Verticillasters 8- or 9-flowered; floral leaves similar to stem leaves but sessile; bracts linear, ca.

1/6 as long as calyx. Calyx campanulate, 9–13 × 2–3 mm, base sometimes purple red, sparsely bristly, minutely hispid; teeth lanceolate, as long as tube, awned, margin ciliate. Corolla yellowish or dirty white, 2–2.5 cm; tube at least as long as calyx, 2–2.5 mm in diam., pubescent, hairy annulate inside, throat dilated; upper lip obovate, 7–10 × 6 mm, obtuse; lower lip 1–1.2 cm, middle lobe 4–6 × 3–4 mm, obreniform, margin ciliate; lateral lobes circular, ca. 2 mm, with a subulate tooth ca. 1 mm. Anthers black-purple, villous. Nutlets dark gray, narrowly ovoid, triquetrous, 3–3.5 × 1.5–1.7 mm, glabrous, tuberculate. Fl. Jul-Sep, fr. Aug-Oct.

Larix forest margins, wet areas in cleared *Picea* forest regions, semishady grassy hillsides; 1400–2400 m. Gansu, Nei Mongol, Shanxi, Xinjiang [India, Japan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe, North America].

The young leaves are edible, and the flowers are used medicinally. It is also used as a honey plant.

3. *Lamium barbatum* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4: 158. 1846.

野芝麻 ye zhi ma

Lamium album Linnaeus var. *barbatum* (Siebold & Zuccarini) Franchet & Savatier; *L. barbatum* var. *glabrescens* C. Y. Wu & Hsuan; *L. barbatum* var. *hirsutum* C. Y. Wu & Hsuan; *L. barbatum* var. *rigidum* C. Y. Wu & Hsuan.

Herbs perennial. Stems to 1 m, unbranched, erect, subglabrous or appressed hirtellous to hirsute. Petiole of basal leaf to 7 cm, apex shorter; basal leaf blade ovate to cordate, 4.5–8.5 × 3.5–5 cm, base cordate, apex caudate-acuminate; upper stem leaves ovate-lanceolate, herbaceous, margin incurved dentate-serrate, hirtellous. Verticillasters 4–14-flowered, in upper axils; bracts linear or filiform, 2–3 mm, ciliate. Calyx campanulate, 11–15 × 4–6 mm, subglabrous to sparsely strigose; teeth lanceolate-subulate, 7–10 mm, ciliate. Corolla white or yellowish, ca. 2 cm; tube ca. 2 mm wide near base, saccate, throat to 8 mm wide, partly hairy, hairy annulate near base inside; upper lip obovate or oblong, ca. 1.2 cm, margin ciliate, villous, apex rounded to emarginate; lower lip ca. 6 mm, middle lobe obreniform, 2-lobulate, base abruptly constricted; lateral lobes semicircular, ca. 0.5 mm, each with a needlelike marginal tooth. Anthers dark purple.

Nutlets brownish, obovoid, apex truncate, base attenuate, ca. 3 × 1.8 mm. Fl. Apr-Jun, fr. Jul-Aug.

Roadsides, fields, waste areas on hillsides, streambanks; 800–2600 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea, Russia].

Lamium barbatum is often included in *L. album*, and their separation needs more detailed investigation.

Fl. USSR states that the corolla can be pinkish; this does not seem to have been recorded for Chinese material.

4. *Lamium maculatum* Linnaeus, Sp. Pl., ed. 2, 2: 809. 1763.

紫花野芝麻 zǐ huā yě zhī mā

Lamium maculatum var. *kansuense* C. Y. Wu & Hsuan.

Herbs perennial. Stems 30–50 cm tall, sparsely white pubescent, hollow. Petiole slender, 1.5–3 cm; stem leaf blades ovate, 2.5–5 × 1.5–3 cm, herbaceous, appressed hirtellous, abaxially glandular punctate, base subtruncate to broadly cuneate, margin coarsely incurved serrate, apex caudate-acuminate. Verticillasters 8–12-flowered; bracts linear, 2–3 mm, ciliate. Calyx campanulate, ca. 1 cm × 3.5 mm, 5-ribbed, glabrous except for hirsute veins; teeth subequal, straight or spreading, linear-lanceolate, 5–6 mm, margin ciliate, apex long aristate. Corolla purple, 1.8–2.5 cm; tube ca. 2 mm wide at base, pilose outside, densely so on upper lip, hairy annulate and puberulent inside; upper lip straight, oblong, ca. 7 mm, narrowed and slightly curved at base, margin undulate; lateral lobes of lower lip shallowly semicircular, each with a marginal tooth 1–1.5 mm. Anthers dark purple. Ovary lobes glabrous, with a membranous margin at apex. Fl. Jul-Aug.

Hill tops, valleys; 2400–2700 m. Gansu, Xinjiang [Russia; SW Asia, Europe, North America].

34. GALEOBDOLON Adanson, Fam. Pl. 2: 190. 1763.

小野芝麻属 xiǎo yě zhī mā shù

Matsumurella Makino.

Shrubs or annual or biennial herbs. Leaves petiolate; blade margin dentate. Verticillasters 2–8-flowered; bracts shorter than calyx, linear, early deciduous. Calyx campanulate, hairy outside, glabrous except for hairy teeth inside, 5-veined; teeth 5, lanceolate, posterior 3 slightly larger than anterior 2. Corolla purple-red or reddish, 1.5–2 × as long as calyx, 2-lipped, hairy especially on upper lip outside; tube slightly exerted, hairy annulate inside; upper lip straight, oblong, rarely obovate, emarginate, rarely as long as tube; lower lip spreading, 3-lobed, middle lobe obcordate to obovate, lateral lobes subcircular to ovate. Stamens 4, anterior 2 longer; anthers ovoid, cells 2, divaricate. Ovary lobes truncate, glabrous or rarely minutely hispid at apex. Style apex subequally 2-cleft. Nutlets triquetrous, oblong, obovoid, to obconical, base attenuate, apex subtruncate, glabrous or short hairy.

Galeobdolon is often included in *Lamium*.

About six species: one in Europe and SW Asia, five in China, among them one also in Japan.

- 1a. Verticillasters 2-flowered; flowers conspicuously pedicellate; apex of ovary lobes sparsely hirtellous; herbs or shrubs.
 - 2a. Shrubs; leaves dark olive green adaxially, midrib densely appressed pilose; flowers on short, leafy axillary shoots 4. *G. yangsoense*
 - 2b. Herbs; leaves yellow-brown adaxially, midrib densely appressed minute hispid-pilose; flowers solitary in axils 5. *G. kwangtungense*
- 1b. Verticillasters 2–8-flowered; flowers subsessile; ovary glabrous; slender herbs with tuberlike roots.
 - 3a. Plants with slender stolons at base; leaves rhombic-ovate, 1.7–4.2 × 1.1–3 cm, coarsely serrate 3. *G. szechuanense*
 - 3b. Plants without slender stolons; leaves ovate, ovate-oblong to broadly lanceolate or ovate-rhombic, crenate-serrate.
 - 4a. Herbs 10–20 cm tall; taproots tuberous; leaves ovate-rhombic, 1–2 × 0.8–1.6 cm; lower lip of corolla spotted 2. *G. tuberiferum*
 - 4b. Plants 10–60 cm tall; roots sometimes tuberlike; leaves ovate-oblong to broadly lanceolate, 1.5–4 × 1.1–2.2 cm; corolla not spotted 1. *G. chinense*

1. *Galeobdolon chinensis* (Benth) C. Y. Wu, Acta Phytotax. Sin. 10: 157. 1965.

小野芝麻 xiǎo yě zhī mā

Lamium chinense Benth, Prodr. 12: 512. 1848.

Herbs annual. Roots sometimes tuberlike. Stems 10–60 cm tall, densely tawny tomentose. Petiole 0.5–1.5 cm; leaf blade ovate or ovate-oblong to broadly lanceolate, 1.5–12 × 1.1–6 cm, herbaceous, base broadly cuneate, apex obtuse to acute. Verticillasters 2–4-flowered; bracts linear, ca. 6 mm,

early deciduous. Calyx tubular-campanulate, ca. 1.5 × 0.7 cm, densely tomentose; teeth lanceolate, 4–6 mm, apex awned-acuminate. Corolla ca. 2.1 cm, white villous; upper lip ca. 1.1 cm, obovate, base attenuate, lower lip ca. 8 × 9 mm, lateral lobes similar to middle lobe, subcircular. Filaments glabrous; anthers purple, glabrous. Style apex unequally 2-cleft. Nutlets obovoid, ca. 2.1 × 0.9 mm, apex truncate. Fl. Mar-May, fr. Jul-Aug.

• Sparse forests, hillsides; 100–300 m. Anhui, Fujian, Guangdong, Guangxi, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang.

- 1a. Leaves 4–12 × 3–6 cm; corolla white
 1b. var. *robustum*
 1b. Leaves less than 4 × 2.2 cm; corolla reddish.
 2a. Leaves rhombic, coarsely crenate, sparsely
 appressed minutely hispid 1c. var. *subglabrum*
 2b. Leaves ovate or ovate-oblong to
 broadly lanceolate, crenate-serrate,
 adaxially appressed ciliate,
 abaxially tawny tomentose..... 1a. var. *chinense*

1a. Galeobdolon chinensis var. chinense

小野芝麻 xiao ye zhi ma

Herbs 10–60 cm tall. Leaves ovate or ovate-oblong to broadly lanceolate, less than 4 × 2.2 cm, adaxially with appressed ciliate hairs, abaxially tawny tomentose, margin crenate-serrate. Corolla reddish.

• Sparse forests; 100–300 m. Anhui, Fujian, Guangdong, Guangxi, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang.

1b. Galeobdolon chinensis var. robustum C. Y. Wu, Acta Phytotax. Sin. 10: 158. 1965.

粗壮变种 cu zhuang bian zhong

Plants robust, ca. 60 cm tall. Leaves 4–12 × 3–6 cm. Corolla white.

• Hillsides. Fujian.

1c. Galeobdolon chinensis var. subglabrum C. Y. Wu, Acta Phytotax. Sin. 10: 158. 1965.

近无毛变种 jin wu mao bian zhong

Plants ca. 19 cm tall. Leaves rhombic, 3.8–4.2 × 1.5–2.2 cm, sparsely appressed hispidulous, margin coarsely crenate.

• Hillsides. Jiangxi.

2. Galeobdolon tuberiferum (Makino) C. Y. Wu, Acta Phytotax. Sin. 10: 158. 1965.

块根小野芝麻 kuai gen xiao ye zhi ma

Leonurus tuberiferus Makino, Bot. Mag. (Tokyo) 19: 146. 1905; *Lamium chinense* Benth. var.? *parvifolia* Hemsley; *Lamium kelungense* Hayata; *Lamium tuberiferum* (Makino) Ohwi; *Matsumurella tuberifera* (Makino) Makino.

Herbs perennial. Taproot forming a globose or oblong tuber at apex. Stems 10–20 cm tall, slender, minutely hispid. Petiole 0.5–1.5 cm; stem leaf blades ovate-rhombic, 1–2 × 0.8–1.6 cm, herbaceous, adaxially appressed white ciliate, abaxially appressed hirsute, base broadly cuneate, margin crenate-serrate, apex acute or obtuse. Verticillasters (2–)4–8-flowered; floral leaves similar to stem leaves, 5–6 × 3–4 mm; bracts linear, ca. 3 mm. Calyx tubular-campanulate, ca. 8 × 2.2 mm, bristly; teeth triangular-lanceolate, as long as calyx tube, apex acuminate. Corolla purple-red or reddish, ca. 1.3 cm; tube ca. 0.6 mm wide at base, ca. 4 mm wide at throat; upper lip straight, oblong, ca. 6 mm, hispid outside; lower lip 8 × 5 mm, purple spotted, middle lobe obcordate, lateral lobes subcircular. Anthers dark purple. Ovary lobes oblong, scaly at apex. Nutlets brown, triquetrous, obovoid, ca. 2 × 1 mm, truncate, glabrous. Fl. Apr, fr. May.

Wet sites close to villages, foothills; 300 m. Guangxi, Hunan, Jiangxi, Taiwan [Japan].

3. Galeobdolon szechuanense C. Y. Wu, Acta Phytotax. Sin. 10: 159. 1965.

四川小野芝麻 si chuan xiao ye zhi ma

Herbs perennial. Stems 8–10 cm tall, base with slender stolons, bristly. Petiole 1.5–3.2 cm; leaf blade rhombic-ovate, 1.7–4.2 × 1.1–3 cm, base broadly cuneate, margin coarsely serrate, apex obtuse, veins sparsely appressed pilose. Verticillasters 2–4-flowered; bracts minute. Calyx tubular-campanulate, 7–8 × 2 mm, sparsely bristly; teeth triangular-lanceolate, awned. Corolla purple-red(?), ca. 1.6 cm, glabrous except for sparsely pilose upper lip outside; tube ca. 1.2 mm wide, to 5 mm wide at throat; upper lip straight, suboblong, ca. 6.5 mm, apex truncate, emarginate; lower lip ca. 6 × 7 mm, middle lobe circular-obovate, lateral lobes subcircular. Ovary lobes subglobose, glabrous. Nutlets unknown. Fl. Apr–May.

• Bamboo forests along streams; 600 m. Sichuan.

4. Galeobdolon yangsoense Sun, Acta Phytotax. Sin. 10: 160. 1965.

阳朔小野芝麻 yang shuo xiao ye zhi ma

Shrubs. Stems ± terete, tawny hispidulous. Petiole ca. 6 mm; leaf blade ovate-oblong or oblong-lanceolate, 4.5–5.5 × 2.8–3.6 cm, papery, adaxially dark olive green, sparsely pilose, midrib densely appressed hairy, abaxially appressed hirtellous, veins tawny villous, base broadly cuneate, margin sparsely serrate, apex obtuse or acute. Verticillasters 2-flowered, 1 or 2 ± terminal on an axillary shoot 2.5–6.5 cm. Pedicel ca. 2 mm. Calyx campanulate, ca. 9 × 5 mm, densely tawny tomentose; teeth lanceolate, as long as calyx tube. Corolla ca. 1.6 cm, pubescent outside except for appressed silky upper lip; tube ca. 1.2 mm wide; upper lip oblong, ca. 8 mm, apex emarginate; lower lip ca. 10 × 8 mm, lobes subcircular, middle lobe slightly constricted at base. Ovary lobes sparsely hirtellous at apex. Nutlets triquetrous, oblong, basally attenuate, apex subtruncate, ca. 3 × 1.6 mm. Fl. and fr. Jul.

• Thickets; 200 m. Guangxi (Yangshuo Xian).

5. Galeobdolon kwangtungense C. Y. Wu, Acta Phytotax. Sin. 10: 160. 1965.

广东小野芝麻 guang dong xiao ye zhi ma

Herbs annual(?). Stems 10–30 cm tall, densely tawny tomentulose. Petiole 1–2 cm; leaf blade ovate to oblong, 2.5–5.5 × 1.7–4.2 cm, papery, adaxially yellow-brown, densely appressed hirtellous, abaxially tawny tomentulose, base broadly cuneate to subrounded, margin shallowly serrate, apex obtuse. Verticillasters 2-flowered. Pedicel ca. 2 mm. Calyx campanulate, ca. 10 × 4.5 mm, puberulent; teeth lanceolate, as long as calyx tube, apex long acuminate. Corolla reddish, ca. 1.8 cm, pubescent, yellowish glandular except for densely villous upper lip outside; tube to 1.2 cm, ca. 1 mm wide at base, to 3.2 mm wide at throat; upper lip straight, oblong, ca. 6 mm, obscurely emarginate, slightly curved; lower lip ca. 6.5 × 7.5 mm, lateral lobes ovate; middle lobe oblate, base constricted, apex emarginate. Nutlets triquetrous, oblong, ca. 3 × 1.2 mm, base attenuate, apex truncate, pubescent. Fl. and fr. Jul–Sep.

• Forests; 800–900 m. Guangdong.

35. ALAJJA Ikonnikov, *Novosti Sist. Vyssh. Rast.* 8: 274. 1971.

菱叶元宝草属 ling ye yuan bao cao shu

Plants annual or perennial, alpine, herbaceous. Leaves short petiolate to subsessile; leaf blade mostly rhombic, margin entire or crenate, tomentose. Verticillasters few flowered; bracts to as long as calyx, subulate. Flowers sessile. Calyx tubular-campanulate, lanate; teeth 5, linear-lanceolate. Corolla purple, 2-lipped; tube erect, straight, exerted, glabrous inside, throat dilated; upper lip subgaleate, apex emarginate; lower lip spreading, 3-lobed; middle lobe 2-lobulate; lateral lobes ovate or oblong, margin entire, apex emarginate. Stamens 4, didynamous, ascending, anterior 2 longer; anthers hirsute or glabrous, cells 2, divaricate. Style equally 2-cleft at apex, lobes subulate.

Many workers include *Alajja* in *Lamium*.

About three species: Afghanistan, India, Kyrgyzstan, Pakistan, Tajikistan; two species in China.

- 1a. Anthers hirsute; bracts as long as calyx; upper stem leaves coarsely crenate 1. *A. rhomboidea*
1b. Anthers glabrous or subglabrous; bracts longer than calyx; upper stem leaves inconspicuously few
crenate or subentire 2. *A. anomala*

1. *Alajja rhomboidea* (Benth) Ikonnikov, *Novosti Sist. Vyssh. Rast.* 8: 274. 1971.

菱叶元宝草属 ling ye yuan bao cao

Lamium rhomboideum Benth, *Labiata. Gen. Spec.* 509. 1834; *Erianthera rhomboidea* (Benth) Benth.

Herbs unbranched. Stem base usually concealed amongst rocks, slender, flexuous, with scalelike leaves; above ground part 15–30 cm tall, robust, ascending, densely villous-tomentose. Basal leaf blades subentire; stem leaves few, crowded, petiolate, blade rhombic; upper leaf blades 5–10 cm wide, corrugate, base cuneate, margin coarsely crenate, apex obtuse, veins flabellate, netted. Verticillasters 2-flowered; floral leaves numerous, gradually reduced at apex; bracts subulate, flaccid-lanate, as long as calyx. Calyx 1.3–2 cm, flaccid-villous outside, teeth lanceolate-linear. Corolla purple; tube straight, ca. 3.8 cm, puberulent outside, glabrous inside; lateral lobes of lower lip ovate, entire. Anthers hirsute.

Alpine alluvial fans; 4000–5000 m. Xizang [Afghanistan, India, Pakistan].

2. *Alajja anomala* (Juzepczuk) Ikonnikov, *Novosti Sist. Vyssh. Rast.* 8: 274. 1971.

异叶元宝草 yi ye yuan bao cao

Herbs perennial. Stems numerous, subterranean base slender, flexuous, whitish, glabrous, with ovate-lanceolate scalelike leaves; aboveground part purplish red, 12–35 cm tall, suberect, sometimes branched from base, densely lanate. Basal stem leaves long petiolate, blade margin entire; upper leaf blades longer, ovate-rhombic, base cuneate, gray, minutely tomentose especially on veins, veins indistinct. Verticillasters 2- or 4-flowered; floral leaves with broad, short to obsolete petiole, blade largest, 1.5–4 × 1.5–4 cm, ± crowded into a rosette, broadly rhombic to cuneate-flabellate, margin few crenulate to subentire, apex rounded; bracts ca. 7 mm. Calyx campanulate, 1.5–2 × ca. 0.8 cm, slightly enlarged after anthesis, densely appressed lanate-tomentose outside; teeth ca. 7 mm, apex spinescent. Corolla purple, 3–4 cm, ± lanate outside, tube 1.5–2 cm, 3–4 mm wide; upper lip ca. 1.5 cm, oblong-ovate, apex obtuse or emarginate; lower lip longer, middle lobe 8–10 × ca. 6 mm, lateral lobes ovate or oblong, apex emarginate. Anthers glabrous or subglabrous. Nutlets unknown. Fl. Jul–Aug.

Hills; 3300 m. Xinjiang (Wuqia Xian) [Kyrgyzstan, Tajikistan].

36. CHAITURUS Willdenow, *Fl. Berol. Prodr.* 200. 1787.

鬃尾草属 zong wei cao shu

Herbs annual or biennial, gray green. Stems erect, branched. Leaf blade circular to lanceolate, margin dentate or subentire. Verticillasters sessile, globose, many flowered; bracteoles spiny. Calyx tubular, 10-veined; veins obscure in flower, ± distinct in fruit; teeth 5, equal, straight, apex spinescent. Corolla purple-white or white, nearly included, glabrous inside, equally 2-lipped; upper lip straight, ovate; lower lip 3-lobed. Stamens 4, subequal, nearly included; anthers ovoid, cells 2, divaricate. Style apex unequally 2-cleft. Nutlets oblong, triquetrous.

Monotypic: China, Kazakhstan, Russia; Europe.

Often included in *Leonurus*.

1. *Chaiturus marrubiastrum* (Linnaeus) Spenner, *Gen. Fl. Germ.*, fasc. 18: 353. 1839.

鬃尾草 zong wei cao

Leonurus marrubiastrum Linnaeus, *Sp. Pl.* 2: 584. 1753; *Cardiaca leonuroides* Willdenow; *Cardiaca marrubiastrum* (Linnaeus) Medikus.

Rhizomes slightly woody, oblique. Stems erect, 30–60 cm tall, branched basally, branches retrorse appressed strigose. Petiole 1.5–2 cm; basal leaf blade circular, margin

remotely dentate-serrate to subentire; stem leaf blades ovate, 2–5 × 1–3 cm, adaxially finely puberulent, abaxially densely appressed gray pubescent, base broadly cuneate, margin as that of basal blade, apex acute; lateral veins 3 or 4 pairs. Verticillasters ca. 1.5 cm in diam.; floral leaves sometimes sublanceolate; bracteoles spiny, slightly longer than calyx tube, spreading or curved upward, finely puberulent. Calyx tubular, 6–7 mm; tube ca. 5 mm, puberulent outside, glabrous inside; teeth triangular, ca. 2 mm, apex spinescent. Corolla 6–7 mm, tube ca. 5 mm, sparsely villous outside; limb pilose outside, glabrous inside; lower lip longer than adaxial, middle

lobe obovate, lateral lobes ovate. Ovary black-brown, apex puberulent. Nutlets oblong, triquetrous, base cuneate, apex truncate, pubescent. Fl. Jun-Jul, fr. Jul-Aug.

Pastures, fallow land, riverbanks, streamsides, roadsides; 900 m. Xinjiang [Kazakhstan, Russia; Europe].

37. STACHYOPSIS Popov & Vvedensky, Trudy Turkestansk. Naucn. Obsc. 1: 122. 1923.

假水苏属 jia shui su shu

Herbs perennial, erect. Leaves sessile or petiolate, simple; leaf blade coarsely serrate. Verticillasters many flowered, numerous, remote or in spikes; bracteoles spinescent to linear-lanceolate, rigid or flaccid. Calyx obconical, 10-veined; teeth 5, equal, triangular, puberulent or silky-villous outside, glabrous inside, apex spinescent. Corolla reddish, 2-lipped; tube with oblique, interrupted villous annulus on basal 1/3 inside; upper lip erect, ovate, margin entire, densely villous outside, glabrous inside; lower lip spreading, glabrous, 3-lobed; middle lobe circular to obovate, apex emarginate; lateral lobes ovate. Stamens 4, ascending to underside of upper lip of corolla, anterior 2 longer, glabrous, posterior 2 puberulent; anthers ovoid, cells 2, divaricate. Style apex equally 2-cleft, lobes subulate. Disc apex truncate, undulate. Nutlets oblong, triquetrous, apex obliquely truncate, glabrous.

Three species: China, Kazakhstan, Kyrgyzstan, Tajikistan.

- 1a. Mid and basal stem leaves petiolate; petiole 0.5–3 cm; calyx subglabrous or appressed puberulent 3. *S. oblongata*
1b. Stem leaves sessile; calyx silky-villous.
2a. Leaf base cordate; bracteoles and calyx teeth flaccid; upper corolla lip densely villous, lateral lobes of lower corolla lip ca. 1/2 as long as middle lobe 1. *S. lamiiflora*
2b. Leaf base cuneate; bracteoles and calyx teeth rigid; upper corolla lip sparsely villous; lateral lobes of lower corolla lip ca. 1/3 as long as middle lobe 2. *S. marrubioides*

1. *Stachyopsis lamiiflora* (Ruprecht) Popov & Vvedensky, Trudy Turkestansk. Naucn. Obsc. 2: 122. 1923.

心叶假水苏 xin ye jia shui su

Stachys lamiiflora Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg 14: 67. 1869.

Herbs perennial. Stems unbranched, erect, 40–80 cm tall, retrorse pubescent, subglabrescent. Leaves sessile; mid stem leaf blades oblong-ovate, 5–10 × 3–5 cm, sparsely appressed pubescent, base rounded to shallowly cordate, margin coarsely crenate-serrate, apex acute; lateral veins 4 or 5 pairs. Verticillasters to 2.5 cm in diam., in widely spaced spikes; floral leaves gradually reduced upward, blade ovate-lanceolate, 3–6 × 1–2.5 cm; bracteoles flaccid, lanceolate-linear to linear, ca. 10 × 1–1.5 mm. Calyx teeth ca. 6 mm, narrowly triangular, apex spinescent-acuminate, villous outside, puberulent inside. Corolla ca. 1.6 cm, apex densely white or yellow villous outside; tube ca. 8 mm; upper lip ovate, concave, ca. 8 × 6 mm; lower lip spreading, subcircular, ca. 8 × 7 mm; middle lobe obovate to subcircular, ca. 5 × 5 mm, apex emarginate; lateral lobes subcircular, ca. 3 mm in diam. Ovary brown, glabrous. Nutlets chestnut brown, oblong, triquetrous, ca. 4 × 2.5 mm, base cuneate, apex obliquely truncate, glabrous. Fl. Aug, fr. Aug-Sep.

Subalpine meadows; 2400 m. Xinjiang [Kazakhstan, Kyrgyzstan].

2. *Stachyopsis marrubioides* (Regel) Ikonnikov-Galitzky, Izv. Bot. Sada Akad. Nauk. URSS 26: 72. 1927.

多毛假水苏 duo mao jia shui su

Phlomis marrubioides Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 375. 1880; *P. oblongata* Schrenk var. *canescens* Regel; *Stachyopsis oblongata* (Schrenk) Popov & Vvedensky var. *canescens* (Regel) Popov & Vvedensky.

Herbs perennial. Stems erect, ca. 50 cm tall, much branched, puberulent. Leaves sessile; upper stem leaves oblong-ovate, 3.5–5 × 1.5 cm, gray puberulent, base broadly cuneate to subrounded, margin serrate near base or middle, apex acuminate; lateral veins 3 or 4 pairs. Verticillasters globose, 2–2.5 cm in diam. in flower, in widely spaced spikes; floral leaves lanceolate, 3–3.5 cm; bracteoles rigid, erect, linear to spiny, ca. 10 × 1 mm, densely villous. Calyx obconical, ca. 9 mm, silky-villous outside, accessory veins 4; teeth triangular, ca. 4 mm, apex spinescent-acuminate, puberulent inside. Corolla ca. 1.7 cm, sparsely white villous on upper lip outside; tube ca. 8 mm; upper lip ovate, concave, ca. 8 × 6 mm, base constricted, apex emarginate; lateral lobes broadly ovate, less than 1/3 as long as middle lobe. Ovary brown, glabrous. Fl. Aug.

Subalpine meadows. Xinjiang [Kazakhstan].

3. *Stachyopsis oblongata* (Schrenk ex Fischer & C. Meyer) Popov & Vvedensky, Trudy Turkestansk. Naucn. Obsc. 1: 121. 1923.

假水苏 jia shui su

Phlomis oblongata Schrenk ex Fischer & C. Meyer, Enum. Pl. Nov. 1: 29. 1841.

Herbs perennial. Stems unbranched, erect, 25–90 cm tall, much branched at middle and toward apex, pubescent. Petiole 0.5–3 cm, densely pubescent; mid stem leaf blades oblong-ovate, 6–11 × 2–4.5 cm, sparsely pubescent, base broadly cuneate, margin coarsely acute serrate, apex long acuminate; lateral veins 4 or 5 pairs. Verticillasters 3–3.5 cm in diam., in widely spaced spikes; floral leaves sessile, oblong-lanceolate, 4–6 × 1–1.8 cm; bracts rigid, spiny, 8–10 × 0.5 mm, puberulent, ciliate. Flowers sessile. Calyx obconical, ca. 1 cm, puberulent outside; teeth ca. 5 mm, triangular, apex spinescent-acuminate. Corolla purple-red, ca. 2 cm, sparsely white villous on upper lip and middle of lower lip outside; tube ca. 1 cm; upper lip ovate, concave, ca. 10 × 8 mm; lower

lip spreading, ovate, ca. 9 × 8 mm; middle lobe subentire, ca. 4 × 4 mm; lateral lobes ovate, ca. 2.5 mm. Ovary glabrous. Nutlets ovoid, triquetrous, ca. 3 × 2 mm, base cuneate, apex obliquely truncate, glabrous. Fl. Jul, fr. Aug-Sep.

Subalpine meadows, grassy slopes, thickets; 2000–2300 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

38. LEONURUS Linnaeus, Sp. Pl. 2: 584. 1753.

益母草属 yi mu cao shu

Herbs annual, biennial, or perennial, erect. Leaves 3–7-lobed, basal ± palmately lobed, usually deciduous at anthesis; stem leaves entire, incised, or 3-lobed. Verticillasters many flowered, in long spikes; bracteoles subulate or spinescent, rigid or flaccid. Calyx obconical or tubular-campanulate, 5-veined, obscurely 2-lipped; upper lip straight, 3-toothed; lower lip 2-toothed, teeth coalescent, spreading or slightly spreading. Corolla white, reddish, to purplish, 2-lipped, tube exerted; upper lip oblong, obovate, or ovate-orbicular, margin entire, straight, villous or glabrous; lower lip straight or spreading, spotted, 3-lobed, lobes oblong-ovate or middle lobe shallowly cordate, larger than ovate lateral lobes. Stamens 4, anterior 2 longer, posterior 2 parallel; anther cells 2, parallel. Style apex equally 2-cleft, lobes subulate. Nutlets acutely triquetrous, base cuneate, apex truncate.

About 20 species: Africa, Asia, Europe, North America, South America; 12 species in China.

- 1a. Calyx indistinctly 2-lipped; anterior teeth not spreading; corolla tube not dilated, with or without distinct hairy annulus inside, if hairy annulus present then horizontal; upper lip of corolla oblong, base inconspicuously constricted; lower lip of corolla limb nearly straight; middle lobe much larger than lateral lobes, apex conspicuously emarginate, margin membranous; stamens nearly straight; leaves 3-lobed.
 - 2a. Corolla less than 1 cm; without hairy annulus inside, puberulent 1. *L. chaituroides*
 - 2b. Corolla more than 1 cm, distinctly ± horizontally scaly annulate inside.
 - 3a. Leaves 3-lobed, lobes pinnately divided.
 - 4a. Lobules of leaves more than 3 mm wide; floral leaves entire or rarely few dentate; corolla 1–1.2 cm; lower lip ca. as long as upper lip; calyx appressed puberulent 2. *L. japonicus*
 - 4b. Lobules of leaves 1–3 mm wide, linear; floral leaves conspicuously 3-partite, lobules linear; corolla ca. 1.8 cm; lower lip ca. 3/4 as long as upper lip; calyx densely pilose especially at middle 3. *L. sibiricus*
 - 3b. Leaves many lobed, lobes incised or coarsely serrate-dentate.
 - 5a. Calyx teeth 5–10 mm; corolla 2.5–2.8 cm, reddish or reddish purple; leaves not corrugate, herbaceous 6. *L. macranthus*
 - 5b. Calyx teeth 3–5 mm; corolla 1.5–2.1 cm, white, somewhat purple lineate; leaves corrugate, rigid.
 - 6a. Plants densely villous 4. *L. villosissimus*
 - 6b. Plants hirsute or strigose-hirtellous 5. *L. pseudomacranthus*
 - 1b. Calyx distinctly 2-lipped; anterior teeth strongly spreading; corolla tube distinctly oblique hairy annulate inside, conspicuously dilated above hairy annulus; upper lip of corolla obovate, base constricted; lower lip of corolla limb horizontally spreading, its 3 lobes subequal, oblong-ovate, margin revolute; anterior stamens projected, reflexed; leaves 5–7-lobed.
 - 7a. Inflorescences densely lanate-villous; bracteoles flaccid 12. *L. pseudopanzerioides*
 - 7b. Inflorescences not lanate-villous; bracteoles rigid.
 - 8a. Bracteoles and calyxes appressed pubescent, setose 8. *L. wutaishanicus*
 - 8b. Bracteoles and calyxes appressed pubescent or appressed pubescent, white villous.
 - 9a. Leaves 7-palmatilobed to 1/3 of their radius; lobes irregularly coarse dentate 7. *L. urticifolius*
 - 9b. Leaves distinctly 5-palmatipartite from 2/3 to nearly entire radius; lobes pinnatilobulate, lobules linear to broadly lanceolate.
 - 10a. Leaves numerous, lower stem leaves not early deciduous, lobes broadly cuneate, lobules broadly lanceolate; anterior teeth of calyx dilated in flower 10. *L. turkestanicus*
 - 10b. Leaves few, lower stem leaves early deciduous, lobes narrowly cuneate to rhombic, lobules lanceolate to linear-lanceolate; anterior calyx teeth inconspicuously dilated in flower.
 - 11a. Basal part of stems, nodes, rachises of inflorescences, and calyxes appressed pubescent, subpatent white villous 11. *L. deminutus*
 - 11b. Stems and calyxes appressed gray pubescent 9. *L. glaucescens*

1. Leonurus chaituroides C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 161. 1965.

假鬃尾草 jia zong wei cao

Herbs annual or biennial. Rhizomes slender, trailing. Stems erect, 30–100 cm, densely retrorse puberulent, purple with age. Lower stem leaves early deciduous; petiole of mid stem leaves less than 1 cm; blade oblong to ovate, 2.5–4 × 1.5–2 cm, herbaceous, puberulent, abaxially gray-green, glandular, base cuneate, 3-partite 1/3–2/3 of leaf, apex

acuminate. Verticillasters 2–12-flowered, to 1.5 cm in diam., in widely spaced long spikes; floral leaves subsessile or short petiolate, reduced toward apex, linear to linear-lanceolate, 2–3 cm × 5–8 mm, base cuneate, margin entire or remotely 1- or 2-dentate, apex acuminate; bracteoles spiny, spreading or slightly reflexed, puberulent, 3–5 mm. Flowers sessile. Calyx turbinate slightly dilated at middle, urceolate in fruit, ca. 4 mm, gray-green, puberulent; anterior teeth subulate, 2.5–3 mm, apex spinescent, projected; posterior teeth equal, triangular, 1.5–2 mm, straight, apex spinescent. Corolla white

or purple-red, 7–8 mm; tube glabrous except for finely white pilose middle, sparsely fine pilose inside, 4–5 mm; limb finely white pilose; upper lip straight, ovate, concave; lower lip spreading, middle lobe obcordate, apex 2-lobulate, margin membranous; lateral lobes ovate. Nutlets chestnut brown, ovoid, triquetrous, ca. 2.5 mm, base cuneate, apex truncate, dotted. Fl. Sep, fr. Oct.

- Waste areas; 1000–1100 m. Anhui, Hubei, Hunan.

2. *Leonurus japonicus* Houttuyn, Nat. Hist. 9: 366. 1778.

益母草 yi mu cao

Leonurus artemisia (Loureiro) S. Y. Hu; *L. heterophyllus* Sweet; *Stachys artemisia* Loureiro.

Herbs annual or biennial. Taproots with dense, fibrous rootlets. Stems erect, 30–120 cm, retrorse strigose, nodes and angles densely strigose. Petiole of stem leaves 0.5–3 cm, narrowly winged at apex; lower stem leaf blades ovate, base broadly cuneate, 3-palmatifid; lobes oblong-rhombic to ovate, 2.5–6 × 1.5–4 cm, pinnately divided, adaxially strigose, abaxially pilose, glandular; mid stem leaf blade rhombic, palmatifid, lobes oblong-linear, base narrow cuneate. Verticillasters 8–15-flowered, 2–2.5 cm in diam.; floral leaves subsessile, linear to linear-lanceolate, 3–12 × 2–8 mm, entire or dentate; bracteoles spiny, shorter than calyx, ca. 5 mm, appressed puberulent. Flowers sessile. Calyx tubular-campanulate, 6–8 mm, appressed puberulent; teeth broadly triangular, 2–3 mm, apex spinescent. Corolla white or reddish to purplish red, 1–1.2 cm, villous; tube ca. 6 mm, inconspicuously scaly annulate inside; upper lip straight, concave, oblong, ca. 7 × 4 mm, margin entire, ciliate; lower lip slightly shorter, base sparsely scaly; middle lobe obcordate, base constricted, margin membranous, apex emarginate; lateral lobes ovate. Filaments sparsely scaly. Nutlets brownish, oblong, triquetrous, ca. 2.5 mm, base cuneate, apex truncate, smooth. Fl. Jun-Sep, fr. Sep-Oct.

Sunny areas; to 3400 m. In all provinces [Cambodia, Japan, Korea, Laos, Malaysia, Myanmar, Thailand, Vietnam; Africa, North America, South America].

Used medicinally.

3. *Leonurus sibiricus* Linnaeus, Sp. Pl. 2: 584. 1753.

细叶益母草 xi ye yi mu cao

Leonurus manshuricus Yabe; *L. sibiricus* var. *grandiflora* Benth.

Herbs annual or biennial. Stems erect, 20–80 cm, appressed strigose. Lower stem leaves early deciduous. Petiole of mid stem leaves ca. 2 cm; leaf blade ovate, ca. 5 × 4 cm, sparsely strigose, abaxially glandular, base broadly cuneate, 3-palmatisect; lobes narrowly oblong-rhombic, 3-lobulate, lobules linear, 1–3 mm wide; veins yellowish white abaxially. Verticillasters many flowered, 3–3.5 cm in diam.; upper floral leaves subrhombic, 3-palmatisect; lobes narrow, with 3 linear lobules 1–2 mm wide; bracteoles spiny, reflexed, shorter than calyx tube, 4–6 mm, strigose. Flowers sessile. Calyx tubular-campanulate, 8–9 mm, densely pilose at middle otherwise appressed puberulent; anterior teeth slightly spreading, subulate-triangular, 3–4 mm, apex spinescent; posterior teeth triangular, 2–3 mm, apex spinescent. Corolla white or reddish to purple-red, ca. 1.8 cm; tube ca. 9 mm, glabrous, scaly annulate inside; limb densely villous, glabrous

inside; upper lip oblong, straight, concave, ca. 10 × 5 mm, margin entire; lower lip ca. 7 × 5 mm, 3/4 as long as upper lip; middle lobe obcordate, base constricted, margin membranous, apex emarginate; lateral lobes ovate. Filaments sparsely scaly. Nutlets brown, oblong, triquetrous, ca. 2.5 mm, base cuneate, apex truncate. Fl. Jul-Sep, fr. Sep.

Stony or sandy grasslands, *Pinus* forests; to 1500 m. Hebei, Nei Mongol, Shaanxi, Shanxi [Mongolia, Russia].

4. *Leonurus villosissimus* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 601. 1977.

柔毛益母草 rou mao yi mu cao

Herbs annual. Stem erect, ca. 60 cm, solitary, striate, densely yellowish villous, much branched apically. Petiole of mid stem leaves 1–3.5 cm; leaf blade triangular-ovate, 5–6.5 × 5–5.5 cm, papery, densely yellowish villous, 3-lobed, base broadly cuneate, margin coarsely serrate-dentate, apex acute; middle lobe rhombic-oblong, ca. 4 × 2.5 cm, lateral lobes oblong, ca. 1.5 cm wide; upper leaves with petiole less than 5 mm, blade circular-ovate or ovate to subcircular, margin coarsely serrate-dentate, entire, or 3-lobed. Verticillasters many flowered; bracteoles spiny, straight, 5–6 mm. Flowers sessile. Calyx tubular, 0.8–1.2 cm, densely yellowish villous, golden glandular; tube 5–7 mm, slightly constricted at mouth, obscurely veined; teeth 3–5 mm, straight, broadly triangular-subulate, apex abruptly acuminate-spinescent, anterior teeth larger. Corolla 1.5–2.1 cm, densely gray-white sericeous-villous, scaly annulate inside, sparsely scaly-puberulent on posterior part of tube; tube 6–7 mm, gradually dilated to 3 mm in diam. at throat; upper lip oblong, spreading, ca. 9 × 4 mm, emarginate; lower lip ovate, ca. 7 × 5 mm, middle lobe obcordate, lateral lobes ovate. Filaments puberulent basally. Ovary brown, glabrous. Nutlets unknown. Fl. Aug.

- Sunny slopes; 500 m. Hebei (Yi Xian).

5. *Leonurus pseudomacranthus* Kitagawa, Bot. Mag. (Tokyo) 48: 109. 1934.

蓼菜 zan cai

Herbs perennial. Stem erect, 60–100 cm, solitary, branched toward apex, densely appressed retrorse puberulent. Petiole of basal leaves 1–2 cm, ± narrowly winged; leaf blade ovate, 6–7 × 4–5 cm, subequally 3-lobed, ± leathery, adaxially densely strigose-hirtellous, scabrid, corrugate, abaxially appressed hirtellous, yellowish glandular, base broadly cuneate, margin coarsely serrate-dentate, apex acute; mid stem leaves simple, with petiole less than 1 cm, leaf blade oblong, margin serrate-dentate. Verticillasters many flowered; floral leaves sessile, linear-oblong, ca. 3 × 1 cm, entire or 1- or 2-serrate-dentate; bracteoles few, spiny, straight, 5–6 mm, hispid. Flowers sessile. Calyx tubular, 7–8 mm, hirtellous, hirsute on veins, yellowish glandular, base stramineous; anterior teeth ca. 5 mm, straight, subulate, apex spinescent; posterior teeth equal, ca. 3 mm, straight, triangular-subulate, apex spinescent. Corolla white or with purple spots, ca. 1.8 cm, pilose; tube ca. 8 mm, scaly annulate inside; upper lip oblong-ovate, to 1 cm, subrounded, straight, margin entire; lower lip ovate, ca. 8 × 5 mm; middle lobe obcordate, 2-lobulate; lateral lobes ovate. Nutlets black-brown, oblong, triquetrous. Fl. Aug-Sep, fr. Sep-Oct.

- Slopes; 100–1200 m. Anhui, Gansu, Hebei, Henan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanxi.

6. *Leonurus macranthus* Maximowicz, Prim. Fl. Amur. 9: 476. 1859.

大花益母草 da hua yi mu cao

Plants perennial. Rhizomes woody. Stem erect, 60–120 cm, solitary, appressed retrorse strigose. Petiole of basal leaves ca. 2 cm; lower stem leaf blades cordate-orbicular, 7–12 × 6–9 cm, 3-lobed, sparsely minutely hispid, base cordate, margin incised, apex acute; mid stem leaves ovate. Verticillasters sessile, 8–12-flowered; floral leaves reduced, ovate to ovate-lanceolate, margin irregularly incised to subentire, apex long acuminate; bracteoles spiny, ca. 7 cm, hispid. Flowers subsessile. Calyx tubular-campanulate, 7–9 mm, strigose, with spinescent teeth, veins conspicuously elevated; anterior teeth subulate-triangular, ca. 1 cm; posterior teeth triangular, ca. 5 mm. Corolla reddish or reddish purple, 2.5–2.8 cm, densely pubescent, scaly annulate inside, scaly near lower lip; tube gradually dilated at apex, ca. 1/2 as long as corolla; upper lip straight, oblong, concave, ca. 12 × 5 mm, margin entire; lower lip ca. 8 × 5 mm, middle lobe ca. 2 × as long as ovate lateral lobes, obcordate, conspicuously emarginate. Nutlets black-brown, oblong, triquetrous, ca. 2.5 mm, base cuneate, apex truncate. Fl. Jul-Sep, fr. Sep.

Grassy slopes, thickets; to 400 m. Hebei, Jilin, Liaoning [Japan, Russia].

7. *Leonurus urticifolius* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 601. 1977.

荨麻叶益母草 qian ma ye yi mu cao

Plants perennial. Rhizomes woody. Stems erect, 30–50 cm, finely striate, sparsely pubescent, angles densely so. Petiole of mid stem leaves 2.5–5.5 cm; leaf blade broadly ovate-cordate, palmately 7-lobed, gray pubescent, densely so along margin and on veins abaxially otherwise yellowish glandular, base cordate, margin coarsely dentate, apex acute; upper leaves gradually reduced, ovate, similar to basal leaves but with shorter petioles. Verticillasters many flowered, subglobose, less than 2 cm in diam.; bracts purplish, spiny, spreading or reflexed, to 7 mm, base slightly dilated. Flowers sessile. Calyx dark purple, campanulate-tubular, ca. 6 mm, base stramineous, densely gray puberulent, veins inconspicuous; teeth broadly triangular-subulate, anterior teeth subequal, ca. 2 mm, spreading. Corolla reddish, to 1.2 cm, gray pubescent; tube ca. 7 mm, villous annulate inside, dilated beyond annulus, to 2.5 wide at throat; upper lip obovate, ca. 5 × 2.5 mm, concave, incurved; lower lip obliquely spreading, ca. 4 mm, lobes ovate, middle lobe larger. Ovary brown, apex truncate, villous. Fl. Jun.

• Forest margins; 3200 m. Xizang (Gyirong Xian).

8. *Leonurus wutaishanicus* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 164. 1965.

五台山益母草 wu tai shan yi mu cao

Herbs erect. Rhizomes woody. Stem erect, 60–90 cm, solitary, angles retrorse puberulent, nodes densely pilose. Petiole of stem leaves 1–1.2 cm; leaf blade subcircular, ca. 5 cm in diam., palmately 5-partite, pilose, abaxially glandular, base cordate; lobes oblong, ca. 1 cm wide, margin irregularly serrate, apex caudate-acuminate. Verticillasters to 1.5 cm in diam., many flowered, in spikes 5–20 cm; floral leaves with petioles 1–1.5 cm, blade narrowly rhombic, 3-partite, base

cuneate, lobes linear-lanceolate; bracts spiny-aristate, 3–5 mm, pilose. Flowers sessile. Calyx obconical, densely puberulent, pilose, conspicuously veined, tube ca. 4 mm; teeth triangular, anterior teeth narrow, ca. 2.5 mm; posterior teeth 2 mm, spinescent, reflexed in fruit. Corolla ca. 8 mm; tube ca. 4 mm, pilose, obliquely pilose annulate inside, conspicuously dilated beyond annulus; upper lip straight, slightly concave, oblong-ovate, pilose; lower lip horizontally spreading, middle lobe largest, lateral lobes ovate. Immature nutlets brown, triquetrous, oblong, base cuneate, apex truncate. Fl. Jul, fr. Aug-Sep.

• Slopes; 2100 m. Shanxi.

9. *Leonurus glaucescens* Bunge in Ledebour, Fl. Altaic. 2: 409. 1830.

灰白益母草 hui bai yi mu cao

Herbs biennial or perennial. Stems erect, 50–100 cm, branched. Petiole of mid stem leaves ca. 1.5 cm; leaf blade circular, ca. 5 cm in diam., palmately 5-partite nearly to base, short strigose, base subtruncate; lobes cuneate to rhombic, pinnately divided into linear to linear-lanceolate segments. Verticillasters 1.5–1.8 cm in diam., numerous; floral leaves with petiole ca. 2 cm, blade rhombic, ca. 4 cm, 3-lobed, base cuneate, lobe margin entire or linear incised; bracteoles spiny, slightly reflexed, appressed pubescent, shorter than calyx tube. Calyx obconical, appressed pubescent, conspicuously veined, tube ca. 4 mm; teeth subulate, spinescent; anterior teeth spreading, 3–3.5 mm; posterior teeth ca. 2.5 mm. Corolla reddish purple, 1–1.2 cm, villous; tube ca. 5 mm, villous annulate inside; upper lip straight, concave, narrowly ovate; lower lip horizontally spreading, narrowly ovate, middle lobe ovate, lateral lobes oblong. Ovary brown, apex truncate, puberulent. Fl. Jul.

Pastures, valleys, thickets; 400–900 m. Nei Mongol [Kazakhstan, Mongolia, Russia].

10. *Leonurus turkestanicus* V. Kreczetovicz & Kuprianova, Bot. Mater. Gerb. Inst. Komarova Akad. Nauk SSSR 11: 134. 1949.

突厥益母草 tu jue yi mu cao

Plants perennial. Rhizomes woody. Stems purple-red, numerous, much branched, 0.7–1.5(–2) m tall, glabrous. Petiole of stem leaves 2–5 cm; leaf blade circular to ovate-orbicular, 6–10 × 4–6 cm, palmatipartite, sparsely villous, abaxially glandular, base broadly cuneate to shallowly cordate; lobes ± broadly cuneate, pinnately divided into broadly lanceolate, apically obtuse segments. Verticillasters 15–20-flowered, to 2 cm in diam., in widely spaced spikes 10–30 cm; floral leaves narrowly rhombic, 3-partite, base cuneate; bracts spiny, spreading or reflexed, 4–6 cm. Flowers sessile. Calyx campanulate, slightly saccate toward apex, appressed fine puberulent, gray-green at apex, veins slightly elevated, tube ca. 6 mm; teeth triangular, spinescent; anterior teeth spreading, ca. 5 mm, narrow; posterior teeth equal, ca. 3 mm. Corolla reddish, ca. 1 cm, villous; tube ca. 6 mm, obliquely villous annulate inside, dilated beyond annulus; upper lip obovate, concave, curved forward; lower lip with ovate lobes, middle lobe larger. Nutlets gray-brown, triquetrous, oblong, ca. 2 mm, base cuneate, apex truncate, puberulent. Fl. Jul-Aug, fr. Aug-Sep.

Slopes, floodplains, streamsides; 1000–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan].

11. Leonurus deminutus V. Kreczetovicz ex Kuprianova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 11: 134. 1949.

兴安益母草 xing an yi mu cao

Herbs biennial or perennial. Stems erect, ca. 60 cm, appressed pubescent. Petiole 1.7–2 cm; blade of mid and upper leaves subcircular, ca. 4.5 cm in diam., palmately 5-partite, short strigose, base broadly cuneate; lobes rhombic, pinnately divided. Verticillasters numerous, in interrupted spikes; floral leaves with petiole ca. 2 cm, blade rhombic, 2.5–3 cm, 3-partite, base cuneate, lobes entire or linear incised; bracteoles spiny, slightly reflexed, appressed pubescent, villous, 3–4 mm. Calyx obconical, appressed pubescent, tube ca. 3 mm; veins conspicuous, villous; teeth 2–3 mm, broadly triangular, long spinescent, anterior teeth spreading. Corolla purplish, ca. 8 mm, villous; tube ca. 4 mm, pilose annulate inside; upper lip straight, oblong; lower lip horizontally spreading, middle lobe larger. Nutlets brownish, triquetrous, oblong, ca. 1.5 × 1 mm, adaxially ribbed, apex truncate, puberulent. Fl. Jul, fr. Aug.

Forested slopes; 800–900 m. Nei Mongol [Mongolia, Russia].

The species was treated in FRPS as *Leonurus tataricus* Linnaeus.

12. Leonurus pseudopanzerioides Krestovskaya, Bot. Zurn. SSSR 73: 1749. 1988.

绵毛益母草 mian mao yi mu cao

Herbs perennial. Rhizomes woody. Stems erect, 50–80 cm, few, appressed puberulent, sparsely spreading pilose, lanate-pilose at insertion of verticillasters. Petiole of mid stem leaves 1.5–2.5 cm; leaf blade circular, 4–5 cm in diam., palmately 5-partite almost to base, sparsely puberulent, glandular, base cordate; lobes rhombic, pinnately divided into linear-lanceolate segments. Verticillasters to 2 cm in diam., 12–18-flowered, lanate-pilose, numerous, in spikes 5–10(–15) cm; floral leaves with petiole 1–2 cm, blade narrowly rhombic, 1–2.5 cm, 3-lobed, lobes entire or dentate; bracteoles spiny, curved upward, slightly shorter than calyx, villous. Calyx obconical, 6–8 mm, lanate-pilose, obscurely veined, tube ca. 5 mm; teeth broadly triangular, apex acute; anterior teeth spreading, ca. 2.5 mm; posterior teeth equal, straight, ca. 1.5 mm. Corolla reddish or purple-red, ca. 1.2 cm, pilose, villous annulate inside; tube ca. 6 mm; upper lip straight, concave, oblong-ovate, margin entire; lower lip horizontally spreading, lobes ovate, middle lobe larger. Immature nutlets yellow-brown, triquetrous, oblong, base cuneate, apex truncate, villous, Fl. Jul–Aug.

Dry slopes, hilltops; 1100–1800 m. Xinjiang [Mongolia].

The species was treated in FRPS as *Leonurus panzerioides* M. Popov.

39. PANZERINA Soják, Cas. Nár. Muz. v Praze 150: 216. 1981.

脓疮草属 nong chuang cao shu

Herbs perennial. Stems solitary or numerous. Leaves long petiolate, palmately lobed. Verticillasters axillary, many flowered, in spikes; bracteoles spiny, spreading or erect, shorter than calyx tube. Flowers sessile. Calyx tubular-campanulate, conspicuously 5-veined; teeth 5, broadly triangular, apex spinescent, 2 anterior teeth ± longer than posterior 3. Corolla white to yellow-white, 2–4 cm, 2-lipped; tube ca. as long as calyx tube, without hairy annulus inside; upper lip straight, galeate, densely villous outside; lower lip straight, 3-lobed; middle lobe cordate, margin membranous. Stamens 4, parallel, anterior 2 slightly longer; anthers ovoid, cells 2, transversely dehiscent, parallel. Style filiform, slightly exerted or as long as stamens, apex equally 2-cleft. Nutlets triquetrous, ovoid, apex rounded.

Two species: China, Mongolia, Russia; both in China.

Some authors have recognized to seven species, but these are connected by many transitional forms.

- 1a. Plant sparsely soft gray pubescent or almost glabrous; verticillasters usually in lax spikes 1. *P. canescens*
1b. Plant ± densely white tomentose; verticillasters in short dense spikes 2. *P. lanata*

1. Panzerina canescens (Bunge) Soják, Cas. Nár. Muz. v Praze 150: 216. 1981.

灰白脓疮草 hui bai nong chuang cao

Panzeria canescens Bunge, Delect. Sem. Horto. Bot. Dorpat: 15. 1839; *Leonurus canescens* (Bunge) Benth; *L. bungeanus* Schischkin.

Herbs perennial. Taproots woody. Stems many, 30–35 cm, sparsely villous. Petiole 2–4.5 cm; leaf blade broadly ovate, 3–4 cm wide; stem leaves palmately 5-partite from 1/2 its length nearly to base, villous, abaxially with scattered yellowish glands. Verticillasters 8–14-flowered, in long terminal spikes; floral leaves 1–3 cm wide, 3-partite; bracteoles rigid, linear-subulate, spreading, ca. 1 cm, spinescent. Calyx tubular-campanulate, ca. 1.6 cm, sparsely pubescent, tube ca. 1.1 cm; teeth narrowly triangular, apex long spinescent, anterior teeth 6.5–7.5 mm, posterior teeth ca. 4.5 mm. Corolla 2.5–3 cm, long villous, tube ca. 1.1 cm; upper lip straight, oblong, galeate; lower lip oblong, subpatent; middle lobe larger, obcordate, 2-lobulate; lateral lobes ovate. Fl. Jul.

Stony dry areas. Xinjiang [Mongolia, Russia].

2. Panzerina lanata (Linnaeus) Soják, Cas. Nár. Muz. v Praze 150: 216. 1981.

绒毛脓疮草 rong mao nong chuang cao

Herbs perennial. Stems numerous, much branched, base ± woody, minute tomentose. Stem leaves circular to broadly ovate, 3.5–6 cm in diam., palmately 5-lobed to 1/2 its length to palmately partite, abaxially white tomentose or long villous; lobes cuneate, pinnately divided or crenate. Verticillasters many flowered; floral leaves 3-partite; bracteoles subulate, spinescent, tomentose or villous. Calyx densely tomentose or long villous, tube 1.3–1.5 cm; teeth triangular, apex spinescent, anterior teeth 3.5–7 mm, posterior teeth 2–4 mm. Corolla yellowish or white, 2–3.5 cm, silky-villous, tube ca. 2 cm. Nutlets ca. 2–3 mm. Fl. Jul.-Sep.

Stony, sandy desert steppes; 900–2700 m. Gansu, Nei Mongol, Ningxia, Shaanxi, Xinjiang [Mongolia, Russia].

- 1a. Stems sparsely minute tomentose; calyx teeth narrowly triangular, apex long spinescent, anterior teeth to 7 mm; corolla 3–3.5 cm 2a. var. *lanata*
- 1b. Stems densely tomentose; calyx teeth short subulate-spinescent.
 - 2a. Corolla 2–2.2 cm 2e. var. *parviflora*
 - 2b. Corolla 3–3.5 cm.
 - 3a. Anterior calyx teeth 5–6 mm 2c. var. *albescens*
 - 3b. Anterior calyx teeth 3.5–4 mm.
 - 4a. Leaves palmatifid for 3/4–2/3 their length, lobes narrowly cuneate, 2–8 mm wide 2b. var. *alaschanica*
 - 4b. Leaves palmatifid for 2/3 1/2 their length, lobes broadly cuneate, 4–10 mm wide 2d. var. *argyracea*

2a. Panzerina lanata var. lanata

绒毛脓疮草 rong mao nong chuang cao

Ballota lanata Linnaeus, Sp. Pl. 2: 582. 1753; *Leonurus lanata* (Linnaeus) Persoon; *Panzeria lanata* (Linnaeus) Bunge, *P. tomentosa* Moench.

Stems sparsely minute tomentose. Calyx teeth narrowly triangular, apex long spinescent, anterior teeth to 7 mm. Corolla 3–3.5 cm.

Stony sandy desert steppes. Gansu, Nei Mongol [Mongolia, Russia].

2b. Panzerina lanata var. alaschanica (Kuprianova) H. W. Li, Novon 3: 264. 1993.

脓疮草 nong chuang cao

Panzeria alaschanica Kuprianova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 15: 363. 1953.

Leaves palmatifid for 2/3–3/4 their length, lobes narrowly cuneate, 2–8 mm wide.

• Sandy areas; 900–1400(–2700?) m. Nei Mongol, Ningxia, Shaanxi, Xinjiang.

2c. Panzerina lanata var. albescens (Kuprianova) H. W. Li, Novon 3: 264. 1993.

变白变种 bian bai bian zhong

Panzeria albescens Kuprianova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 15: 363. 1953.

Stems densely tomentose. Calyx teeth short subulate-spinescent, anterior teeth 5–6 mm. Corolla 3–3.5 cm.

Desert steppes, sandy areas. Gansu, Nei Mongol, Xinjiang [Mongolia, Russia].

2d. Panzerina lanata var. argyracea (Kuprianova) H. W. Li, Novon 3: 264. 1993.

银白变种 yin bai bian zhong

Panzeria argyracea Kuprianova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 15: 364. 1953.

Leaves palmatifid for 1/2–2/3 their length; lobes broadly cuneate, 4–10 mm wide. Calyx teeth short subulate-spinescent, anterior teeth 3.5–4 mm. Corolla 3–3.5 cm.

Nei Mongol [Mongolia, Russia].

2e. Panzerina lanata var. parviflora (C. Y. Wu & H. W. Li) H. W. Li, Novon 3: 264. 1993.

小花变种 xiao hua bian zhong

Panzeria parviflora C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 164. 1965.

Stems densely tomentose. Calyx teeth short subulate-spinescent. Corolla 2–2.2 cm.

• Dry areas. Xinjiang.

40. LAGOCHILUS Bunge ex Bentham, Labiat. Gen. Spec. 640. 1834.

兔唇花属 tu chun hua shu

Subshrubs or perennial herbs. Rootstocks woody. Stems green-white, rigid, sparsely hirsute. Leaf blade rhombic, palmatifid or pinnatifid; lobes spinescent, sometimes subtending sterile spinescent bracteoles. Verticillasters 2–10-flowered. Calyx campanulate to tubular-campanulate, 5-veined; throat oblique, straight; teeth 5, subequal or 3 posterior teeth longer, triangular to oblong or broadly ovate, usually longer than tube, apex spinescent. Corolla villous outside, pilose annulate inside, 2-lipped; upper lip oblong, straight, slightly concave, 2-lobed or 4-toothed; lower lip obliquely spreading, 3-lobed; middle lobe largest, obcordate, 2-lobulate; lateral lobes straight, acute, or emarginate. Stamens 4, exerted or subincluded, anterior 2 longer; filaments complanate; anther cells 2, parallel or divergent, ciliate. Style filiform, apex subequally 2-cleft. Nutlets flattened-obconical, oblong-obovoid or oblong-ovoid, apex truncate or rounded, glandular, dusty hairy, scaly or glabrous, smooth.

About 35 species: Asia, 11 species in China.

- 1a. Leaf axils of sterile branches without spinescent bracteoles.
 - 2a. Calyx tube oblong-lanceolate 4. *L. ilicifolius*
 - 2b. Calyx teeth triangular.

- 3a. Calyx tube and bracteoles glabrous 2. *L. bungei*
 3b. Calyx tube and bracteoles hairy.
 4a. Calyx teeth erect or slightly oblique, subequal, tube densely bristly; bracteoles densely strigose, capitate glandular 1. *L. hirtus*
 4b. Calyx teeth projected, 2 anterior shorter, tube sparsely hairy at base; bracteoles spreading hairy 3. *L. pungens*
- 1b. Leaf axils with spinescent bracteoles.
 5a. Calyx teeth 4, rarely 5; apical leaf blade broadly cuneate or flabellate, awned-serrate toward apex 7. *L. xinjiangensis*
 5b. Calyx teeth 5; leaf blade broadly cuneate to rhombic, deeply divided or lobed.
 6a. Calyx teeth ovate to broadly ovate, shorter than to as long as tube.
 6b. Calyx teeth oblong or lanceolate, longer than tube.
 7a. Leaf base cuneate to round; blade 1- or 2-pinnatipartite 8. *L. grandiflorus*
 7b. Leaf base cuneate; blade 3-lobed, lobes toothlike or ovate-oblong.
 8a. Leaf blade broadly rhombic, lobes obtuse, spinescent; nodes glabrous 5. *L. diacanthophyllus*
 8b. Leaf blade cuneate-rhombic, lobes spinescent-aristate; basal nodes lanate, apical nodes tomentose 6. *L. lanatonodus*
 9a. Spinescent bracteoles glabrous; calyx tube sparsely villous; upper lip of corolla 2-cleft, middle lobe of lower lip short 2-toothed, lateral lobes dentate 11. *L. kaschgaricus*
 9b. Spinescent bracteoles sparsely hispid or villous; calyx tube densely villous or tomentose, glandular hairy; upper lip of corolla 2- or 3-lobulate, middle lobe of lower lip 2-lobulate or entire.
 10a. Calyx teeth ovate, apex acute, tube sparsely tomentose; lobes of upper lip of corolla 2-lobulate, lobes of lower lip entire 10. *L. platyacanthus*
 10b. Calyx teeth broadly ovate, apex rounded, tube densely villous; lobes of upper lip of corolla many lobulate, lobes of lower lip 2-toothed at apex 9. *L. macrodontus*

1. *Lagochilus hirtus* Fischer & C. Meyer, Enum. Pl. Nov. 32. 1841.

硬毛兔唇花 ying mao tu chun hua

Lagochilus brachyacanthus C. Y. Wu & Hsuan.

Herbs perennial. Stems ca. 16 cm, much branched, sparsely strigose. Petiole 5–8 mm, absent in apical leaves; leaf blade cuneate, 1.2–2 cm × 7–12 mm, 3-lobed, papery, base attenuate, forming a winged petiole; lobes of basal leaves with 2 or more triangular lobules, short spinescent, glabrous, dusty glandular. Verticillasters 4–6-flowered; bracteoles spinescent, 4–7 mm. Calyx narrowly campanulate, ca. 13 × 6.5 mm, densely bristly; teeth triangular, subequal, 4–5 mm, straight or slightly oblique. Corolla ca. 2.6 cm; limb sparsely hairy, densely glandular; upper lip straight, lobes ca. 5 mm, apex rounded to truncate; middle lobe of lower lip ca. 2.5 × 6.5 mm, apex 2-lobulate, lobules and lateral lobes triangular. Anterior stamens to 1/2 as long as upper corolla lip. Ovary glabrous.

Gravelly slopes. Xinjiang [Kazakhstan].

2. *Lagochilus bungei* Benth, Labiat. Gen. Spec. 641. 1834.

阿尔泰兔唇花 a er tai tu chun hua

Lagochilus altaicus C. Y. Wu & Hsuan.

Herbs perennial. Stems to 24 cm, base glabrous, apex sparsely hirsute. Petiole to 2.5 cm, winged in basal leaves, obsolete in upper leaves; leaf blade cuneate, 1–1.5 × 0.5–2 cm, pinnatipartite; lobes oblong, 2–7 mm, transparent glandular, apex mucronate or rounded, not spinescent. Verticillasters ca. 6-flowered; bracteoles spinescent, to 7 mm, glabrous. Calyx campanulate, ca. 10 × 6 mm, glabrous; teeth triangular, ca. 2 mm, subequal, apex spinescent, spines 1.5–2 mm. Corolla reddish, 2.5 cm, white villous; upper lip 1.7–1.9 cm × 7 mm, lobules subtruncate; lower lip 1–1.1 cm, pubescent; middle lobe obcordate, ca. 4 × 9 mm; lateral lobes triangular, ca. 3 mm. Anterior stamens ca. 1.1 cm, posterior stamens 8–9 mm; filament base pubescent. Ovary glabrous.

Nutlets flattened-obconical, ca. 2.5 × 1.7 mm, apex truncate. Fl. Jul, fr. Sep.

Dry slopes; 500 m. Xinjiang [Kazakhstan].

Kazakhstan material so named differs by the hairy calyx.

3. *Lagochilus pungens* Schrenk, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg 2: 195. 1844.

锐刺兔唇花 rui ci tu chun hua

Lagochilopsis pungens (Schrenk) Knorrning.

Herbs perennial. Stems numerous, 15–25 cm, branched, base woody, spreading hairy. Leaves leathery, cuneate, 3–5-lobed, glabrous, glandular; lobes triangular or circular, apical spine 2–2.5 mm. Verticillasters 6–10-flowered; bracteoles 7–12 mm, linear-subulate, sparsely spreading hairy. Calyx tubular-campanulate; teeth triangular, 3–5 mm, anterior teeth shorter than posterior teeth, ca. 1/2 as long as to longer than tube, apical spine ca. 2.5 mm; tube sparsely hairy toward base. Corolla reddish, ca. 2 × as long as calyx; upper lip lobes linear; middle lobe of lower lip with 2 broadly ovate lobules, lateral lobes ovate-triangular. Stamens nearly as long as corolla. Nutlets smooth. Fl. May–Jul.

Hilly or desert grasslands dominated by *Artemisia*. Xinjiang [Kazakhstan, Mongolia].

4. *Lagochilus ilicifolius* Bunge ex Benth, Labiat. Gen. Spec. 641. 1834.

冬青叶兔唇花 dong qing ye tu chun hua

Herbs perennial. Stems branched, diffuse, 10–20 cm, base woody, white minutely hispid. Leaves sessile; leaf blade cuneate-rhombic, ca. 10 × 5–9 mm, firmly leathery, glabrous, base cuneate, apex 3–5-incised-toothed; teeth short awned, whitish green. Verticillasters 2–4-flowered; bracteoles spinescent, ca. 8 mm, glabrous. Calyx tubular-campanulate, ca. 12 × 6 mm, whitish green, firmly leathery, glabrous; teeth ca. 5 mm, oblong-lanceolate, apex short spinescent, posterior tooth ca. 7 mm. Corolla yellowish with distinct purple-brown veins, 2.5–2.7 cm; upper lip ca. 1.8 × 0.6 cm, white lanate

outside, white strigose inside; lower lip ca. 1.5×1 cm, 3-partite, puberulent outside, glabrous inside; middle lobe obcordate, ca. 8×10 mm, apex 2-lobulate; lateral lobes ovate, ca. 4.2×3.5 mm, apex 2-toothed. Posterior stamens ca. 2 cm, anterior ca. 2.4 cm. Ovary glabrous. Fl. Jul-Sep, fr. Oct.

Sandy areas, thickets on gentle slopes in semideserts; 800–2000 m. Gansu, Nei Mongol, Ningxia, Shaanxi [Mongolia, Russia].

5. *Lagochilus diacanthophyllus* (Pallas) Bentham, Labiat. Gen. Spec. 641. 1834.

二刺叶兔唇花 er ci ye tu chun hua

Moluccella diacanthophyllum Pallas, Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 10: 380. 1797; *Lagochilus chingii* C. Y. Wu & Hsuan; *L. obliquus* C. Y. Wu & Hsuan.

Herbs perennial. Stems 15–25 cm, white, base woody, branched, sparsely villous, apex and nodes glabrous. Petiole of basal leaves to 2 cm, narrowly winged, upper leaves subsessile; leaf blade broadly rhombic, $2-3.5 \times 1.5-2.5$ cm, papery, adaxially sparsely minutely hispid, abaxially densely white transparent glandular, base attenuate-decurrent, pinnatipartite; basal lobes with 3 circular to oblong, apically awned to spinescent lobules. Verticillasters 4–6-flowered; bracteoles white-green, needlelike or subulate, 0.4–1.6 cm, glabrous, apex spinescent. Calyx campanulate, ca. 1.7×0.7 cm, glabrous; teeth oblong, anterior teeth ca. 5 mm; posterior teeth 7–8 mm, obtuse, mucronate, margin ciliolate. Corolla purplish, ca. 3.4 cm, densely pubescent, base glabrous; upper lip \pm straight, ca. 2 cm, margin villous, lobes ovate, apex 2- or 4-toothed; lower lip ca. 1.6 cm, middle lobe obcordate, ca. 6×9 mm; lateral lobes triangular, ca. 4×2.5 mm, glabrous, obtuse. Anterior stamens ca. 1.6 cm, posterior stamens ca. 1.4 cm. Ovary apex white scaly. Fl. Jul-Aug.

Sandy or gravelly dry slopes, valleys; 1100–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan].

6. *Lagochilus lanatonodus* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 216. 1965.

毛节兔唇花 mao jie tu chun hua

Herbs perennial. Stems 15–25 cm, much branched, woody, minutely hispid; nodes \pm swollen, basal nodes lanate, surrounded by persistent sheaths, upper nodes tomentose. Leaves cuneate-rhombic, $1-1.6 \times 0.7-1.4$ cm, leathery, adaxially glabrous or sparsely minutely hispid, abaxially pubescent or glabrous, base cuneate, apex 3-lobed; lobes 3–5-lobulate, spinescent-aristate. Verticillasters 2-flowered; bracteoles spinescent, 4–12 mm, glabrous. Calyx tubular-campanulate, ca. 1.8×0.8 cm, teeth to as long as tube or rarely longer, narrowly oblong-lanceolate, leathery, netted, obtuse, apex short spinescent. Corolla reddish, ca. 3 cm, pubescent; upper lip straight, ca. 2×0.7 cm, white villous outside; lower lip ca. 1.7×0.9 cm; middle lobe obcordate, ca. 8×8 mm, apex 2-lobulate; lateral lobes lanceolate, ca. 4×2 mm, apex 2-toothed. Anterior filaments ca. 1.8 cm, posterior filaments 1.5 cm. Ovary tuberculate. Nutlets black-brown, flattened-obconical, ca. 4×2 mm, dusty hairy, apex truncate. Fl. Jun-Aug.

• Dry hills, stony desert steppes; 900–2400 m. Xinjiang.

7. *Lagochilus xinjiangensis* G. J. Liu, Bull. Bot. Res. 5(1): 132. 1985.

新疆兔唇花 xin jiang tu chun hua

Herbs perennial. Stems 6–20 cm, base branched, rigid, creamy white, pubescent; nodes swollen, tomentose, basal ones lanate, surrounded by persistent brown sheaths. Basal leaves long petiolate, upper stem leaves sessile; basal leaf blade broadly cuneate, margin incised; lobules awned, apex 3-cleft; upper leaf blade broadly cuneate or flabellate, $8-12 \times 6-10$ mm, herbaceous, sparsely whitish hispid, glandular puberulent, base cuneate, margin regularly serrate apically; teeth ca. 2 mm, awned, apex obtuse. Verticillasters 2-flowered; bracteoles spinescent, 0.5–2 cm, glabrous. Calyx narrowly campanulate, 0.8–1.5 cm, whitish hispid, glandular puberulent; teeth 4 (or 5), to slightly longer than calyx, oblong-lanceolate, leathery, netted, obtuse, apex short spinescent. Corolla rose, ca. 2 cm, puberulent; upper lip straight, ca. 12×4 mm, oblong, rounded, villous outside, with ovate, apically retuse lobules; lower lip ca. 10×5 mm, middle lobe oblong, ca. 5 mm, apex 2-lobulate; lateral lobes ca. 3 mm, lanceolate, rounded. Anterior filaments ca. 1.1 cm, posterior ca. 9 mm. Fl. Jun, fr. Aug.

• Xinjiang (Urumqi shi).

8. *Lagochilus grandiflorus* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 217. 1965.

大花兔唇花 da hua tu chun hua

Herbs perennial. Stems 10–30 cm tall, much branched from base, \pm diffuse, white when dry, minutely hispid. Leaves broadly ovate, $2.8-4 \times 2.2-3.2$ cm, leathery, adaxially sparsely minutely hispid, glandular, abaxially pubescent and more densely glandular, base cuneate to rounded, 1- or 2-pinnatipartite; lobes 2.2–4.2 mm wide, apex rounded or acute, short spinescent. Verticillasters ca. 6-flowered; bracteoles yellow-white, needlelike, 2–15 mm, sparsely white ciliate, margin glabrescent. Calyx narrowly tubular-campanulate, ca. 2.3×0.7 cm, densely puberulent, glandular, glabrous on tube otherwise pubescent inside; teeth oblong, $9-14 \times 3.5-4.5$ mm, leathery, acute, apex short spinescent. Corolla reddish, ca. 4.6 cm, white villous; upper lip ca. 3×1.1 cm, glabrous inside, lobes 2-lobulate; lower lip obovate-cuneate, ca. 2.5×1.2 cm; middle lobe ca. 11×5 mm, apex 2-lobulate; lateral lobes ovate, ca. 5×4 mm, emarginate. Anterior stamens ca. 2.8 cm, posterior stamens ca. 2.3 cm. Ovary glabrous. Fl. Jun.

• Rocky slopes. Xinjiang.

9. *Lagochilus macrodontus* Knorring, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 13: 236. 1950.

大齿兔唇花 da chi tu chun hua

Lagochilus iliensis C. Y. Wu & Hsuan.

Herbs perennial. Stems ca. 30 cm tall, white, sparsely minutely hispid, base branched, subglabrous. Petiole 2–4 mm; leaf blade rhombic-triangular, $2.2-3 \times 2.1-3$ cm, leathery, minutely hispid, densely so abaxially, glandular, pinnatipartite, base abruptly attenuate into a narrowly winged petiole; lobes ovate to oblong, basal 2 3-partite or pinnatipartite, apex rounded, short spinescent. Verticillasters 4–8-flowered; bracteoles subulate, horizontal or slightly reflexed, 0.8–1.5 cm, apex spreading hispid, base glabrescent. Calyx narrowly campanulate, ca. 1.9×0.7 cm; teeth broadly ovate, ca. $6 \times 4.5-5.5$ mm, netted, apex rounded, short spinescent; tube densely spreading villous, glandular hairy. Corolla rose, $2.5-3 \times$ as long as calyx; upper lip straight,

lobes many lobulate, margin villous; middle lobe of lower lip 2-lobed, lobules ovate to circular, all lobes 2-toothed at apex.

Dry, gravelly slopes. Xinjiang [Kyrgyzstan, Tajikistan].

10. *Lagochilus platyacanthus* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg 14: 68. 1869.

阔刺兔唇花 kuo ci tu chun hua

Herbs perennial. Stem 15–25 cm, branched from base, strigose. Petiole 0.5–1.7 cm, winged; leaf blade rhombic in outline, upper blades circular, pinnatifid; lobes linear or ovate, margin ciliate, apex acute. Verticillasters 4–8-flowered; bracteoles lanceolate, 7–12 mm, apex conspicuously awned spinescent, densely villous, capitate glandular. Calyx narrowly campanulate; tube sparsely tomentose, glandular hairy; teeth ovate, acute, 6–7 × 4–5 mm. Corolla ca. 2 × as long as calyx; lobes of upper lip 2-lobulate; middle lobe of lower lip emarginate, lateral lobes oblong.

Dry, gravelly slopes. Xinjiang [Kyrgyzstan, Tajikistan].

Non-Chinese material so named has the calyx tube densely tomentose outside.

11. *Lagochilus kaschgaricus* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg 14: 67. 1869.

喀什兔唇花 ka shi tu chun hua

Herbs perennial. Stems numerous, 15–19 cm tall, gray whitish, glabrous, pubescent toward apex. Leaf blade broadly rhombic, 1- or 2-pinnatifid, glabrous or sparsely villous, base attenuate into a short wide petiole; lobes oblong, margin involute and ciliolate, apex obtuse or acute, with spines 1–1.5 mm. Verticillasters 4–6-flowered; bracts robust, needlelike-spinescent, spreading, 1.5–2.3 cm, glabrous. Calyx tubular-campanulate, tube sparsely villous; teeth broadly ovate, 6–8 × 5 mm, apex spinescent-subacute, spines ca. 1 mm. Corolla rose, ca. 2 × as long as calyx; upper lip much longer than lower lip, lobules 3-toothed; middle lobe of lower lip emarginate, lateral lobes oblong, apex 2-toothed.

Dry slopes. Xinjiang [Kyrgyzstan].

41. *ERIOPHYTON* Bentham, Edward's Bot. Reg. 15: t. 1289. 1829.

绵参属 mian shen shu

Herbs perennial, lanate. Roots thick, terete. Leaf blade rhombic to subcircular, lower stem leaves sometimes reduced, scalelike. Verticillasters 6-flowered, compact or basally widely spaced; bracteoles spinelike. Flowers sessile. Calyx broadly campanulate, ± transparent, 10-veined; teeth 5, subequal, triangular, apex acuminate. Corolla purplish to reddish, 2-lipped; tube included, without hairy annulus inside; upper lip broad, galeate, incurved, covering lower lip; lower lip subpatent, 3-lobed; middle lobe slightly larger than lateral lobes, emarginate to rounded; lateral lobes circular. Stamens 4, anterior 2 longer, apex dentate, ascending beneath upper lip. Posterior filaments basally thickened; anthers close together in pairs, cells 2, apex divaricate, confluent, villous. Style apex subequally 2-cleft, lobes subulate. Ovary glabrous. Nutlets broadly triquetrous, oblong, large, apex rounded, smooth.

Monotypic: China, India (Sikkim), Nepal.

1. *Eriophyton wallichii* Bentham, Pl. Asiat. Rar. 1: 63. 1830.

绵参 mian shen

Herbs perennial. Roots thick, apex forked. Stems erect, 10–20 cm tall, unbranched, rigid, lanate. Petiole very short or obsolete; basal leaves scalelike, colorless, glabrous; upper leaves rhombic to circular, ca. 3–4 × 3–4 cm, reduced apically, densely lanate, base broadly cuneate, margin crenate to crenate-serrate near apex, apex acute, veins radiate from base. Bracteoles spinelike, to 1.2 cm, densely lanate. Flowers

sessile. Calyx broadly campanulate, ca. 1.5 cm, densely lanate outside, glabrous inside, margin lanate; teeth ca. 7 mm, long acuminate. Corolla purplish to reddish, 2.2–2.8 cm, tube slightly incurved, 1.1–1.4 cm, densely lanate outside. Nutlets yellow-brown, ca. 3 mm. Fl. Jul-Sep, fr. Sep-Oct.

Alpine, stony alluvial fans; 2700–4700 m. Qinghai, Sichuan, Xizang, Yunnan [India (Sikkim), Nepal].

Roots used as a tonic.

42. *LOXOCALYX* Hemsley, J. Linn. Soc., Bot. 26: 308. 1890.

斜萼草属 xie e cao shu

Herbs perennial, erect. Stems much branched. Leaves long petiolate; leaf blade margin dentate. Verticillasters few flowered; bracteoles few, subulate. Flowers short pedicellate. Calyx long turbinate, base narrowed, hairy on veins, glabrous inside, 5–10-veined, 2-lipped; anterior teeth 2, coalescent, dilated; posterior teeth 3, shorter than anterior teeth. Corolla rose, purple, dark purple, to dark red, 2-lipped, puberulent, hairy annulate near base inside; tube slender, much exerted; upper lip galeate, straight, entire; lower lip spreading, 3-lobed; middle lobe larger, margin entire or emarginate; lateral lobes entire. Stamens 4, subequal, ascending beneath upper corolla lip; filaments complanate, puberulent; anthers close together in pairs, ovoid, cells 2, divaricate. Disc apex truncate, elongate in fruit. Style included or slightly exerted, apex equally 2-cleft. Nutlets triquetrous, ovoid, apex truncate, puberulent.

Two species: endemic to China.

- 1a. Stem and young branches densely retrorse pubescent; leaves ovate-lanceolate, base cuneate to subrounded adaxially sparsely minutely hispid, abaxially densely pubescent; calyx 5-veined 1. *L. quinquerivius*
- 1b. Stem and young branches subglabrous, sparsely puberulent or sparsely pilose-strigose, densely strigose on nodes; leaves broadly ovate to cordate-ovate, base truncate to cordate, sparsely minutely hispid; calyx 8–10-veined 2. *L. urticifolius*

1. *Loxocalyx quinquenervius* Handel-Mazzetti, Symb. Sin. 7: 924. 1936.

五脉斜萼草 wu mai xie e cao

Herbs erect. Stems ca. 1 m tall, much branched toward apex, densely retrorse pubescent. Petiole 0.5–4 cm, densely appressed pubescent; leaf blade ovate-lanceolate, 3.5–9 × 1.5–5.5 cm, thin papery, adaxially sparsely minutely hispid, abaxially densely pubescent especially on veins and margin, base cuneate to subrounded, attenuate, margin crenate-serrate, apex long acuminate; lateral veins 3 or 4 pairs. Verticillasters 6–12-flowered; bracteoles subulate, 2–5 mm, densely pubescent. Pedicel very short to obsolete. Calyx ca. 1 cm, appressed pubescent mainly on veins outside, conspicuously 5-veined; teeth shorter than tube, thin papery, ovate, apex acuminate, with a short spine. Corolla dark red, white spotted on throat, to 2 cm, densely pubescent outside, scaly inside; tube slender, straight; upper lip narrowly elliptic, ca. 5 mm, entire; lower lip as long as upper lip, middle lobe obcordate, lateral lobes ovate. Fl. Aug.

- Broad-leaved forests, riverbanks; 1200–1400 m. Hunan.

2. *Loxocalyx urticifolius* Hemsley, J. Linn. Soc., Bot. 26: 309. 1890.

斜萼草 xie e cao

Herbs erect. Stems 1–1.3 m, subglabrous to sparsely puberulent or pilose-strigose. Petiole 1–6 cm, slender; leaf blade broadly ovate to cordate-ovate, 4.5–12 × 2–7 cm, sparsely minutely hispid, abaxially distinctly glandular, base truncate to cordate, margin coarsely serrate-dentate, apex long acuminate, terminal tooth elongated. Verticillasters (2–)6–12-flowered; bracteoles subulate, ca. 2 mm. Pedicel less than 1 mm. Calyx 1–1.5 cm, long turbinate, dotted or subglabrous, minutely hispid or strigose on veins, conspicuously 8–10-veined; teeth shorter than tube, narrowly triangular or ovate, spinescent, anterior teeth much longer than posterior teeth. Corolla rose or purple to dark red, 1.5–3 cm, pubescent, sparsely scaly except for annulus inside; upper lip oblong-elliptic, ca. 5 mm, margin entire; middle lobe of lower lip

oblong to obcordate, emarginate; lateral lobes subcircular. Nutlets chestnut brown, triquetrous, ovoid, adaxially ribbed. Fl. Jul-Aug, fr. Sep.

- Wet areas in valley forests, hillsides; 1200–2700 m. Gansu, Guizhou, Hebei, Henan, Hubei, Shaanxi, Sichuan, Yunnan.

- 1a. Stem and young branches subglabrous or sparsely puberulent; calyx 8-veined, veins minutely hispid, posterior teeth subequal; corolla ca. 1.5(–2) cm, middle lobe of lower lip oblong 2a. var. *urticifolius*
- 1b. Stem and young branches sparsely pilose-strigose, nodes densely strigose; calyx 10-veined, veins strigose, middle posterior tooth elongated; corolla 1.5–3 cm, middle lobe of lower lip obcordate 2b. var. *decemnervius*

2a. *Loxocalyx urticifolius* var. *urticifolius*

斜萼草 xie e cao

Stem and young branches subglabrous or sparsely puberulent. Calyx 8-veined, minutely hispid on veins; anterior teeth 2, coalescent, slightly dilated; posterior teeth 3, subequal. Corolla ca. 1.5(–2) cm, middle lobe of lower lip oblong.

- Wet areas in valley forests; 1200–2700 m. Gansu, Guizhou, Hebei, Henan, Hubei, Shaanxi, Sichuan, Yunnan.

2b. *Loxocalyx urticifolius* var. *decemnervius* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 220. 1965.

十脉变种 shi mai bian zhong

Stem and young branches sparsely pilose-strigose, densely strigose on nodes. Calyx 10-veined, strigose on veins; anterior teeth 2, strongly coalescent, dilated; posterior teeth 3, unequal, middle tooth elongated. Corolla 1.5–3 cm, middle lobe of lower lip obcordate.

- Hillsides; 1500–2300 m. Shaanxi.

43. *PARALAMIUM* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 168. 1913.

假野芝麻属 jia ye zhi ma shu

Herbs perennial, erect. Leaves large, petiolate. Inflorescences slender terminal thyrses; bracts and bracteoles minute. Pedicel short. Calyx campanulate, membranous, prominently 10-veined and dilated in fruit; teeth 5, posterior tooth largest, apex truncate, conspicuously revolute in fruit; lateral teeth triangular-lanceolate, anterior teeth narrowly oblong-lanceolate. Corolla tube elongated, exerted, slender, dilated at throat, 2-lipped; upper lip straight, oblong, slightly concave; lower lip spreading, 3-lobed; middle lobe larger than lateral lobes, entire. Stamens 4, anterior 2 longer, ascending to underside of upper corolla lip, parallel, close together; filaments ciliolate basally; anthers ovoid, cells 2, divaricate, apex confluent. Style apex unequally 2-cleft. Disc apex truncate. Nutlets flattened, triquetrous, globose, shiny, pitted.

Monotypic: China, Myanmar, Vietnam.

1. *Paraladium gracile* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 168. 1913.

假野芝麻 jia ye zhi ma

Herbs erect. Stems 40–80 cm, densely pubescent and spreading pilose. Petiole 2–10 cm; leaf blade ovate-cordate, 9–17 × 4–10 cm, pubescent and pilose especially on veins abaxially, distinctly glandular, base cordate, margin crenulate, apex acuminate. Thyrses 7–30 cm, 1.5–2 cm in diam.; verticillasters many, 2–10-flowered, surrounded by minute

subulate bracts; rachises densely minutely hispid and spreading pilose; bracteoles minute, subulate. Pedicel ca. 1 mm, to 2 mm in fruit, base 1-bracteolate, densely minutely hispid and spreading pilose. Calyx campanulate, ca. 3 mm, puberulent, glandular, subglabrous in fruit, bristly annulate inside; tube ca. 2 mm, throat glandular otherwise glabrous; teeth lanceolate, apex acute, posterior tooth largest, broadly ovate, apex truncate. Corolla ca. 9 mm, limb purple; tube white, puberulent, retrorse pubescent inside; middle lobe of

lower lip subcircular, lateral lobes ovate. Nutlets black, ca. 1 mm. Fl. Apr, fr. Apr-May.

Streamsides, wet areas in forests; 1200–1800 m. Yunnan [Myanmar, Vietnam].

44. PARAPHLOMIS (Prain) Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74: 721. 1908.

假糙苏属 jia cao su shu

Phlomis Linnaeus sect. *Paraphlomis* Prain, Ann. Roy. Bot. Gard. (Calcutta) 9: 60. 1901.

Herbs or subshrubs, rhizomatous. Stems ascending or erect. Leaves sessile or long petiolate; leaf blade membranous to ± leathery, margin dentate. Verticillasters axillary; bracteoles lanceolate to bristlelike, sometimes minute, early deciduous. Calyx tubular to obconical, mouth sometimes slightly constricted, gradually or abruptly dilated, truncate or pleated; veins 5–10, ± distinct; teeth 5, broadly triangular to subulate, straight, spreading or reflexed, bristlelike-acuminate to acute or widened into wings from veins. Corolla 2-lipped; tube hairy annulate inside, gradually dilated at apex; upper lip flat, erect or galeate, densely hairy outside; lower lip spreading at about 90°, 3-lobed, middle lobe larger. Stamens 4, anterior 2 longer; filaments filiform, complanate, ± hairy; anther cells 2, parallel or divergent. Ovary apex truncate, glabrous or hairy. Style apex subequally 2-cleft, lobes subulate. Disc ringlike or cupulate, apex truncate. Nutlets obovoid or triquetrous oblong, glabrous or hairy.

About 24 species: China, India, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam; 23 species in China.

- 1a. Calyx tubular or tubular-campanulate.
 - 2a. Calyx teeth minute, mouth subtruncate, pleated 10. *P. membranacea*
 - 2b. Calyx teeth conspicuous, broadly triangular to subulate, apex bristlelike to acute.
 - 3a. Leaves ovate, ovate-orbicular, or subcircular.
 - 4a. Stems and leaves sparsely bristly; calyx tube densely bristly, teeth narrowly triangular, apex bristlelike..... 7. *P. seticalyx*
 - 4b. Stems, leaves, and calyces densely pubescent and/or villous; calyx teeth broadly triangular, apex acute.
 - 5a. Erect herbs; stems, leaves, and calyces densely villous and pubescent; corolla densely white villous outside; bracteoles minute 8. *P. albiflora*
 - 5b. Ascending herbs; stems, leaves, and calyces densely villous only; corolla sparsely pubescent outside; bracteoles linear, 2–5 mm 9. *P. foliata*
 - 3b. Leaves elliptic, elliptic-ovate, to oblong-elliptic.
 - 6a. Calyx bristly.
 - 7a. Leaves ± leathery; leaves and stem glabrous; calyx sparsely white bristly at apex and along veins otherwise strigose 4. *P. paucisetosa*
 - 7b. Leaves membranous or thin papery; leaves and stem hairy; calyx densely bristly.
 - 8a. Leaves thin papery; leaves and stem densely spreading bristly 5. *P. patentisetulosa*
 - 8b. Leaves membranous, strigose and finely papillate except for hispid veins of adaxial surface; abaxially white granular, finely strigose and sparsely hispid; stem densely retrorse fine strigose 3. *P. hispida*
 - 6b. Calyx not bristly.
 - 9a. Stems and calyx densely tawny hirsute 2. *P. hirsutissima*
 - 9b. Stems and calyx not tawny hirsute.
 - 10a. Stems retrorse strigose; calyx glabrous or hirtellous becoming glabrescent in fruit 1. *P. javanica*
 - 10b. Stems and calyx densely and finely bristly puberulent 6. *P. setulosa*
 - 1b. Calyx obconical.
 - 11a. Calyx teeth lanceolate-triangular, acute.
 - 12a. Verticillasters surrounded by leaflike bracts, with linear basal bracteoles 11. *P. albotomentosa*
 - 12b. Verticillasters surrounded by linear bracts, with bristlelike basal bracteoles.
 - 13a. Leaves elliptic or elliptic-ovate; calyx densely tomentose outside 12. *P. tomentosocapitata*
 - 13b. Leaves broadly ovate or ovate-lanceolate to lanceolate; calyx pubescent outside.
 - 14a. Leaves 3–5 cm wide; calyx ca. 9.5 mm; corolla ca. 1.8 cm 13. *P. lancidentata*
 - 14b. Leaves 6.5–9.5 cm wide; calyx ca. 11 mm; corolla ca. 1.4 cm 14. *P. reflexa*
 - 11b. Calyx teeth not lanceolate-triangular.
 - 15a. Calyx teeth triangular or inconspicuous, calyx mouth subtruncate, distinctly extended into winged extensions from veins.
 - 16a. Leaves oblong to ovate-oblong, 5–8 × 2.4–3.4 cm, margin undulate-crenate; calyx teeth conspicuously triangular, calyx mouth not subtruncate 22. *P. brevifolia*
 - 16b. Leaves lanceolate to narrowly lanceolate, 7–15 × 1.5–3 cm, margin remotely, shallowly serrate above base; calyx teeth inconspicuous, calyx mouth subtruncate 23. *P. subcoriacea*
 - 15b. Calyx teeth broadly triangular to broadly ovate-triangular or subulate, apex acuminate to acute.
 - 17a. Apical part of stem, petiole, and abaxial leaf surface densely retrorse pilose, especially on leaf veins 19. *P. albida*
 - 17b. Apical part of stem, petiole, and abaxial leaf surface not densely retrorse pilose.
 - 18a. Plants sparsely pubescent or subglabrous 16. *P. lanceolata*
 - 18b. Plants densely retrorse strigose or pubescent.

- 19a. Corolla tube shorter than calyx tube; calyx teeth subulate 15. *P. gracilis*
 19b. Corolla tube longer than calyx tube; calyx teeth not subulate.
 20a. Leaves lanceolate to sublanceolate.
 21a. Stems densely spreading pubescent toward base, conspicuously grooved; leaves lanceolate, apex long acuminate, base attenuate; petiole ca. 2 cm; corolla conspicuously hairy annulate inside; ovary glabrous 17. *P. parviflora*
 21b. Stems densely pubescent throughout, not grooved; leaves oblong-elliptic, apex acute, base cuneate; petioles ca. 1 cm; corolla inconspicuously hairy annulate inside; apex of ovary puberulent 18. *P. kwangtungensis*
 20b. Leaves ovate.
 22a. Leaves membranous; corolla tube much exerted; anthers ciliate; ovary glabrous 20. *P. intermedia*
 22b. Leaves papery; corolla tube slightly exerted; anthers not ciliate; ovary apex pubescent 21. *P. pagantha*

1. *Paraphlomis javanica* (Blume) Prain, Ann. Roy. Bot. Gard. (Calcutta) 9: 59. 1901.

假糙苏 jia cao su

Herbs erect. Stem solitary, 0.5–1.5 m, retrorse strigose, flexuous, leafless toward base. Petiole slender, to 8 cm; leaf blade elliptic to oblong-ovate, 3–15(–30) × 1.5–8.5(–14) cm, adaxially ± minutely hispid, abaxially strigose, base rounded to subtruncate, margin inconspicuously serrate to crenate-serrate, apex acute to acuminate. Verticillasters many flowered, globose, ca. 3 cm in diam., surrounded by few bracteoles at base; bracteoles subulate, ca. 6 mm, shorter than calyx, hirtellous. Flowers sessile. Calyx tubular in flower, abruptly spreading at mouth, enlarged and red in fruit, leathery, densely hirtellous or minutely hispid, glabrescent, inconspicuously veined, tube ca. 7 mm; teeth subequal, needlelike to triangular, 2–4 mm. Corolla yellow or yellowish, less often whitish, ca. 1.7 cm, ± hirtellous on apical parts of tube and limb outside, pubescent annulate inside, upper lip oblong, entire. Nutlets black, triquetrous, obovoid, apex rounded, glabrous. Fl. Jun–Aug, fr. Aug–Dec.

Evergreen and mixed forests; 300–2400 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Pakistan, Philippines, Thailand, Vietnam].

- 1a. Calyx teeth triangular, ca. 2 mm, apex not subulate or needlelike; leaves inconspicuously serrate 1d. var. *henryi*
 1b. Calyx teeth subulate, triangular-subulate or needlelike, 3–4 mm, apex subulate or needlelike; leaves ± conspicuously serrate, crenate, or crenulate.
 2a. Calyx teeth needlelike, minutely hispid; leaves ovate to narrowly lanceolate, inconspicuously crenulate 1c. var. *angustifolia*
 2b. Calyx teeth subulate or triangular-subulate, hirtellous; leaves elliptic, elliptic-ovate, or oblong-ovate, crenate-serrate or shallowly widely spaced-serrate to crenate.
 3a. Leaves 7–15(–30) × 3–8.5(–14) cm, membranous or papery, crenate-serrate 1a. var. *javanica*
 3b. Leaves 3–9(–15) × 1.5–6 cm, succulent, shallowly remotely serrate to crenate 1b. var. *coronata*

1a. *Paraphlomis javanica* var. *javanica*

假糙苏 jia cao su

Leonurus javanicus Blume, Bijdr. 828. 1826; *Lamium longipetiolata* Hayata; *Paraphlomis rugosa* (Benth) Prain; *Phlomis rugosa* Benth.

Leaf blade elliptic, elliptic-ovate, or oblong-ovate, 7–15(–30) × 3–8.5(–14) cm, membranous or papery, margin crenate-serrate. Calyx teeth subulate or triangular-subulate, hirtellous.

Forests; 300–1300(–2500?) m. Guangxi, Hainan, Taiwan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Pakistan, Philippines, Thailand, Vietnam].

1b. *Paraphlomis javanica* var. *coronata* (Vaniot) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13(1): 72. 1975.

小叶变种 xiao ye bian zhong

Lamium ? *coronatum* Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 174. 1904; *Lamium gesneroides* Hayata; *Loxocalyx vaniotiana* H. Léveillé; *Paraphlomis rugosa* (Benth) Prain var. *coronata* (Vaniot) C. Y. Wu.

Leaf blade 3–9(–15) × 1.5–6 cm, succulent, margin shallowly remotely serrate to crenate.

• Evergreen and mixed forests; 400–2400 m. Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan.

A medicinal herb used for soothing lungs, as an antitussive, and for irregular menstruation.

1c. *Paraphlomis javanica* var. *angustifolia* (C. Y. Wu) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13(1): 73. 1975.

狭叶变种 xia ye bian zhong

Paraphlomis rugosa (Benth) Prain var. *angustifolia* C. Y. Wu, Acta Phytotax. Sin. 8: 38. 1959.

Leaf blade ovate-lanceolate to narrowly lanceolate, margin inconspicuously crenulate. Calyx acicular, hispidulous.

Evergreen and mixed forests; 500–1600 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Yunnan [Vietnam].

1d. *Paraphlomis javanica* var. *henryi* (Yamamoto) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13(1): 73. 1975.

短齿变种 duan chi bian zhong

Paraphlomis rugosa (Benth) Prain var. *henryi* Yamamoto, J. Soc. Trop. Agric. 6: 555. 1934.

Leaf blade margin inconspicuously serrate. Calyx teeth broadly triangular, ca. 2 × 1.5 mm, not acicular.

• Evergreen forests. Taiwan, Yunnan.

2. *Paraphlomis hirsutissima* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 62. 1965.

多硬毛假糙苏 duo ying mao jia cao su

Herbs. Stems flexuous, densely retrorse tawny hirsute. Petiole 2–5 cm, densely tawny hirsute; leaf blade elliptic, 5.5–13 × 2–5 cm, papery, adaxially sparsely hirtellous when young, subglabrescent, abaxially tawny, sparsely hirsute, densely hirsute on veins, base cuneate, margin remotely undulate-serrate above base, apex acute; lateral veins 5 or 6 pairs, conspicuously elevated abaxially. Verticillasters 8–10-flowered, subtended at base by minute subulate bracteoles ca. 4 mm. Pedicel short to obsolete. Fruiting calyx tubular, slightly open, red becoming brown when dry, 8–9 mm, inconspicuously 5-veined; teeth ca. 2 mm, broadly triangular, subulate, reflexed. Corolla not seen. Nutlets unknown. Fr. Jan.

- Stony areas in tropical forests; 1300 m. Yunnan.

3. *Paraphlomis hispida* C. Y. Wu, Acta Phytotax. Sin. 8: 39. 1959.

刚毛假糙苏 gang mao jia cao su

Herbs. Stems slightly ascending, ca. 60 cm, densely retrorse fine strigose. Petiole slender, to 15 cm, finely strigose, hispid on groove; leaf blade elliptic, 3–20 × 1.8–11.5 cm, membranous, adaxially dark green, strigose, finely papillate, hispid on veins, abaxially white granular, finely strigose, sparsely hispid, base broadly cuneate to shallow cordate, margin irregularly serrulate or sometimes undulate-crenulate, apex acute to short acuminate. Verticillasters many flowered, globose; bracteoles lanceolate, margin ciliolate. Fruiting calyx tubular-campanulate, tawny outside, densely hispid, glabrous inside; teeth narrowly lanceolate, erect, ca. 5 mm, apex bristlelike-acuminate. Nutlets truncate. Fr. Nov-Jan.

Dense tropical forests, thickets; 1200–1500 m. Yunnan [Vietnam].

4. *Paraphlomis paucisetosa* C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 10: 63. 1965.

少刺毛假糙苏 shao ci mao jia cao su

Subshrubs. Stems ascending, ca. 7 mm in diam., glabrous, finely striate, sometimes lenticellate. Petiole ca. 8 cm; leaf blade ovate-elliptic, to 20 × 10 cm, ± leathery, glabrous, base rounded to shallowly cordate, margin remotely undulate-serrate, apex acute; midrib brown abaxially. Verticillasters many flowered; bracteoles linear. Pedicel short. Fruiting calyx tubular-campanulate, ca. 1.7 cm, strigose, sparsely white bristly at apex and along conspicuously elevated veins; teeth broadly triangular. Corolla not seen. Nutlets black-brown, triquetrous ovoid, ca. 6 × 3.5 mm, rounded, base attenuate, glabrous. Fr. Mar.

- Rocky hillsides. Guangxi.

5. *Paraphlomis patentisetulosa* C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 10: 63. 1965.

展毛假糙苏 zhan mao jia cao su

Herbs robust. Stems ascending, leafless toward base, densely fine tawny patent-setose, internodes abbreviated. Petiole 2–8 cm; leaf blade elliptic to broadly elliptic, 5.5–14.5 × 2.5–7 cm, adaxially densely fine spreading setose, abaxially sparsely fine spreading setose, densely so on veins,

base broadly cuneate to rounded-cordate, margin irregularly undulate-serrate, apex acute. Verticillasters many flowered, globose, ca. 2.5 cm in diam. in fruit; bracteoles subulate to linear, ca. 8 mm, hairy outside, glabrous inside. Pedicel short. Fruiting calyx tubular-campanulate, to 1.1 cm, finely bristly outside, conspicuously 5-veined; teeth broadly triangular, ca. 3 mm, apex long acuminate. Corolla not seen. Nutlets black-brown, triquetrous, oblong, ca. 6 × 2.5–2.8 mm, rounded, base attenuate, glabrous. Fr. Nov.

- Streamsides. Guangdong.

6. *Paraphlomis setulosa* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 602. 1977.

小刺毛假糙苏 xiao ci mao jia cao su

Herbs. Stem solitary, erect, 30–70 cm, grooves purple or purple-red, densely retrorse fine bristly-puberulent. Petiole 0.5–2 cm, longest and narrowly winged on mid stem leaves; leaf blade elliptic to oblong-ovate, 8–15 × 4–6(–8) cm, adaxially sparsely fine bristly-puberulent, abaxially finely bristly-puberulent mainly along veins, sometimes indistinctly yellowish glandular, base cuneate-decurrent, margin crenate-serrate, apex acute. Verticillasters (2–)4–14-flowered, subglobose, 1.5–2 cm in diam. before anthesis; bracteoles linear, to 4 × 0.5 mm. Pedicel 1–2 mm. Calyx tubular, ca. 7 mm, sparsely fine bristly, inconspicuously yellowish glandular; teeth finely bristly-puberulent on inside, triangular, 2.5–3 mm, ca. 1.5 mm wide, apex bristlelike-acuminate, reflexed. Corolla white, ca. 1.5 cm; tube straight, cylindrical or throat slightly dilated, sparsely pilose, pilose annulate inside; upper lip oblong, ca. 5 mm, concave, entire, densely pilose; middle lobe of lower lip trapeziform, less than 3 mm wide, margin undulate, glabrous except for densely pilose center; lateral lobes ovate, ca. 2 mm wide, densely pilose outside. Ovary glabrous. Nutlets unknown. Fl. Jun.

- Montane, subtropical evergreen broad-leaved forests; 400 m. Anhui, Jiangxi.

7. *Paraphlomis seticalyx* C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 10: 64. 1965.

刺萼假糙苏 ci e jia cao su

Herbs. Stem solitary, ascending, 40–60 cm, apex sometimes flexuous, sparsely fine floccose-setose, leafless toward base. Petiole slender, 3.5–9 cm; leaf blade ovate to subcircular, 10–12 × 6–8 cm, papery, adaxially sparsely finely tawny pilose, abaxially sparsely golden glandular, gray-green, finely tawny setose on veins, base broadly cuneate to shallowly cordate, margin irregularly crenate, apex acute. Verticillasters (2–)10–18-flowered, subglobose, ca. 2.5 cm in diam. before anthesis; bracteoles linear, 2–7 × 0.8 mm. Pedicel short to obsolete. Calyx tubular, 1–1.2 cm, papery, veins finely tawny setose, conspicuously 10-veined, throat and teeth puberulent; teeth narrowly triangular, ca. 3 × 1.3 mm, bristlelike-acuminate. Corolla white, purple spotted on throat, ca. 1.8 cm; tube erect, cylindrical or slightly dilated at throat, sparsely pilose, obliquely hairy annulate inside; upper lip oblong, slightly concave, entire, densely pilose outside; middle lobe of lower lip trapeziform, margin undulate, pilose in center outside; lateral lobes ovate. Ovary glabrous. Fl. Jun-Jul.

- Clumps of grass, dense forests, streamsides, wet sandy areas; 500–800 m. Guangxi.

8. *Paraphlomis albiflora* (Hemsley) Handel-Mazzetti, Acta Horti Gothob. 13: 347. 1939.

白花假糙苏 bai hua jia cao su

Herbs with or without tubers. Stems erect or ascending, 30–60 cm, base purplish, leafless, unbranched. Petiole slender, to 8 cm; leaf blade ovate, sometimes circular in basal stem leaves, 6–8 × 3.5–4 cm, villous-pubescent, abaxially gray-green, margin irregularly coarse crenate-serrate. Verticillasters 2–20-flowered, subglobose, to 3(–4) cm in diam.; bracteoles ca. 2 mm, linear, ciliate. Pedicel short to obsolete. Calyx tubular, slightly curved, somewhat dilated toward apex, villous pubescent, 10-veined, throat and teeth strigose; teeth broadly triangular, subequal, apex acute. Corolla white or purple spotted on throat, 1.2–1.5 cm; tube 8–10 mm, straight, cylindrical, slightly dilated at throat, much exerted, glabrous, villous annulate inside; limb white villous outside; upper lip oblong, erect, concave, margin entire. Ovary glabrous. Nutlets triquetrous, oblong, glabrous, apex truncate. Fl. Jun.

• Wet areas in valley forests, waste areas; 100–800 m. Hubei, Sichuan.

1a. Plants without tubers, densely long hairy; verticillasters ca. 20-flowered 8a. var. *albiflora*

1b. Plants with tubers, sparsely short hairy; verticillasters 2–6-flowered 8b. var. *biflora*

8a. *Paraphlomis albiflora* var. *albiflora*

白花假糙苏 bai hua jia cao su

Phlomis albiflora Hemsley, J. Linn. Soc., Bot. 26: 304. 1890; *Paraphlomis hirsuta* Handel-Mazzetti.

Plants without tubers, densely long hairy. Verticillasters ca. 20-flowered.

• Wet areas in valley forests; 100–800 m. Hubei, Sichuan.

8b. *Paraphlomis albiflora* var. *biflora* (Sun) C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 10: 65. 1965.

二花变种 er hua bian zhong

Paraphlomis biflora Sun, Acta Phytotax. Sin. 4: 47. 1955.

Plants with tubers, sparsely short hairy. Verticillasters 2–6-flowered.

• Waste areas. Sichuan.

9. *Paraphlomis foliata* (Dunn) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 66. 1965.

曲茎假糙苏 qu jing jia cao su

Lamium foliatum Dunn, J. Linn. Soc., Bot. 38: 363. 1908.

Herbs flexuous ascending, with short stolons. Stem solitary, to 25 cm, densely white villous, base prostrate, leafless. Petiole 1.5–5 cm, longest basally, densely white villous; leaf blade ovate, 6–9 × 4–7.5 cm, densely villous, abaxially sparsely yellowish glandular, base shallowly cordate, margin crenate, apex obtuse to rounded. Verticillasters many flowered, globose; bracteoles linear, 2–5 mm. Flowers sessile. Calyx tubular, to 1 cm, conspicuously 10-veined, slightly curved at apex, sparsely yellowish glandular, veins villous, apical part of tube and teeth

puberulent inside; teeth subequal, triangular, ca. 2 mm, apex acute. Corolla ca. 2 cm, sparsely pubescent, puberulent annulate inside; tube ca. 1.8 cm, straight, cylindrical, throat slightly dilated; upper lip oblong, flat, ca. 7 × 2.5 mm; middle lobe of lower lip obcordate, ca. 3 mm wide; lateral lobes ovate, ca. 2.5 mm wide. Stamens included. Ovary black-brown, glabrous. Nutlets triquetrous, oblong, glabrous. Fl. Jul-Aug, fr. Sep-Oct.

• Clumps of grass in evergreen forests; 600–800 m. Anhui, Fujian, Guangdong, Jiangxi.

10. *Paraphlomis membranacea* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 66. 1965.

薄萼假糙苏 bo e jia cao su

Herbs. Stems ascending, to 50 cm, base prostrate, to 7 mm in diam., strigose, glabrescent. Petiole 2–6 cm, densely pubescent; leaf blade ovate, 11–18 × 6–8 cm, membranous, sparsely pubescent, densely so on veins, adaxially also bristly, base rounded, margin crenulate, apex acute. Verticillasters many flowered, globose; bracteoles oblanceolate-obovate, 3–6 × 2–3 mm, membranous, conspicuously ribbed, apex sparsely bristly. Flowers sessile. Calyx tubular-campanulate, nearly transparent, sparsely white bristly, glabrous inside, ca. 7 mm; teeth broadly triangular, acute, less than 1 × 2 mm; mouth subtruncate, pleated. Corolla purple, ca. 1.5 cm, glabrous on limb; tube slender, to 10 × 1.2 mm, uniformly wide, glabrous, pilose annulate inside; upper lip oblong, ca. 5 mm, erect, margin entire; lower lip horizontally spreading, middle lobe ovate, emarginate; lateral lobes oblong, margin entire. Ovary black-brown, glabrous. Nutlets unknown.

Sandy streambanks in tropical rain forests; 100–2500 m. Yunnan [Vietnam].

11. *Paraphlomis albotomentosa* C. Y. Wu, Acta Phytotax. Sin. 8: 36. 1959.

绒毛假糙苏 rong mao jia cao su

Herbs with long, lanate stolons. Stems solitary, ca. 50 cm, retrorse strigose, leafless toward base. Lower stem leaves early deciduous; petiole densely strigose, 3–5 cm, longest basally; upper stem leaf blades broadly triangular-ovate, 4–9 × 3–6 cm, herbaceous, adaxially sparsely strigose, densely so on veins, abaxially densely white tomentose except for strigose veins, base broadly cuneate, margin gradually remote dentate-serrate above base, apex short acuminate; lateral veins 5–7 pairs, inconspicuous. Verticillasters 4–8-flowered, surrounded by leaflike bracts and linear bracteoles; peduncle ca. 5 mm. Flowers sessile. Calyx tubular-campanulate, 8–9 mm, densely strigose, hirsute inside, veins inconspicuous; teeth equal, narrowly triangular, acute. Corolla white, 1.5–2 cm, densely strigose, slender, straight, recurved at apex; upper lip oblong, entire; lower lip somewhat larger, middle lobe trapeziform, apex emarginate, hirsute-puberulent inside. Ovary glabrous. Fl. Jul.

• Valley streambanks. Hunan.

12. *Paraphlomis tomentosocapitata* Yamamoto, J. Soc. Trop. Agr. Taiwan 6: 556. 1934.

绒头假糙苏 rong tou jia cao su

Subshrubs. Stems unbranched, suberect or flexuous, retrorse fine pubescent, ca. 55 cm tall, leafy toward apex, base prostrate, rooting from nodes. Petiole 4–5 cm, pubescent; leaf

blade elliptic to elliptic-ovate, 18–19 × 8–9 cm, membranous, adaxially sparsely strigose, abaxially glaucous, puberulent or glabrescent, pubescent on midrib, base obtuse to broadly acute, margin crenate-dentate, apex acute to acuminate. Verticillasters fascicled, globose, densely hirsute; bracteoles linear-lanceolate to awnlike, ca. 5 × 0.5–1 mm, sparsely villous. Flowers subsessile. Calyx obconical-campanulate, ca. 1 cm, to 7 mm wide at throat, leathery, densely tomentose outside; teeth spreading, lanceolate-triangular, apex acute. Corolla gray-yellow, exserted, ca. 2 cm; upper lip spatulate, rounded, hirsute on back outside; lower lip hirsute at base outside. Stamens nearly included. Fl. Aug.

- Taiwan.

13. *Paraphlomis lancidentata* Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 30. 1935.

云和假糙苏 yun he jia cao su

Herbs perennial, erect. Stems to 50 cm, rarely branched, red-purple, base glabrous, apex puberulent. Petiole 1–4 cm; leaf blade ovate-lanceolate to lanceolate, 8–16 × 3–5 cm, adaxially hirsute, abaxially gray-green, finely puberulent, base cuneate-decurrent into petiole, margin coarsely dentate-serrate, apex long acuminate. Verticillasters widely spaced, 10- or more flowered. Calyx tubular, ca. 9.5 mm, puberulent; tube ca. 7 mm, conspicuously 10-veined; teeth narrowly triangular, ca. 2.3 × 1.8 mm, apex acute. Corolla gray-yellow, tubular, ca. 1.8 cm, densely villous outside, pilose annulate near base inside; tube ca. 1.2 cm; upper lip oblong, ca. 6 × 3.5 mm, erect, margin entire; lower lip broadly obovate, ca. 6 × 7 mm; middle lobe obcordate, ca. 3 × 2.6 mm, emarginate; lateral lobes broadly elliptic, ca. 2.2 × 1.9 mm, margin entire. Nutlets black-brown, ca. 2 × 0.9 mm, base cuneate, apex truncate. Fl. Jun.

- Shady slopes. Zhejiang.

14. *Paraphlomis reflexa* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 65(2): 602. 1977.

折齿假糙苏 zhe chi jia cao su

Herbs perennial. Stems erect, 50–100 cm, densely yellowish or gray tomentose, base glabrescent, unbranched. Petiole 1–2.5 cm; leaf blade broadly ovate, 12–14 × 6.5–9.5 cm, adaxially sparsely pubescent, densely so on veins, abaxially densely yellowish or gray-white tomentose, base broadly cuneate to rounded, margin coarsely crenate-dentate, apex acute. Verticillasters widely spaced, (2–)4–10-flowered; bracteoles needlelike, ca. 1 mm. Pedicel 1–2 mm. Calyx obconical, ca. 1.1 cm, densely pubescent, glabrous except for pubescent teeth inside, 10-veined; teeth triangular-subulate, ca. 3 × 1.5 mm, apex subulate-acuminate, conspicuously reflexed after anthesis. Corolla dark-purple when dry, ca. 1.4 cm; tube ca. 8 mm, cylindrical to slightly dilated at throat, densely gray pubescent, base glabrous, pilose annulate inside lower lip; upper lip oblong, ca. 6 × 2 mm, slightly concave; lower lip obliquely patent, ca. 5.5 × 5 mm; middle lobe ca. 2 mm wide, densely pubescent at middle, margin entire; lateral lobes ca. 1.5 mm, margin entire. Nutlets brown, triquetrous, oblong, ca. 2 × 1.2 mm, adaxially ribbed, rounded, basally broadly cuneate, glabrous. Fl. Aug. fr. Sep.

- Hillsides. Jiangxi.

15. *Paraphlomis gracilis* (Hemsley) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 210. 1929.

纤细假糙苏 xian xi jia cao su

Herbs erect, bearing stolons. Stems ca. 1 m, rigid, slender, retrorse strigose, apex few branched, with internodes longer than leaves. Petiole narrowly winged, dilated at apex, 1–2.5 cm; leaf blade lanceolate, 5–10 × 1.7–3.3 cm, reduced apically, thin papery, adaxially sparsely strigose, densely so on veins, abaxially densely strigose, golden glandular, base attenuate, decurrent into petiole or leaves sessile, margin crenate-serrate above base, apex acute to acuminate. Verticillasters (2–)4–8(–12)-flowered; bracteoles minute, subulate or obsolete. Calyx obconical, ca. 1.2 cm, densely retrorse strigose, obscurely 10-veined; teeth subulate, almost as long as tube. Corolla white with purple-spotted lower lip or yellow, ca. 1.5 cm; tube included, ca. 5 mm, glabrous, pilose annulate inside; upper lip erect, pilose, oblong, apex rounded, concave, ca. 2 × as long as tube; lower lip somewhat wider, spreading. Ovary subglabrous. Fl. Jun-Jul.

- Dense forests, shady streamsides; 300–1400 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Sichuan, Taiwan(?).

- 1a. Leaves short petiolate, petiole narrowly winged; corolla white with purple-spotted lower lip..... 15a. var. *gracilis*
- 1b. Leaves sessile, narrower; corolla yellow 15b. var. *lutiensis*

15a. *Paraphlomis gracilis* var. *gracilis*

纤细假糙苏 xian xi jia cao su

Phlomis gracilis Hemsley, J. Linn. Soc., Bot. 26: 305. 1890; ? *Ajuga formosana* Hayata; ? *Lamium formosanum* Nakai ex Hayata.

Leaves short petiolate; petiole narrowly winged. Corolla white, purple spotted on lower lip.

- Dense forests; 600–800 m. Guizhou, Hubei, Hunan, Taiwan(?).

15b. *Paraphlomis gracilis* var. *lutiensis* (Sun) C. Y. Wu., Acta Phytotax. Sin. 8: 34. 1959.

罗甸变种 luo dian bian zhong

Paraphlomis lutiensis Sun, Acta Phytotax. Sin. 4: 48. 1955.

Leaves sessile. Corolla yellow.

- Shady streamsides; 300–1400 m. Guangdong, Guangxi, Guizhou, Sichuan.

16. *Paraphlomis lanceolata* Handel-Mazzetti, Symb. Sin. 7: 922. 1936.

长叶假糙苏 chang ye jia cao su

Herbs erect. Stems ca. 50 cm, subglabrous to sparsely retrorse pubescent or short pilose, unbranched or few branched toward apex. Petiole 0–1.5 cm, upper leaves sessile; leaf blade lanceolate, 5–13 × 1.3–3.3 cm, adaxially minutely dotted or sparsely short pilose, slightly puberulent on midrib, abaxially glabrous or sparsely short pilose, base attenuate, decurrent into petiole, apex long acuminate. Verticillasters 8–10-flowered; bracteoles ca. 1 mm, subulate, deciduous. Pedicel ca. 2 mm. Calyx obconical, ca. 5 mm, sparsely fine strigose, glabrous inside, inconspicuously 5-veined; teeth broadly ovate-triangular, ca. 2 mm, equal, apex long

acuminate. Corolla ca. 1.5 cm, glabrous, villous annulate inside; tube ca. 6 mm, uniformly wide; upper lip oblong, erect, margin entire; lower lip horizontally spreading, spotted inside, middle lobe trapeziform. Ovary apex puberulent. Nutlets brown, triquetrous, oblong, truncate, puberulent, base attenuate. Fl. Apr-Aug, fr. Aug-Sep.

• Broad-leaved forests, valley forests, streamsides, shady areas, grasslands; 600–1700 m. Guangdong, Guangxi, Hunan, Jiangxi.

- 1a. Leaves sessile; leaves and stems sparsely short pilose; corolla yellow..... 16b. var. *sessilifolia*
1b. Leaves petiolate, adaxially slightly puberulent along midvein, abaxially glabrous; stems subglabrous or sparsely retrorse pubescent; corolla yellowish white or rose.
2a. Corolla yellowish white 16a. var. *lanceolata*
2b. Corolla rose 16c. var. *subrosea*

16a. Paraphlomis lanceolata var. *lanceolata*

长叶假糙苏 chang ye jia cao su

Stems subglabrous or sparsely retrorse pubescent. Leaves petiolate; blade adaxially slightly puberulent along costa, abaxially glabrous. Corolla yellowish white.

• Broad-leaved forests; 1000–1200 m. Guangdong, Hunan, Jiangxi.

16b. Paraphlomis lanceolata var. *sessilifolia* Handel-Mazzetti, Symb. Sin. 7: 922. 1936.

无柄变种 wu bing bian zhong

Stems sparsely short pilose. Leaves sessile; blade sparsely short pilose. Corolla yellow.

• Valley forests, streamsides, shady areas; 600–1700 m. Guangxi.

16c. Paraphlomis lanceolata var. *subrosea* Handel-Mazzetti, Symb. Sin. 7: 922. 1936.

红花变种 hong hua bian zhong

Corolla rose.

• Grasslands. Hunan.

17. Paraphlomis parviflora C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 69. 1965.

小花假糙苏 xiao hua jia cao su

Herbs erect, with yellowish indumentum. Stems ca. 35 cm, solitary, base ca. 2.5 mm in diam., apex densely retrorse appressed puberulent, hairs ± spreading toward base. Petiole (0.5–)2–2.5 cm, longer basally; leaf blade lanceolate, ca. 10 × 3.5 cm, membranous, sparsely puberulent, densely so on adaxial midrib and veins, densely impressed glandular abaxially, base attenuate, margin irregularly serrate, apex long acuminate. Verticillasters (3–)5–7-flowered; bracteoles subulate, ca. 1 mm. Pedicel ca. 2 mm. Calyx obconical, ca. 5 mm, dilated to 3 mm wide at throat, sparsely retrorse puberulent, glabrous except for puberulent teeth inside, obscurely 5-veined; teeth broadly triangular, ca. 1.5 × 1.3 mm, apex long acuminate. Corolla ca. 9 mm; tube ca. 4 mm, puberulent apically, glabrous basally, pilose annulate inside; upper lip erect, oblong, entire, densely puberulent outside; lower lip sparsely puberulent outside. Ovary glabrous. Fl. Jun.

• Grasslands; 1500 m. Taiwan.

18. Paraphlomis kwangtungensis C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 70. 1965.

八角花 ba jiao hua

Herbs erect. Stem solitary, ca. 25 cm, base ca. 2.5 mm in diam., base glabrous, apex densely retrorse yellowish puberulent. Petiole 0.5–1.5 cm; leaf blade oblong-elliptic, 6–8 × 2–3 cm, densely pubescent especially along veins, base cuneate, margin shallowly serrate, apex acute. Verticillasters 2- to many flowered; bracteoles subulate, less than 1 mm, adaxially glabrous, abaxially puberulent. Pedicel ca. 1.3 mm. Calyx obconical, ca. 4 mm, sparsely appressed yellowish puberulent, pubescent on teeth inside, otherwise glabrous, conspicuously 5-veined; teeth broadly triangular, ca. 1.3 mm, apex acute. Corolla ca. 9 mm; tube ca. 4 mm, glabrous, obscurely pilose annulate inside; limb pubescent outside, glabrous inside; upper lip straight, oblong, margin entire. Ovary apex pubescent. Fl. Jul.

• Hilly bamboo forests. Guangdong.

19. Paraphlomis albida Handel-Mazzetti, Symb. Sin. 7: 922. 1936.

白毛假糙苏 bai mao jia cao su

Herbs erect. Stem solitary, 30–60 cm, densely retrorse white pilose, leafless toward base, unbranched. Petiole narrowly winged; leaf blade ovate, 4–9 × 2.5–4.5 cm, adaxially dark green, sparsely white pubescent, densely so on veins, abaxially gray, densely retrorse pilose especially on veins, golden glandular, base rounded or cuneate-attenuate into petiole, margin irregularly crenate-serrate, apex acute to acuminate. Verticillasters 2–8-flowered; bracteoles minute, subulate, early deciduous. Pedicel 1–2 mm. Calyx obconical, 6–7 mm, densely fine strigose, glabrous inside, conspicuously 5-veined; teeth triangular, subulate to acute, incurved. Corolla white or tinged purple, ca. 1.4 cm, strigose-villous, glandular, villous annulate inside; tube ca. 6 mm, throat slightly dilated; upper lip elliptic, entire, erect, concave; lower lip larger, middle lobe trapeziform, emarginate. Ovary apex villous. Fl. Jul-Oct.

• Forests, thickets, streamsides; 100–900 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Taiwan.

- 1a. Calyx teeth broadly triangular extending into subulate apex 19a. var. *albida*
1b. Calyx teeth ovate-triangular, apex acute 19b. var. *brevidens*

19a. Paraphlomis albida var. *albida*

白毛假糙苏 bai mao jia cao su

Calyx teeth broadly triangular-subulate, apex subulate.

• Forests, streamsides; 200–900 m. Guangdong, Hunan.

19b. Paraphlomis albida var. *brevidens* Handel-Mazzetti, Symb. Sin. 7: 922. 1936.

短齿变种 duan chi bian zhong

Calyx teeth broadly ovate-triangular, apex acute.

• Evergreen and pine forests, thickets; 100–900 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Taiwan.

20. *Paraphlomis intermedia* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 72. 1965.

中间假糙苏 zhong jian jia cao su

Herbs erect. Stem solitary, to 1 m, retrorse puberulent, base to 4 mm in diam., leafless, unbranched. Petiole 1.5–4 cm, narrowly winged; leaf blade ovate, 6.5–11 × 4–6.5 cm, sparsely pubescent, glandular, base broadly cuneate, abruptly decurrent, margin crenate-serrate, apex acute to acuminate. Verticillasters 10–14-flowered, globose, ca. 3 cm in diam.; bracteoles subulate, ca. 0.5 mm, deciduous. Pedicel obsolete. Calyx obconical, ca. 5 mm, sparsely pubescent, glabrous except for puberulent teeth inside, conspicuously 5-veined; teeth subequal, broadly triangular, ca. 1 mm, apex acute. Corolla white, ca. 1.5 cm, sparsely puberulent, glandular, pilose annulate inside; tube ca. 9 mm, throat ca. 3 mm wide; upper lip oblong, margin entire; middle lobe of lower lip ovate, lateral lobes oblong. Nutlets brown, triquetrous, oblong, ca. 2.2 × 1.3 mm, base attenuate, apex truncate, sparsely pubescent.

- Clumps of grass in bamboo forests; 400 m. Anhui, Zhejiang.

21. *Paraphlomis pagantha* Dunn, Fl. Indo-Chine 4: 1015. 1936.

奇异假糙苏 qi yi jia cao su

Herbs erect. Stem solitary, to 1 m, retrorse fine strigose. Petiole 3–4 cm, ± winged toward apex; leaf blade ovate, 10–16 × 4–7 cm, adaxially dark green, sparsely and finely strigose, densely so on veins, abaxially densely golden glandular, finely strigose along veins, base broadly cuneate, attenuate-decurrent along petiole, margin crenate-serrate, apex acute. Verticillasters (4–)6–13-flowered, subglobose, 1.5–1.8 cm in diam. in bud; bracteoles subulate, ca. 1 mm, early deciduous. Pedicel ca. 1.5 mm, strigose. Calyx obconical, ca. 4 mm, strigose, glandular or sometimes subglabrous, glabrous inside, conspicuously 10-veined; teeth equal, triangular, ca. 1 mm, apex acute. Corolla yellow or white, ca. 1.3 cm; tube slender, straight, cylindric, slightly longer than calyx tube, glabrous, villous annulate inside; upper lip elliptic, apex 2-lobed, sparsely pubescent outside; middle lobe of lower lip trapeziform, emarginate; lateral lobes ovate. Ovary apex pubescent. Fl. May–Jun.

45. *OMBROCHARIS* Handel-Mazzetti, Symb. Sin. 7: 925. 1936.

喜雨草属 xi yu cao shu

Herbs perennial. Rhizomes forming woody tubers. Stems sweetly aromatic. Verticillasters 6-flowered, in terminal racemes, bracts lanceolate, bracteoles minute. Calyx campanulate, 11-veined, 2-lipped, villous annulate on throat, dilated in fruit, ± membranous; upper lip 2-toothed, teeth lanceolate, apex acute; lower lip ca. 1/2 as long as upper lip, 3-toothed, teeth circular, apex acute. Corolla 2-lipped; upper lip somewhat galeate, deeply 2-lobed, lobes ovate; lower lip ca. 1/2 as long, 3-lobed, lobes subequal, subcircular, margin undulate. Stamens 4, included, inserted at middle of corolla tube; anterior filaments longer; anthers ellipsoid/circular, cells 2, subparallel, free. Style exerted, apex equally 2-cleft. Nutlets brownish, ovoid, flattened, smooth.

Monotypic: endemic to China.

1. *Ombrocharis dulcis* Handel-Mazzetti, Symb. Sin. 7: 926. 1936.

喜雨草 xi yu cao

Tubers to 3 cm in diam. Stems 1–3, erect, unbranched, 20–30 cm, slender, purplish villous, leafless toward base, glabrescent. Leaves ca. 5-paired toward apex; petiole 1.5–8

- Shady areas in dense forests, forest margins; 100 m. Hainan.

22. *Paraphlomis brevifolia* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 73. 1965.

短叶假糙苏 duan ye jia cao su

Herbs erect, with yellowish indumentum. Stems densely retrorse pilose, leafless toward base, unbranched. Petiole 3–6 mm; leaf blade oblong to ovate-oblong, 5–8 × 2.4–3.4 cm, ± leathery, densely puberulent, abaxially golden glandular, base obtuse to rounded, margin undulate-crenate, apex acute. Verticillasters 2-flowered; bracteoles minute, deciduous. Pedicel ca. 1 mm. Fruiting calyx obconical, ca. 6 mm, densely fine pilose, conspicuously 5-veined apically; teeth triangular, ca. 1.8 mm, puberulent inside, conspicuously extended into wings from veins, reflexed. Corolla unknown. Immature nutlets brown, triquetrous, oblong, ca. 2.5 × 1.5 mm, densely fine pilose, base attenuate, apex truncate.

- Guangxi.

23. *Paraphlomis subcoriacea* C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 10: 73. 1965.

近革叶假糙苏 jin ji ye jia cao su

Herbs erect, with yellowish indumentum. Stems ca. 60 cm, densely retrorse appressed pilose, leafless toward base, unbranched. Leaves lanceolate to narrowly lanceolate, 7–15 × 1.5–3 cm, ± leathery, adaxially densely appressed pilose, sparsely so with age, abaxially glabrous, densely appressed pilose along veins, sparsely so with age, base attenuate or abruptly obtuse, margin remotely serrulate, apex acuminate. Verticillasters 2–8-flowered; bracteoles subulate, less than 0.5 mm. Pedicel 3–4 mm. Calyx obconical, ca. 6 mm, sparsely fine appressed pilose, conspicuously 5-veined apically; teeth ca. 1.5 mm, inconspicuous so that calyx mouth appears subtruncate, extended into wings from veins. Corolla white or purple-white, ca. 1.6 cm; tube slightly longer than calyx, glabrous, interior pilose annulate; limb pilose outside; upper lip oblong, ca. 10 × 4.5 mm, galeate, concave, undulate; lower lip ovate, middle lobe ovate. Ovary apex sparsely puberulent.

- Forests, rocky valleys. Guangdong.

mm; leaf blade ovate to oblong-ovate, 4–12 × 1–4 cm, sparsely fine pilose, short floccose-pilose along veins, base broadly cuneate, decurrent along petiole, margin coarsely crenate-serrate, apex acute to short acuminate. Racemes 4–7 cm, retrorse minutely tomentose; verticillasters subsessile, widely spaced; bracts sessile, lanceolate, 5 mm, base acuminate, margin entire or few dentate, apex acuminate,

ciliolate; bracteoles minute. Pedicel 0.9–1.5 cm. Calyx 4–5 mm, glandular, veins finely pilose, pouched to 8 mm in fruit, limb 2-lipped to nearly 1/2 its length; upper lip 2-toothed to 2/3 of length. Corolla purplish, 6–8 mm, margin papillate

ciliolate; upper lip 3–4 mm, netted toward base, sparsely pilose abaxially. Nutlets ca. 2 mm. Fl. and fr. Aug.

- Subtropical evergreen forests; 1300 m. Hunan.

46. *BETONICA* Linnaeus, Sp. Pl. 2: 573. 1753.

药水苏属 yao shui su shu

Herbs erect, perennial, pilose. Basal leaves long petiolate; leaf blade broadly ovate to lanceolate, base strongly cordate, margin coarsely crenate. Verticillasters many flowered, in terminal spikes; floral leaves sessile; bracteoles at least as long as calyx. Calyx tubular-campanulate, 5-veined, hairy, glabrous at throat inside; teeth 5, equal, straight, rigidly spinescent. Corolla cylindrical, at least as long as calyx, 2-lipped, without hairy annulus inside, straight or slightly curved downward, rarely dilated at throat; upper lip concave, margin entire or emarginate; lower lip spreading, 3-lobed; middle lobe longer than lateral lobes, obtuse to emarginate. Stamens 4, parallel, ascending to underside of upper lip of corolla; anterior stamens longer, rarely curved laterally at throat after anthesis; anther cells 2, subparallel. Style apex subequally 2-cleft. Nutlets rounded to subtruncate.

About 15 species: SW Asia, Europe; one species cultivated in China.

Many workers consider *Betonica* to be synonymous with *Stachys*.

1. *Betonica officinalis* Linnaeus, Sp. Pl. 2: 573. 1753.

药水苏 yao shui su

Betonica glabrata K. Koch; *Stachys betonica* Benthams; *S. officinalis* (Linnaeus) Trevisan de Saint-Léon ex Briquet.

Plants rhizomatous. Stems 50–100 cm, striate, densely fine pilose. Petioles of stem leaves 4–7.5 cm; basal leaf blade broadly ovate, 8–12 × 3–5 cm, pilose, base deeply cordate, margin crenate, apex obtuse; stem leaf blade ovate, 4.5–5.5 × 3–4 cm, widely spaced. Spikes ca. 4 cm, compact, oblong; lower verticillasters sometimes ± widely spaced; basal floral leaves sessile, oblong-lanceolate, ca. 2.5 × 1 cm,

margin dentate, apex acute; upper floral leaves linear, margin entire, ca. 6.5 mm; bracteoles ovate to linear, ca. 6.5 mm, abaxially puberulent, margin densely pilose, adaxially glabrous, apex rigidly acute. Flowers subsessile. Calyx ca. 6.5 mm, densely pilose; teeth narrowly triangular, ca. 2.5 mm, pilose. Corolla purple, ca. 1.2 cm, puberulent except for base outside; tube cylindrical, ca. 8 mm; upper lip oblong, ca. 4 × 2.5 mm, emarginate, undulate; lower lip oblate, ca. 4 × 6 mm; middle lobe to 4 mm in diam., broadly ovate, undulate; lateral lobes ovate, ca. 1.5 mm wide. Stamens nearly included; filaments puberulent. Ovary black-brown, glabrous. Fl. May.

Cultivated in China [SW Asia, Europe].

47. *STACHYS* Linnaeus, Sp. Pl. 2: 580. 1753.

水苏属 shui su shu

Herbs erect perennials or diffuse annuals, rarely subshrubs or shrubs, sometimes rhizomatous. Verticillasters 2- to many flowered, in terminal spikes. Pedicel short or obsolete. Calyx tubular-campanulate, obconical or tubular, 5- or 10-veined; teeth 5, equal or posterior 3 larger, acute to bristlelike, or spinescent. Corolla red, purple, yellow, gray, or white, 2-lipped; tube cylindrical, nearly always villous annulate inside, sometimes saccate, incurved at apex, throat not dilated; upper lip straight or subpatent; lower lip longer, 3-lobed, middle lobe entire or emarginate, lateral lobes shorter. Stamens 4, reaching upper lip of corolla, anterior 2 longer and curved laterally at corolla throat; anther cells 2, conspicuous, parallel or divergent. Style apex subequally 2-cleft, lobes subulate. Nutlets ovoid to oblong, smooth or tuberculate, apex obtuse to rounded.

About 300 species: Africa, Asia, Europe, North America, South America; 18 species in China.

- 1a. Annual herbs; corolla tube short, included 18. *S. arvensis*
 1b. Perennial herbs.
 2a. Bracteoles much longer than pedicels, at least 1/2 as long as calyx.
 3a. Plants densely gray sericeous-lanate; leaves thick; verticillasters in long compact spikes 1. *S. lanata*
 3b. Plants pilose; leaves papery; verticillasters in widely spaced spikes.
 4a. Branches few or none; calyx teeth ovate-lanceolate, apex spinescent, strongly reflexed 3. *S. strictiflora*
 4b. Branches many from near stem base; calyx teeth triangular, apex rigid, straight 2. *S. melissaefolia*
 2b. Bracteoles shorter to slightly longer than pedicels, early deciduous.
 5a. Stem leaves ovate-cordate, 8–12 × 5–9.5 cm; petiole 3–6.5 cm 4. *S. sylvatica*
 5b. Stem leaves smaller.
 6a. Leaves lanceolate to oblong-lanceolate.
 7a. Abaxial leaf surface densely gray villous-tomentose, veins villous 9. *S. oblongifolia*
 7b. Abaxial leaf surface puberulent to hispid or glabrous.
 8a. Stems densely retrorse villous, nodes and angles sparsely hispid 5. *S. palustris*
 8b. Stems spreading hispid or subglabrous.
 9a. Stems densely hispid or minutely hispid; calyx densely white villous-hispid 6. *S. baicalensis*

- 9b. Stems glabrous or minutely hispid to villous-hispid on nodes and angles; calyx villous-hispid or glandular puberulent.
- 10a. Adaxial leaf surface sparsely minutely hispid or subglabrous; petiole 0–5 mm; calyx sparsely villous-hispid along veins and margin 7. *S. chinensis*
- 10b. Leaves glabrous; petiole 3–17 mm; calyx glandular puberulent 8. *S. japonica*
- 6b. Leaves ovate, oblong-ovate, or cordate.
- 11a. Rhizomes not enlarged or succulent; leaves cordate- to truncate-triangular, ca. 3 cm 17. *S. kouyangensis*
- 11b. Rhizomes enlarged, succulent; leaves ovate, oblong-ovate, or cordate, more than 3 cm.
- 12a. Plants subglabrous; calyx teeth with rigid apices 11. *S. adulterina*
- 12b. Plants conspicuously hairy.
- 13a. Calyx teeth linear-lanceolate, reflexed, apex acuminate 16. *S. pseudophlomis*
- 13b. Calyx teeth narrowly triangular, straight.
- 14a. Plants much branched, pubescent; leaves cordate 12. *S. arrecta*
- 14b. Plants unbranched or few branched; leaves ovate to oblong-ovate.
- 15a. Corolla white.
- 16a. Adaxial leaf surface silky-strigose; calyx teeth 1–2 mm, acute 15. *S. taliensis*
- 16b. Adaxial leaf surface sparsely pilose-hispid; calyx teeth ca. 3 mm, awned, ± reflexed 13. *S. geobombycis*
- 15b. Corolla yellow or red to purple.
- 17a. Calyx teeth ca. 1.5 mm, acute 13. *S. geobombycis*
- 17b. Calyx teeth 2.5–4 mm, spinescent.
- 18a. Corolla yellow; petiole to 5 cm 14. *S. xanthantha*
- 18b. Corolla red to purple; petiole ca. 3 cm 10. *S. sieboldii*

1. *Stachys lanata* Jacquin, Icon. Pl. Rar. 1: 11. 1781.

绵毛水苏 mian mao shui su

Herbs perennial, usually densely gray or white silky-lanate throughout. Stems erect, ca. 60 cm tall. Petiole semiamplexicaul; basal leaf blade oblong-elliptic, ca. 10 × 2.5 cm, base attenuate, margin crenulate, apex attenuate. Spikes 10–22 cm; verticillasters many flowered, contiguous except for lowest 1–3; floral leaves subsessile, minute, lower ones slightly longer than verticillasters, upper ones shorter; bracteoles linear to linear-lanceolate, ca. 6 mm. Flowers sessile. Calyx tubular-campanulate, slightly curved, ca. 1.2 cm, glabrous except for teeth on inside, 10-veined, accessory veins inconspicuous; teeth subequal or posterior teeth larger, ovate-triangular, 2–3 mm, apices rigid. Corolla ca. 1.2 cm, silky-lanate, base glabrous; tube ca. 6 mm; upper lip ovate, margin entire; lower lip subpatent, middle lobe broadly ovate, lateral lobes oblong. Filaments densely villous basal to middle. Style much exerted. Immature nutlets brown, oblong, glabrous. Fl. Jul.

Cultivated in China [SW Asia, Europe].

Used as an ornamental.

2. *Stachys melissaefolia* Bentham, Labiat. Gen. Spec. 538. 1834.

多枝水苏 duo zhi shui su

Stachys splendens Wallich.

Herbs perennial. Stems erect, 60–80 cm, retrorse pilose, slender; branches many, divaricate. Petiole 0.6–2.5 cm; leaf blade ovate-cordate to oblong-cordate, 5–6 × ca. 2.3 cm, adaxially somewhat bullate, villous, abaxially densely villous, base cordate, margin crenate or double crenate, apex acute. Verticillasters ca. 10-flowered, widely spaced; floral leaves sessile, ovate; bracteoles few, linear, villous, 2.5–3.5 mm. Calyx obconical, 5–7 × 5–7 mm, sparsely pubescent, puberulent inside, obscurely 10-veined; teeth triangular, ca. 1.5 mm, subequal or posterior 3 larger, apex rigid, pubescent.

Corolla reddish, to 1.3 cm, puberulent except for glabrous base, tube ca. 7 mm; upper lip straight, ovate, ca. 3 mm, margin entire; lower lip ca. 6 mm, lateral lobes ovate; middle lobe largest, obcordate. Stamens reaching middle of upper corolla lip; filaments puberulent. Style slightly exerted. Nutlets brown, triquetrous, ovoid, ca. 2 mm, adaxially ribbed, glabrous. Fl. Jul, fr. Aug.

Wet areas in forests; 3100 m. Xizang [India (Sikkim), Nepal].

3. *Stachys strictiflora* C. Y. Wu, Acta Phytotax. Sin. 10: 220. 1965.

直花水苏 zhi hua shui su

Herbs erect, rhizomatous, perennial, usually densely pilose throughout. Stems 30–60 cm, slender, branches few or none. Petiole 0.7–1.5 cm; leaf blade ovate-cordate, 3–5 × 2–3 cm, adaxially bullate, base cordate, margin crenate, apex acute. Verticillasters 2–6-flowered, widely spaced; floral leaves short petiolate or subsessile, triangular-oblong to ovate, base shallowly cordate to subrounded, apex acute; bracteoles few, linear, ca. 2 mm. Pedicel less than 1 mm. Calyx campanulate, ca. 7 mm, pilose, glandular, 10-veined, accessory veins inconspicuous; teeth subequal, ca. 3 mm, glandular puberulent outside, finely pilose inside. Corolla reddish, sparsely puberulent; tube ca. 9 mm, base saccate; upper lip straight, ovate, ca. 3.5 mm, margin entire; lower lip spreading, ca. 4 × 5 mm; middle lobe trapeziform, emarginate; lateral lobes ovate, ca. 1.5 mm wide. Stamens reaching middle of upper lip of corolla; filaments puberulent, apex slightly dilated. Ovary dark brown, glabrous. Style nearly included. Fl. Jun-Jul.

• Grassy slopes; 2100–3400 m. Yunnan.

- 1a. Calyx teeth ovate-lanceolate, spinescent, conspicuously reflexed; corolla ca. 1.2 cm; plants densely pilose throughout 3a. var. *strictiflora*
- 1b. Calyx teeth ovate-triangular, acute, nearly straight; corolla more than 1.5 cm; plants densely villous throughout 3b. var. *latidens*

3a. *Stachys strictiflora* var. *strictiflora*

直花水苏 zhi hua shui su

Plants densely pilose throughout. Calyx teeth ovate-lanceolate, spinescent, conspicuously reflexed. Corolla ca. 1.2 cm.

- Grassy slopes; 2100 m. Yunnan.

3b. *Stachys strictiflora* var. *latidens* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 221. 1965.

宽齿变种 kuan chi bian zhong

Plants densely villous throughout. Calyx teeth ovate-triangular, apex acute, suberect. Corolla more than 1.5 cm.

- Grassy slopes; 2500–3400 m. Yunnan.

4. *Stachys sylvatica* Linnaeus, Sp. Pl. 2: 580. 1753.

林地水苏 lin di shui su

Herbs perennial. Stems erect or slightly flexuous, 30–120 cm, branched toward apex, hispid, angles glandular puberulent. Petiole slender, 3–6.5 cm; stem leaf blades ovate-cordate, 8–12 × 5–9.5 cm, adaxially shiny, appressed villous-hispid, abaxially gray-green, yellowish glandular, villous-hispid along veins, base cordate, margin coarsely callose crenate-serrate, apex acuminate. Spikes 10–20 cm; verticillasters 6(–8)-flowered, widely spaced; lower floral leaves petiolate, 10–15 × 2–4 mm, margin dentate; upper floral leaves sessile, oblong-lanceolate, slightly longer than verticillasters, margin entire; bracteoles minute or absent. Pedicel ca. 1 mm. Calyx tubular-campanulate, ca. 7 mm, spreading hispid, glandular puberulent, 10-veined, accessory veins inconspicuous; teeth triangular-lanceolate, 2–3 mm, subequal, apex spinescent; fruiting calyx slightly saccate-dilated. Corolla red to purple, ca. 1.4 cm, sparsely puberulent; tube straight, ± saccate; upper lip straight, oblong, ca. 5 × 3 mm; lower lip spreading, ca. 7 × 6 mm; middle lobe subcircular, emarginate; lateral lobes ovate. Filaments villous below middle. Style nearly exerted. Nutlets dark brown, triquetrous, ovoid, glabrous. Fl. Jul-Aug, fr. Aug.

Coniferous forests, thickets, alpine meadows; 1700 m. Xinjiang (cultivated in other provinces) [Kazakhstan, Kyrgyzstan, Russia; SW Asia, Europe].

Sometimes cultivated as an ornamental.

5. *Stachys palustris* Linnaeus, Sp. Pl. 2: 580. 1753.

沼泽水苏 zhao sheng shui su

Herbs perennial. Rhizomes robust. Stems usually much branched, 60–110 cm, densely retrorse pubescent, nodes and angles sparsely hispid. Stem leaves petiole 2–3 mm; leaf blade oblong-lanceolate to ovate-lanceolate, 3–8 × 1.2–1.5 cm, appressed puberulent, densely so on veins and abaxially, base rounded to shallowly cordate, margin serrate-crenate, apex acute to acuminate. Spikes long; verticillasters 6-flowered, ± close together except for lower ones; lower floral leaves subsessile, similar to stem leaves; upper ones long acuminate, entire, shorter than verticillasters; bracteoles ca. 1 mm, early deciduous. Pedicel ca. 1 mm. Calyx tubular-campanulate, ca. 7 mm, grooved, villous, glandular puberulent, puberulent inside, 10-veined, accessory veins inconspicuous; teeth triangular-lanceolate, ca. 3 mm, apex spinescent, ± reflexed; fruiting calyx campanulate, conspicuously pouched. Corolla purple to red-purple, ca. 1.3

cm, sparsely puberulent outside, puberulent on throat; tube ca. 7 mm; upper lip straight, broadly ovate, ca. 3 × 2 mm; lower lip ± spreading, ca. 6 × 6 mm; middle lobe reniform, apex rounded; lateral lobes ovate. Nutlets brown, triquetrous ovoid, glabrous. Fl. Jun-Aug, fr. Aug-Sep.

Marshy areas along lakes and streams in tall grass; 500 m. Xinjiang [India, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; SW Asia, Europe, North America].

A polymorphic species. Specimens from Xinjiang resemble var. *subcanescens* Ledebour.

6. *Stachys baicalensis* Fischer ex Benth, Labiat. Gen. Spec. 543. 1834.

毛水苏 mao shui su

Herbs perennial, rhizomatous. Stems erect, 50–100 cm, sometimes branched toward apex, glabrous to pubescent. Petiole 0–2 mm; leaf blade 3–11 × 0.4–1.5 cm, hispid, sometimes only on veins abaxially, base rounded, margin crenulate-serrate, apex acute. Spikes continuous except at base; verticillasters 6-flowered; floral leaves lanceolate, shorter to slightly longer than calyx; bracteoles linear, spinescent, early deciduous. Pedicel ca. 1 mm, hispid. Calyx campanulate, ca. 9 mm, veins and margin densely villous-hispid, glabrous inside, conspicuously 10-veined; teeth lanceolate-triangular, ca. 3 mm, apex spinescent. Corolla purplish to purple, to 1.5 cm, hairy on limb outside; tube straight, ca. 9 mm, glabrous; upper lip straight, ovate, ca. 7 × 4 mm; lower lip ovate, ca. 8 × 7 mm; middle lobe subcircular, ca. 4 mm in diam.; lateral lobes ovate, ca. 2 mm wide. Nutlets brown, ovoid, glabrous. Fl. Jul, fr. Aug.

Wet grassy areas, riverbanks; 200–1700 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Japan, Korea, Russia].

- 1a. Leaves linear to linear-lanceolate, 3–4.5 cm × 4–6 mm 6c. var. *angustifolia*
- 1b. Leaves oblong-linear, 4–11 × 0.7–1.5 cm.
 - 2a. Stem angles sparsely minutely hispid especially toward apex, subglabrous at base, nodes hispid; leaves sparsely minutely hispid; calyx sparsely villous-hispid 6b. var. *hispidula*
 - 2b. Stems glabrous, angles and nodes densely retrorse to spreading hispid; adaxial surface of leaf sparsely hispid, abaxial surface glabrous, veins hispid; calyx densely villous-hispid along veins and margin 6a. var. *baicalensis*

6a. *Stachys baicalensis* var. *baicalensis*

毛水苏 mao shui su

Stachys aspera Michaux var. *baicalensis* (Fischer ex Benth) Maximowicz; *S. baicalensis* var. *hispidula* (Ledebour) Nakai; *S. japonica* Miquel f. *villosa* Kudô; *S. palustris* Linnaeus var. *hispidula* Ledebour; *S. riederi* Chamisso var. *hispidula* (Ledebour) H. Hara; *S. ringens* Oettingen.

Stems densely retrorse to patent hispid on angles and nodes, glabrous elsewhere. Leaf blade adaxially sparsely hispid, abaxially hispid along veins otherwise glabrous. Calyx densely villous-hispid along veins and margin.

Wet grassy areas, riverbanks; 400–1700 m. Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Russia].

6b. *Stachys baicalensis* var. *hispidula* (Regel) Nakai, Bot. Mag. (Tokyo) 34: 46. 1920.

小剛毛变种 xiao gang mao bian zhong

Stachys palustris Linnaeus var. *hispidula* Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg 4: 119. 1861; *S. baicalensis* f. *intermedia* Kudô; *S. riederi* Chamisso var. *hispidula* (Regel) H. Hara.

Stems sparsely hispidulous along angles especially toward apex, subglabrous at base, hispid on nodes. Leaf blade sparsely hispidulous. Calyx sparsely villous-hispid.

Wet areas; 200–700 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Russia].

6c. *Stachys baicalensis* var. *angustifolia* Honda, Bot. Mag. (Tokyo) 46: 374. 1932.

狭叶变种 xia ye bian zhong

Stachys japonica Miquel f. *angustifolia* Miquel; *S. riederi* Chamisso var. *hispidula* (Regel) H. Hara f. *angustifolia* (Honda) H. Hara.

Leaves linear to linear-lanceolate, 3–4.5 cm × 4–6 mm.

Open areas; 600 m. Jilin [Japan, Korea, Russia].

7. *Stachys chinensis* Bunge ex Benth, Labiat. Gen. Spec. 544. 1834.

华水苏 hua shui su

Stachys aspera Michaux var. *chinensis* (Bunge ex Benth) Maximowicz; *S. baicalensis* Fischer ex Benth var. *chinensis* (Bunge ex Benth) V. Komarov; *S. chanetii* H. Léveillé.

Herbs erect, perennial. Stems ca. 60 cm, unbranched or branched at base, glabrous, angles and nodes sparsely retrorse villous-hispid. Petiole (0–)2–5 mm; leaf blade oblong-lanceolate, 5.5–8.5 × 1–1.5 cm, sparsely minutely hispid or glabrescent, base subrounded, margin serrate-crenate, apex obtuse. Verticillasters 6-flowered, widely spaced; floral leaves sessile, upper blades lanceolate, villous hispid, sessile, margin subentire; bracteoles spiny, ca. 1 mm. Pedicel short to obsolete. Calyx campanulate, ca. 1 cm, veins and margin villous-hispid, accessory veins inconspicuous; teeth lanceolate, equal, ca. 4 mm, apex acute, spinescent. Corolla purple, ca. 1.5 cm, lips puberulent; tube ca. 8 mm, straight, slightly saccate; upper lip erect, oblong, ca. 4 × 2 mm; lower lip spreading, subcircular, ca. 7 × 7 mm; middle lobe subcircular, ca. 3 × 4 mm, emarginate; lateral lobes ovate, ca. 2 mm wide. Nutlets brown, triquetrous, ovoid, glabrous. Fl. Jun-Aug, fr. Jul-Sep.

Sandy areas, ravines; to 1000 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Russia].

8. *Stachys japonica* Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 111. 1865.

水苏 shui su

Stachys aspera Michaux var. *chinensis* (Bunge ex Benth) Maximowicz f. *glabrata* Nakai; *S. aspera* var. *japonica* (Miquel) Maximowicz; *S. baicalensis* Fischer ex Benth var. *japonica* V. Komarov; *S. japonica* f. *glabrata* Matsumura & Kudô; *S. riederi* Chamisso var. *japonica* (Miquel) H. Hara.

Herbs perennial, rhizomatous. Stems unbranched, ascending, 20–80 cm, glabrous, angles and nodes minutely hispid. Petiole conspicuous, 0.3–1.7 cm; leaf blade broadly oblong-lanceolate, 5–10 × 1–2.3 cm, glabrous, abaxially gray-green, base rounded to shallowly cordate, margin crenate-serrate, apex acute. Spikes 5–13 cm; verticillasters 6–8-flowered, lower widely spaced; floral leaves sessile, lanceolate, margin subentire, lower ones longer than verticillasters, upper shorter; bracteoles spiny, ca. 1 mm, glabrous. Pedicel ca. 1 mm. Calyx campanulate, to 7.5 mm, glandular puberulent, veins pilose, rarely appressed-puberulent or subglabrous, obscurely 10-veined; teeth equal, triangular-lanceolate, spinescent, ciliate, sparsely puberulent inside. Corolla reddish or reddish purple, ca. 1.2 cm; tube ca. 6 mm, ± included, saccate, glabrous, throat scaly-puberulent below lower lip; limb puberulent outside, glabrous inside; upper lip straight, obovate, ca. 4 × 2.5 mm; lower lip spreading, ca. 7 × 6 mm; middle lobe subcircular, emarginate; lateral lobes ovate. Filaments slightly dilated at apex, puberulent. Style slightly longer than stamens. Nutlets brown, ovoid, glabrous. Fl. May-Jul, fr. Aug-Sep.

Wet areas in ravines, riverbanks; to 2300 m. Anhui, Fujian, Hebei, Henan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Shandong, Zhejiang [Japan, Russia].

Used medicinally for tonsillitis, sore throat, and dysentery.

9. *Stachys oblongifolia* Wallich ex Benth, Pl. Asiat. Rar. 1: 64. 1830.

针筒菜 zhen tong cai

Herbs perennial, rhizomatous. Stems erect or ascending, 30–60 cm, slightly scabrid at base, ± puberulent, angles and nodes villous, branches few or none. Petiole 0–2 mm; leaf blade oblong-lanceolate, 3–7 × 1–2 cm, adaxially sparsely puberulent, villous, abaxially densely white villous-tomentose, villous on veins, base shallowly cordate, margin crenate-serrate, apex acute. Verticillasters 6-flowered, lower widely spaced, upper in terminal spikes 5–8 cm; floral leaves sessile, lanceolate, longer than calyx, margin subentire; bracteoles linear-setiform, ca. 1 mm, puberulent. Calyx campanulate to obconical-campanulate, ca. 7 mm, 10-veined, glandular villous-tomentose, veins sparsely villous, accessory veins inconspicuous; teeth triangular-lanceolate, ca. 2.5 mm, subequal or lower 2 longer, apex spinescent. Corolla reddish or reddish purple, ca. 1.3 cm, sparsely puberulent; limb densely pilose; tube ca. 7 mm, throat puberulent, annulus inconspicuous or absent; upper lip oblong; lower lip spreading, middle lobe reniform, lateral lobes ovate. Filaments puberulent. Nutlets brown, ovoid, ca. 1 mm in diam., glabrous.

Bamboo forests, thickets, dry sandy areas, reed marshes, wet areas; 200–1900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan [India (Sikkim)].

- 1a. Leaves short petiolate to subsessile; calyx campanulate; corolla ca. 2 × as long as calyx, tube equal to slightly longer than calyx 9a. var. *oblongifolia*
- 1b. Leaves petiolate; calyx obconical-campanulate; corolla slightly longer than calyx, tube included..... 9b. var. *leptopoda*

9a. *Stachys oblongifolia* var. *oblongifolia*

针筒菜 zhen tong cai

Stachys imaii Nakai; *S. modica* Hance; *S. palustris* Linnaeus var. *imaii* (Nakai) Nakai; *S. subargentea* Hayata.

Leaves short petiolate to subsessile. Calyx campanulate. Corolla ca. 2 × as long as calyx, tube equal to slightly longer than calyx.

Bamboo forests, thickets, reed marshes, wet areas; 200–1900 m. Anhui, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan [India (Sikkim)].

Used medicinally for dysentery and traumatic injury, and as a tonic. Young stems and leaves fed to pigs.

9b. *Stachys oblongifolia* var. *leptopoda* (Hayata) C. Y. Wu, Acta Phytotax. Sin. 10: 222. 1965.

细柄变种 xi bing bian zhong

Stachys leptododa Hayata, Icon. Pl. Formos. 8: 93. 1919; *S. oblongifolia* Benth. f. *leptopoda* (Hayata) Kudô.

Stems slender. Leaves petiolate. Calyx obconical-campanulate. Corolla slightly longer than calyx, tube included.

• Dry sandy areas, waste fields; to 500 m. Fujian, Guangdong, Guangxi, Sichuan, Taiwan, Yunnan.

10. *Stachys sieboldii* Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 112. 1865.

甘露子 gan lu zi

Herbs perennial. Rhizomes white. Stems erect or inclined, 30–120 cm. Petiole 1–3 cm; leaf blade ovate to elliptic-ovate, 3–12 × 1.5–6 cm, base broadly cuneate to shallowly cordate, margin crenate-serrate, apex acute to acuminate. Spikes 5–15 cm; verticillasters 6-flowered, widely spaced; floral leaves bractlike, reflexed (especially in cultivated form), adaxial ones sessile, lanceolate, margin subentire, shorter than calyx; bracteoles linear, ca. 1 mm. Pedicel ca. 1 mm. Calyx narrowly campanulate, ca. 9 mm, glandular pubescent, ± conspicuously 10-veined; teeth narrowly triangular, ca. 4 mm, apex spinescent, slightly reflexed. Corolla red to purple; lower lip purple spotted, ca. 1.3 cm, tube ca. 9 mm, somewhat saccate, puberulent; upper lip oblong, ca. 4 × 2 mm, straight or slightly reflexed; lower lip ca. 7 × 7 mm, middle lobe subcircular, ca. 3.5 mm in diam., lateral lobes ovate. Filaments slightly dilated apically, puberulent. Nutlets black-brown, ovoid, ca. 1.5 cm in diam., tuberculate. Fl. Jul-Aug, fr. Sep.

Hillsides, wet and submersed areas; to 3200 m. Nei Mongol, Shaanxi, Shanxi, Xinjiang (cultivated in other provinces) [Japan; Europe, North America].

1a. Plants subglabrous throughout 10c. var. *glabrescens*

1b. Plants ± hairy throughout.

2a. Hairs of stems and leaves

gray, slender, short..... 10b. var. *malacotricha*

2b. Hairs of stems and leaves

not gray, rigid, long..... 10a. var. *sieboldii*

10a. *Stachys sieboldii* var. *sieboldii*

甘露子 gan lu zi

Stachys affinis Bunge; *S. tuberifera* Naudin.

Hairs of stems and leaves not gray, rigid, long.

Wet and submersed areas; to 3200 m. Gansu, Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang (cultivated in other provinces) [Japan; Europe, North America].

Rhizomes edible. Entire plant used as medicine for colds and pneumonia.

10b. *Stachys sieboldii* var. *malacotricha* Handel-Mazzetti, Acta Horti Gothob. 9: 83. 1934.

软毛变种 ruan mao bian zhong

Hairs of stems and leaves gray, slender, short.

• Wet areas in valleys, streamsides; 800–1600 m. Shaanxi, Shanxi.

10c. *Stachys sieboldii* var. *glabrescens* C. Y. Wu, Acta Phytotax. Sin. 10: 222. 1965.

近无毛变种 jin wu mao bian zhong

Plants subglabrous throughout.

• Hillsides; 2400 m. Hubei, Sichuan.

11. *Stachys adulterina* Hemsley, J. Linn. Soc., Bot. 26: 300. 1890.

少毛甘露子 shao mao gan lu zi

Herbs perennial, glabrous nearly throughout. Stems 60–120 cm, solitary, internodes sometimes longer than leaves. Basal leaves absent; stem leaves conspicuously long petiolate except for a few upper floral leaves; petiole ciliolate; leaf blade oblong-lanceolate, to 15 cm including petiole, smaller and sometimes subcircular in upper leaves, membranous, glabrous or sparsely strigose, base rounded or sometimes cordate, margin serrate-crenate, apex acute. Verticillasters few, ca. 6-flowered. Flowers sessile. Calyx minutely hispid, slightly oblique, ca. 1 cm, conspicuously 5-veined; teeth broadly triangular, rigid, apex obtuse. Corolla red or white, ca. 1.9 cm; upper lip galeate, hirsute outside; lower lip oblong, undulate, lateral lobes smaller. Stamens included; filaments dilated below middle, puberulent. Nutlets subglobose, glabrous, adaxially ribbed (specimens not seen).

• Garden margins; 1800 m. Hubei, Sichuan.

Rhizomes edible.

12. *Stachys arrecta* L. Bailey, Gentes Herb. 1: 43. 1920.

蜗儿菜 wo er cai

Herbs perennial. Rhizomes succulent. Stems erect, 40–60 cm, much branched along entire length, densely villous; branches slender, densely villous. Petioles of stem leaves 0.5–1.5 cm, densely pubescent; stem leaves blade cordate, 2.5–6.5 × 1.5–3 cm, papery, adaxially sparsely pubescent, abaxially pubescent, densely pubescent and glandular on veins, base cordate, margin crenulate or crenate-serrate, apex acuminate; lateral veins 3–5 pairs, conspicuously elevated abaxially. Verticillasters 2–6-flowered, few, widely spaced, subapical; upper floral leaves sessile, lanceolate; bracteoles linear, ca. 1 mm. Pedicel ca. 1 mm. Calyx tubular-campanulate, ca. 5 mm, conspicuously 10-veined, densely glandular pubescent or pubescent outside, apex sparsely puberulent inside; teeth subequal, narrowly triangular, 2–2.5 mm, apex acuminate, rigid. Corolla reddish, ca. 1.2 cm, tube ca. 8 mm, subequal in diam., puberulent; upper lip erect, oblong-ovate, ca. 3 × 2 mm; lower lip subpatent, subcircular,

ca. 4 × 3.5 mm. Filaments puberulent; anthers ovoid, divaricate. Ovary glabrous. Nutlets brown, ovoid, ca. 1.5 mm, tuberculate. Fl. Jul-Aug, fr. Sep-Oct.

• Jungles, shady valleys; 1500–2000 m. Anhui, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Shanxi, Zhejiang.

13. *Stachys geobombycis* C. Y. Wu, Acta Phytotax. Sin. 10: 222. 1965.

地蚕 di can

Herbs perennial. Rhizomes enlarged, succulent. Stems erect, 40–50 cm, angles and nodes sparsely retrorse pilose-hispid. Petiole of stem leaves 1–4.5 cm; blade oblong-ovate, 4.5–8 × 2.5–3 cm, sparsely pilose-hispid, densely so on abaxial veins, base shallowly cordate or rounded, margin coarsely crenate-serrate, apex obtuse. Spikes 5–18 cm; verticillasters 4–6-flowered, widely spaced; bracteoles few, less than 0.5 mm, early deciduous. Pedicel ca. 1 mm. Calyx obconical, ca. 5.5 mm, densely puberulent, glandular, conspicuously 10-veined; tube ca. 4 mm; teeth deltate to lanceolate-triangular, equal, 1.5–3 mm, margin glandular puberulent. Corolla ca. 1.1 cm; tube ca. 7 mm, cylindric, apex puberulent; upper lip straight, oblong-ovate, ca. 4 × 2.5 mm; lower lip horizontally spreading, ovate, ca. 5 × 4 mm; middle lobe narrowly ovate, ca. 1.5 mm wide, sparsely puberulent; lateral lobes ovate, ca. 1.5 mm wide. Stamens included; filaments puberulent below middle. Ovary black-brown, glabrous. Fl. Apr-May.

• Broad-leaved forests, waste areas, wet grasslands; 200–700 m. Fujian, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Zhejiang.

- 1a. Corolla white; calyx teeth lanceolate-triangular, ca. 3 mm, awned, ± reflexed
..... 13b. var. *alba*
1b. Corolla reddish to purple-blue; calyx teeth deltate, ca. 1.5 mm, acute
..... 13a. var. *geobombycis*

13a. *Stachys geobombycis* var. *geobombycis*

地蚕 di can

Corolla reddish to purple-blue. Calyx teeth deltate, ca. 1.5 mm, acute.

• Waste areas, wet grasslands; 200–700 m. Fujian, Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Zhejiang.

Rhizomes edible. Entire plant used medicinally to treat traumatic injury and scabies.

13b. *Stachys geobombycis* var. *alba* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 223. 1965.

白花变种 bai hua bian zhong

Corolla white. Calyx teeth lanceolate-triangular, ca. 3 mm, aristate, ± reflexed.

• Broad-leaved forests; 600 m. Guangdong, Guangxi, Hunan.

14. *Stachys xanthantha* C. Y. Wu, Acta Phytotax. Sin. 10: 224. 1965.

黄花地钮菜 huang hua di niu cai

Stachys xanthantha var. *gracilis* C. Y. Wu & H. W. Li.

Herbs perennial. Rhizomes not enlarged. Stems erect or ascending, slender, few branched above middle, angles and nodes retrorse strigose, internodes much longer than leaves.

Petiole 1–5 cm; leaf blade oblong-ovate, rarely triangular-ovate, (1.5–)4–10 × (1–)1.8–4 cm, adaxially sparsely strigose, densely so on margin, abaxially subglabrous, base shallowly cordate to broadly cuneate, margin regularly crenate-serrate, apex acute; midrib and veins abaxially sparsely strigose, conspicuous, whitish. Spikes 5–12 cm; verticillasters 6-flowered, lower 1 or 2 widely spaced; upper floral leaves sessile, lanceolate; bracteoles less than 1 mm, early deciduous. Pedicel ca. 1 mm. Calyx narrowly campanulate, ca. 8 mm, conspicuously 10-veined, veins hispid; teeth equal or posterior 3 larger, triangular, 2.5–3 mm, glandular puberulent, apical spine ca. 0.5 mm. Corolla yellow, ca. 1.5 cm; tube ca. 9 mm, saccate, apex sparsely puberulent; upper lip straight, oblong-ovate, ca. 5 × 3 mm, undulate; lower lip horizontally spreading, ca. 7 × 6 mm; middle lobe subcircular, ca. 5 mm wide; lateral lobes ovate, ca. 2 mm wide. Filaments apex slightly dilated, puberulent at middle. Ovary dark brown, glabrous. Fl. Jun-Jul.

• Waste areas; 1900–2300 m. Sichuan.

15. *Stachys taliensis* C. Y. Wu, Acta Phytotax. Sin. 10: 225. 1965.

大理水苏 da li shui su

Herbs perennial. Rhizomes not enlarged. Stems erect, slender, unbranched, angles retrorse strigose, base subglabrous, apex densely pilose-strigose, internodes much longer than leaves. Petiole 1–2 cm; leaf blade lanceolate-ovate, 4–8 × 2–2.5 cm, adaxially densely silky-strigose, abaxially sparsely strigose, base truncate to shallowly cordate, margin crenate-serrate, apex acute. Spikes 5–7 cm; verticillasters 6-flowered, lower 2 or 3 ± widely spaced; upper floral leaves sessile, ca. as long as verticillasters; bracteoles few, less than 1 mm, early deciduous. Pedicel ca. 1 mm. Calyx campanulate, 6–7 mm, silky-strigose, 5-veined; teeth triangular, subequal or posterior 3 slightly larger, 1–2 mm, apex acute, glandular puberulent. Corolla white, ca. 1.3 cm; tube ca. 8 mm, subcylindric, sparsely puberulent, saccate; upper lip straight, oblong-ovate, ca. 5 × 3 mm; lower lip horizontally spreading, ovate, ca. 5 mm wide; middle lobe subcircular, ca. 3 mm wide, emarginate; lateral lobes ovate, ca. 1.5 mm wide. Stamens included; filaments puberulent below middle, slightly dilated at apex. Ovary black-brown, glabrous. Fl. Jun.

• Evergreen, broad-leaved forests; 2000 m. Yunnan.

16. *Stachys pseudophlomis* C. Y. Wu, Acta Phytotax. Sin. 10: 226. 1965.

狭齿水苏 xia chi shui su

Herbs perennial. Rhizomes enlarged. Stems ascending-erect, 50–100 cm, densely retrorse pilose. Petiole 1.5–2.5 cm; stem leaf blade ovate-cordate, 5–7 × 2.8–4 cm, membranous, adaxially densely silky-strigose; abaxially densely strigose, densely pilose on veins, base cordate, margin crenulate-serrate, apex acuminate. Verticillasters 2–6-flowered, widely spaced; upper floral leaves sessile, lanceolate, base rounded, shorter than flowers; bracteoles linear, less than 1 mm. Pedicel ca. 1 mm. Calyx tubular-campanulate, 6.5–7 mm, densely pilose, glandular, ± conspicuously 10-veined, inside silky-puberulent; teeth subequal, linear-lanceolate, 2.5–3 mm, apex acuminate, reflexed. Corolla purple or red, ca. 1.5 cm; tube cylindric, saccate, apex puberulent; upper lip straight, oblong-ovate, ca. 4 × 2.5 mm; lower lip horizontally

spreading, ca. 5 mm wide; middle lobe largest, subcircular, ca. 3 mm wide; lateral lobes ovate, ca. 1.5 mm wide. Stamens included; filaments puberulent, apex slightly dilated. Ovary brown, glabrous. Fl. Jul-Aug.

- Bamboo forests; 800 m. Hubei, Sichuan.

17. *Stachys kouyangensis* (Vaniot) Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 167. 1913.

西南水苏 xi nan shui su

Herbs perennial, rhizomatous. Stems slender, flexuous, base prostrate, ca. 50 cm, angles and nodes hispid. Petiole ca. 1.5 cm; leaf blade triangular-cordate to hastate-triangular, ca. 3 × 2.5 cm, base cordate to truncate, margin crenate, apex obtuse. Spikes lax; verticillasters 5- or 6-flowered, widely spaced; upper floral leaves sessile, ovate-triangular, remotely crenate, shorter than calyx tube; bracteoles ca. 1 mm, early deciduous. Pedicel less than 1 mm. Calyx obconical, ca. 6 mm, minutely hispid, conspicuously 10-veined; teeth ca. 2 × 2 mm, apical spine ca. 1 mm. Corolla reddish to purple red, ca. 1.5 cm; tube ca. 1.1 cm, puberulent, saccate; upper lip erect, oblong-ovate, ca. 4 × 3 mm; lower lip spreading, ca. 6 × 6 mm; middle lobe circular, ca. 3.5 mm in diam.; lateral lobes ovate, ca. 1.5 mm wide. Nutlets ovoid to obovoid, 1.5–3 mm in diam., brownish, smooth to tuberculate. Fl. Jul-Aug, fr. Sep, sometimes fl. and fr. Nov.

- Thickets, mixed forests, grassy slopes, open areas, field margins, moist streamsides; 900–3800 m. Guizhou, Hubei, Sichuan, Xizang, Yunnan.

- 1a. Calyx teeth linear to lanceolate, subpatent to reflexed.
- 2a. Calyx teeth subpatent; leaves hastate-triangular, base subtruncate, margin coarsely crenate 17e. var. *franchetiana*
- 2b. Calyx teeth reflexed; leaves triangular-cordate, base cordate, margin crenate 17c. var. *leptodon*
- 1b. Calyx teeth triangular, straight.
 - 3a. Young parts of plant densely silky-puberulent, especially calyx and abaxial surface of leaves 17d. var. *villosissima*
 - 3b. Young parts of stems and abaxial surface of leaves hispid; calyx minutely hispid.
 - 4a. Nutlets obovoid, 2.5–3 mm, tuberculate 17b. var. *tuberculata*
 - 4b. Nutlets ovoid, ca. 1.5 mm, smooth 17a. var. *kouyangensis*

17a. *Stachys kouyangensis* var. *kouyangensis*

西南水苏 xi nan shui su

Lamium kouyangensis Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 175. 1904; *Stachys cardiophylla* Prain ex Dunn.

Young stems and abaxial leaf surface densely or sparsely hispid. Calyx minutely hispid outside, teeth deltate and erect. Nutlets ovoid, ca. 1.5 mm in diam., smooth.

- Grassy slopes, open areas, moist streamsides; 900–2800 m. Guizhou, Hubei, Sichuan, Yunnan.

Used medicinally.

17b. *Stachys kouyangensis* var. *tuberculata* (Handel-Mazzetti) C. Y. Wu, Acta Phytotax. Sin. 10: 227. 1965.

具瘤变种 ju liu bian zhong

Stachys sieboldi Miquel var. *tuberculata* Handel-Mazzetti, Acta Horti Gothob. 13: 348. 1939.

Calyx teeth acute. Nutlets obovoid, 2.5–3 mm, tuberculate.

- Thickets, mixed forests; 1600–3200 m. Yunnan.

17c. *Stachys kouyangensis* var. *leptodon* (Dunn) C. Y. Wu, Acta Phytotax. Sin. 10: 227. 1965.

细齿变种 xi chi bian zhong

Stachys leptodon Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 167. 1913.

Calyx teeth lanceolate to linear, reflexed. Nutlets ovoid, ca. 2 mm.

- Grassy slopes, streamsides; 1200–2600 m. Guizhou, Yunnan.

17d. *Stachys kouyangensis* var. *villosissima* C. Y. Wu, Acta Phytotax. Sin. 10: 228. 1965.

柔毛变种 rou mao bian zhong

Young parts of plant densely sericeous-puberulent, especially calyx and abaxial leaf surface.

- Open areas; 1200–1900 m. Yunnan.

17e. *Stachys kouyangensis* var. *franchetiana* (H. Léveillé) C. Y. Wu, Acta Phytotax. Sin. 10: 228. 1965.

粗齿变种 cu chi bian zhong

Stachys franchetiana H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 246. 1911.

Leaf blade hastate-triangular, base subtruncate, margin coarsely crenate. Calyx teeth linear, subpatent.

- Grassy slopes, streamsides, field margins; 2400–3800 m. Sichuan, Xizang, Yunnan.

18. *Stachys arvensis* Linnaeus. Sp. Pl. ed. 2, 2: 814. 1762.

田野水苏 tian ye shui su

Herbs annual. Stems slender, suberect to decumbent, 30–50 cm, sparsely puberulent, much branched. Stem leaves petiolate; blade ovate, ca. 2 × 1 cm, adaxially sparsely puberulent, abaxially densely pubescent, sparsely puberulent on veins, base cordate, margin crenate, apex obtuse. Verticillasters 2(–4)-flowered, widely spaced; upper floral leaves sessile, base cuneate, margin ± entire, shorter than calyx; bracteoles ca. 1 mm. Pedicel ca. 1 mm. Calyx tubular-campanulate, ca. 3 mm, densely puberulent, 10-veined; teeth subequal, lanceolate-triangular, ca. 1 mm, apex acute; fruiting calyx urceolate, conspicuously netted. Corolla red, ca. 3 mm, nearly included; upper lip ovate, ca. 1 mm, puberulent outside; lower lip spreading, pubescent outside; middle lobe largest, circular; lateral lobes ovate. Nutlets brown, ovoid, ca. 1.5 mm. Fl. and fr. year round.

Weed in waste areas adjacent to cultivated land. Fujian, Guangdong, Guangxi, Taiwan [Russia; Europe, North America, South America].

48. METASTACHYDIUM Airy Shaw ex C. Y. Wu & H. W. Li, Fl. Reipub. Popularis Sin. 66: 28. 1977.

箭叶水苏属 jian ye shui su

Herbs perennial, rhizomatous. Leaves sagittate, base strongly cordate, stellate hairy abaxially, margin coarsely crenate. Verticillasters in oblong spikes. Calyx tubular, conspicuously 10-veined; teeth 5, equal, subulate, apex spinescent. Corolla violet, 2-lipped; tube pilose annulate at middle, throat tomentose; upper lip erect, equal to or shorter than lower lip; lower lip 3-lobed; middle lobe broadly reniform, margin unequally denticulate or undulate; lateral lobes ovate-oblong, much shorter than middle lobe. Stamens 4, included; filaments densely tufted hairy, unequally papillate near base, triangular-dilated at base; anthers reniform. Style longer than stamens, apex unequally 2-cleft, lobes linear-oblong.

Monotypic: China, Kyrgyzstan.

The genus name is based on *Metastachys* Knorring (1959), an illegitimate later homonym of *Metastachys* van Tieghem (1895). Airy Shaw drew attention to the status of Knorring's name and suggested, but did not validate, *Metastachydium* as a replacement. Wu and Li (Acta Phytotax. Sin. 13: 73. 1975) took up Airy-Shaw's name but did not give the correct page number for Knorring's protologue and thus the genus name and their new combination within it must date from their 1977 account in which the full reference is given.

1. *Metastachydium sagittatum* (Regel) C. Y. Wu & H. W. Li, Fl. Reipub. Popularis Sin. 66: 28. 1977.

箭叶水苏 jian ye shui su

Phlomis sagittata Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 373. 1880; *Metastachys sagittata* (Regel) Knorring.

Stems 40–70 cm, brown-purple or brown, with small, branched hairs denser below nodes. Petiole of basal leaves 6–8 cm, base dilated, persistent, petiole of stem leaves 2–6 cm,

clasping; basal leaf blade 6–8 × 5.5–7.5 cm, adaxially sparsely hispid, abaxially gray, with appressed stellate hairs with unequal arms; stem leaves in 1 or 2 pairs, upper pair shorter than verticillasters. Spikes with 4 remote and 2 or 3 close verticillasters; floral leaves sessile or subsessile; bracteoles subulate, 6–9 mm, partly adnate to flowers, stellate, hispid. Calyx greenish purple, with branched and sparse glandular hairs. Corolla 1.5–2 cm, glabrous, throat and limb with branched hairs (specimens not seen).

Hillside meadows. Xinjiang [Kyrgyzstan].

49. COLQUHOUNIA Wallich, Trans. Linn. Soc. London 13: 608. 1822.

火把花属 hu o ba hua shu

Shrubs erect or ascending. Stems and branches terete. Leaves petiolate, with simple or stellate hairs, margin serrate or crenate. Inflorescences pedunculate to subsessile; verticillasters few flowered, in spikes or capitula; bracteoles minute, linear. Pedicel short to obsolete. Calyx tubular-campanulate, 10-veined, glabrous at throat; teeth 5, subequal. Corolla yellow to purple, sometimes spotted, 2-lipped; tube exerted, curved, dilated at throat, not hairy annulate inside; upper lip straight; lower lip ± patent, slightly unequally 3-lobed, middle lobe sometimes emarginate. Stamens 4, reaching upper lip of corolla, anterior 2 longer; filaments slightly hairy; anthers ellipsoid, cells 2, divaricate, apex confluent. Ovary glabrous. Style apex unequally 2-cleft. Nutlets oblong to oblanceolate, flattened dorsiventrally, swollen on 1 side, apex membranous winged.

About six species: Bhutan, China, India, Laos, Myanmar, Nepal, Thailand, Vietnam; five species in China.

1a. Leaves with simple hairs only.

- 2a. Corolla tube less than 2 × as long as upper lip 5. *C. seguinii*
2b. Corolla tube more than 3 × as long as upper lip 4. *C. elegans*

1b. Leaves with stellate hairs, sometimes also with simple hairs.

- 3a. Stem, branches, and abaxial leaf surface densely white lanate-tomentose; calyx 1.2–1.5 cm 2. *C. vestita*
3b. Stem, branches, and abaxial leaf surface not white lanate-tomentose, sometimes densely gray tomentulose; calyx less than 1 cm.
4a. Young branches and abaxial leaf surface densely gray tomentulose with simple and stellate hairs; leaves 4–5 cm; cymes few flowered, pedunculate, on short branchlets with reduced leaves 3. *C. compta*
4b. Young branches and abaxial leaf surface rust colored stellate tomentose; leaves 7–11 cm; cymes many flowered, ± pedunculate, on normal lateral branches 1. *C. coccinea*

1. *Colquhounia coccinea* Wallich, Trans. Linn. Soc. London 13: 609. 1822.

深红火把花 shen hong hu o ba hua

Shrubs 1–2(–4.5) m tall, erect or pendent; branches rust colored tomentose. Petiole 1–2 cm; leaf blade ovate to ovate-lanceolate, 7–11 × 2.5–4.5 cm, gradually reduced toward apex, papery, rust colored stellate tomentose, base rounded, margin crenulate, apex acuminate. Verticillasters 6–20-

flowered, in fascicled, capitate, or elongated inflorescences on lateral branches, ± stellate hairy, surrounded by bracteoles; floral leaves similar to stem leaves. Pedicel less than 1 mm. Calyx ca. 6 mm, stellate hairy, inconspicuously 10-veined; teeth straight, broadly triangular, ca. 1 mm. Corolla orange-red to scarlet, 2–2.5 cm, sparsely stellate hairy; tube 1.7–2.3 cm, curved outward, mouth dilated; upper lip ovate, slightly 2-lobed, slightly galeate; lower lip spreading, lobes ovate.

Ovary glandular. Nutlets oblanceolate. Fl. Aug-Nov(-Dec), fr. Nov-Jan.

Stony, grassy hillsides, thickets, rarely forests; 1400–3000 m. Xizang, Yunnan [Bhutan, India (Sikkim), Myanmar, Nepal, Thailand].

- 1a. Branches and leaves sparsely rust colored stellate tomentose 1a. var. *coccinea*
1b. Branches and leaves densely rust colored stellate tomentose 1b. var. *mollis*

1a. Colquhounia coccinea var. coccinea

深红火把花 shen hong huo ba hua

Branches and leaves sparsely rust colored stellate tomentose.

Hillsides; 2300 m. Xizang [Bhutan, India (Sikkim), Nepal].

1b. Colquhounia coccinea var. mollis (Schlechtendal) Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 62: 37. 1893.

火把花 huo ba hua

Colquhounia mollis Schlechtendal, Linnaea 24: 681. 1851; *C. tomentosa* Houlet; *C. vestita* Wallich var. *rugosa* C. B. Clarke ex Prain.

Branches and leaves densely rust colored stellate tomentose.

Stony, grassy slopes, thickets, rarely forests; 1400–3000 m. Xizang, Yunnan [Bhutan, India (Sikkim), Myanmar, Nepal, Thailand].

Used medicinally and as an ornamental.

2. Colquhounia vestita Wallich, Tent. Fl. Nepal 1: 14. 1824, p.p. quoad specim. Kamaon.

白毛火把花 bai mao huo ba hua

Colquhounia coccinea Wallich var. *vestita* Prain.

Shrubs erect, 1.5–3 m tall. Old branches subglabrous, with longitudinally exfoliating bark, young branches densely gray lanate-tomentose. Petiole 1.2–1.5 cm; leaf blade ovate to elliptic-ovate, 5.5–12 × 2–6 cm, adaxially dark green, finely bullate, with simple and stipitate stellate hairs, abaxially gray, densely lanate-tomentose, base rounded to shallowly cordate, margin crenulate, apex acute. Verticillasters 6–10-flowered, in ± racemose spikes, densely lanate-tomentose except for corollas. Pedicel ca. 1 mm. Calyx ± tubular, 1.2–1.5 cm, lanate-tomentose; teeth triangular, 1.5–2 mm. Corolla orange-red, with sparse stellate and simple hairs, ca. 2.5 cm; tube ca. 2 cm, curved outward, throat dilated, narrowed toward base; upper lip ovate; lobes of lower lip ovate, middle lobe emarginate. Filaments bearded. Ovary glandular. Fl. Jul.

- Thickets; 2000 m. Yunnan.

3. Colquhounia compta W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 96. 1916.

金江火把花 jin jiang huo ba hua

Shrubs erect, 1–2 m tall, much branched. Branches densely gray minutely tomentose, with simple and stellate hairs when young, later subglabrous, with longitudinally exfoliating bark. Petiole 1.5–2 cm; leaf blade ovate, 4–5 × 2.5–3 cm, papery, adaxially bullate, tomentose, abaxially densely tomentose, base truncate, margin crenulate, apex

subacute. Cymes few flowered, pedunculate, in fascicled or capitate inflorescences on short branches; bracteoles minutely tomentose. Calyx ca. 7 mm, stellate tomentose outside; teeth narrowly triangular to triangular-subulate, apex short acuminate. Corolla dark gray-red to dark red, puberulent; tube scaly inside, ca. 1.6 cm, attenuate toward base; upper lip elliptic, apex entire to emarginate; lobes of lower lip subequal, middle lobe emarginate. Ovary slightly winged. Fl. Sep.

- Dry thickets in open valleys; 1800–2100 m. Sichuan, Yunnan.

- 1a. Calyx teeth narrowly triangular; corolla dark gray-red, to 2.5 cm, upper lip entire, middle lobe of lower lip subequal to lateral lobes 3a. var. *compta*
1b. Calyx teeth triangular-subulate; corolla dark red, 3(–3.5) cm, upper lip emarginate, middle lobe of lower lip slightly longer than lateral lobes..... 3b. var. *mekongensis*

3a. Colquhounia compta var. compta

金江火把花 jin jiang huo ba hua

Calyx teeth narrowly triangular. Corolla dark gray-red, to 2.5 cm, upper lip entire, middle lobe of lower lip subequal to lateral lobes.

- Dry thickets in open valleys; 1800–2100 m. Yunnan.

3b. Colquhounia compta var. mekongensis (W. Smith) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 182. 1929.

沧江变种 cang jiang bian zhong

Colquhounia mekongensis W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 97. 1916.

Calyx teeth triangular-subulate. Corolla dark red, 3(–3.5) cm, upper lip emarginate, middle lobe of lower lip slightly longer than lateral lobes.

- Dry thickets in open valleys; 2000–2100 m. Sichuan, Yunnan.

4. Colquhounia elegans Wallich ex Benth, Pl. Asiat. Rar. 1: 65. 1830.

秀丽火把花 xiu li huo ba hua

Shrubs 1–3 m tall, ± decumbent, hairy throughout. Branches densely hirsute with retrorse rust-colored hairs. Petiole 1–1.5 cm; leaf blade elliptic, 4.5–8.5 × 2–4 cm, papery, hirsute, densely so abaxially, adaxially finely bullate, base broadly cuneate to rounded, margin mucronate-crenulate, apex acuminate. Verticillasters few flowered, densely rust colored hirsute, in dense capitate inflorescences on branches; floral leaves short petiolate, ovate, 2–3 cm; bracteoles 2–3 mm. Pedicel 1–2 mm. Calyx 6–9 mm, teeth subulate-triangular to triangular, ca. 3 mm. Corolla yellow or red, ca. 2.5–2.8 cm, pubescent, tube slender, ca. 2.3 cm; upper lip erect, oblong, apex rounded or emarginate; lobes of lower lip ovate, subequal. Fl. Nov-Feb.

Sunny thickets, forests; 1100–2000 m. Yunnan [Cambodia, Laos, Myanmar, Thailand, Vietnam].

- 1a. Plants densely hairy throughout; calyx ca. 9 mm, densely hairy; teeth subulate-triangular, long acuminate; corolla ca. 2.8 cm 4a. var. *elegans*
1b. Plants sparsely hairy throughout; calyx ca. 6 mm, sparsely hairy; teeth triangular, acuminate; corolla ca. 2.5 cm ... 4b. var. *tenuiflora*

4a. Colquhounia elegans var. elegans

秀丽火把花 xiu li huo ba hua

Plants densely hairy throughout. Calyx ca. 9 mm, densely hairy; teeth subulate-triangular, apex long acuminate. Corolla ca. 2.8 cm.

Sunny thickets, forests; 1500–2000 m. Yunnan [Myanmar, Thailand].

4b. *Colquhounia elegans* var. *tenuiflora* (J. D. Hooker) Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 62: 38. 1893.

细花变种 xi hua bian zhong

Colquhounia tenuiflora J. D. Hooker, Fl. Brit. India 4: 674. 1885.

Plants sparsely hairy throughout. Calyx ca. 6 mm, sparsely hairy; teeth triangular, apex acuminate. Corolla ca. 2.5 cm.

Thickets, evergreen broad-leaved forests; 1100–1800 m. Yunnan [Cambodia, Laos, Myanmar, Thailand, Vietnam].

Used medicinally for traumatic injury, hemostasis, and dysentery.

5. *Colquhounia seguinii* Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 165. 1904.

藤状火把花 teng zhuang huo ba hua

Shrubs ca. 2 m tall. Stems glabrous or pubescent; branches densely puberulent; branchlets 5–10 cm. Petiole 1–3(–4.5) cm, nearly as long as blade in basal leaves, shorter in upper leaves; leaf blade ovate-oblong, 2.5–4(–11) × 1–2(–5.5) cm, adaxially dark green, sparsely strigose to densely villous, abaxially pubescent to villous mainly along midrib and veins, base broadly cuneate or rounded, margin serrulate, apex acuminate. Inflorescences capitate, 3–4 cm; verticillasters 2–6-flowered; floral leaves ovate, 1–1.5 cm. Pedicel 2–3 mm.

Calyx ca. 5 mm, densely puberulent; teeth triangular, ca. 2 mm. Corolla yellow to purple, ca. 2 cm, finely pubescent, glandular outside; tube ca. 1.2 cm; upper lip oblong, ca. 8 mm, apex rounded; lateral lobes of lower lip largest, ovate. Nutlets triquetrous, ovoid.

Thickets, streamsides; 200–2700 m. Guangxi, Guizhou, Hubei, Sichuan, Yunnan [Myanmar].

- 1a. Branches densely puberulent; leaf blade sparsely strigose adaxially, pubescent abaxially especially on veins 5a. var. *seguinii*
1b. Branches densely floccose-villous; leaf blade densely villous adaxially, villous abaxially especially on veins 5b. var. *pilosa*

5a. *Colquhounia seguinii* var. *seguinii*

藤状火把花 teng zhuang huo ba hua

Caryopteris fluminis H. Léveillé; *Colquhounia decora* Diels; *Colquhounia elegans* Wallich var. *pauciflora* Prain.

Branches densely puberulent. Leaf blade sparsely strigose adaxially, pubescent mainly along midrib and lateral veins abaxially.

Thickets; 200–2700 m. Guangxi, Guizhou, Hubei, Sichuan, Yunnan [Myanmar].

5b. *Colquhounia seguinii* var. *pilosa* Rehder, Pl. Wilson. 3: 380. 1917.

长毛变种 chang mao bian zhong

Branches densely floccose-villous. Leaf blade villous adaxially and especially along midrib and lateral veins abaxially.

- Thickets, streamsides; 1200–1700 m. Sichuan, Yunnan.

50. ACHYROSPERMUM Blume, Bijdr. 840. 1826.

鳞果草属 lin guo cao shu

Herbs, prostrate at base. Leaves numerous, petiolate, margin dentate. Verticillasters ca. 6-flowered, in axillary or terminal spikes; floral leaves generally reduced to ovate bracts slightly longer than calyx. Calyx tubular-campanulate, pouched in fruit, straight or curved downward, herbaceous, 10–15-veined; teeth 5, subequal or limb ± 2-lipped and upper lip 3-toothed and lower lip 2-toothed. Corolla tube nearly included or much exerted, straight or curved downward, slightly dilated at apex, 2-lipped; upper lip short, straight, emarginate or 2-lobed; lower lip longer, spreading, 3-lobed, lobes ovate; middle lobe largest, entire or 2-lobulate. Stamens 4, anterior 2 longer, reaching upper corolla lip; anther cells 1 or 2, divaricate, apex confluent if 2. Style apex 2-cleft, posterior lobe short. Disc shallowly cupulate, crenate. Nutlets obovoid to oblong-ovoid, densely scaly.

About 30 species: Asia, Africa; two species in China.

- 1a. Plants less than 20 cm tall; leaves ovate, 6.5–9.5 × 3–4 cm; lateral veins ca. 10 pairs; bracts inconspicuous..... 1. *A. densiflorum*
1b. Plants to 80 cm tall; leaves broadly ovate, 10–15 × 5–10 cm; lateral veins 4–6 pairs; bracts conspicuous, longer than calyx 2. *A. wallichianum*

1. *Achyropermum densiflorum* Blume, Bijdr. 841. 1826.

鳞果草 lin guo cao

Achyropermum philippinense Benth; *A. phlomoides* Blume.

Stems prostrate, rooting adventitiously, ascending portion unbranched, ca. 16 cm, densely pubescent. Petiole 0.5–3(–6) cm; leaf blade ovate, 6.5–9.5 × 3–4 cm, papery, purplish, adaxially sparsely strigose, abaxially densely

pubescent on veins, base broadly cuneate, margin crenulate or serrate-crenate, apex acute. Spikes terminal, cylindrical, 3.8–5 cm; verticillasters 6-flowered; bracts ovate to spatulate, 6–8 mm, yellowish to pink. Pedicel ca. 1 mm. Calyx 6–7 mm, 15-veined, 2-lipped, becoming enlarged to 8–10 mm, conspicuously netted, pubescent or subglabrescent with yellowish glands; teeth subequal or middle tooth larger. Corolla ca. 7.5 mm, slightly exerted, puberulent; tube slender, ± cylindrical except slightly dilated at throat; upper lip 2-lobed, lobes semicircular; lobes of lower lip subcircular,

middle lobe entire, lateral lobes ciliate. Anther cells 2. Style apex subequally 2-cleft. Nutlets oblong-obovoid, apex and adaxially densely linear-scaly, abaxially smooth. Fl. Nov, fr. Dec.

Forests, shady areas in valleys. Hainan [Indonesia, Philippines].

The calyx in specimens from Hainan is 15-veined, not 10-veined as described by Blume in the original description. This may be due to local variation within the species.

2. *Achyropermum wallichianum* (Benth) Benth ex J. D. Hooker, Fl. Brit. India 4: 673. 1885.

西藏鳞果草 xi zang lin guo cao

Teucrium wallichianum Benth, Pl. Asiat. Rar. 2: 19. 1830.

Herbs unbranched, to 80 cm tall. Stem base woody, prostrate, rooting adventitiously, brown, glabrescent, densely retrorse yellow-brown puberulent basally. Petiole 5–7.5 cm,

51. EURYSOLEN Prain, Sci. Mem. Off. Med. Dept. Gov. India 11: 43. 1898.

宽管花属 kuan guan hua shu

Shrubs erect or twining. Branches sometimes ascending. Leaves long petiolate, margin dentate. Spikes terminal on short branches, cylindrical, composed of crowded verticillasters; bracts persistent, ciliate. Calyx tubular-campanulate, conspicuously 10-veined; teeth 5, subequal, anterior teeth slightly longer; fruiting calyx slightly urceolate, teeth straight. Corolla tube exerted, saccate-swollen in front at middle, puberulent annulate, 2-lipped; upper lip straight, emarginate; lower lip slightly longer, spreading, 3-lobed; middle lobe largest, subcircular; lateral lobes semicircular. Stamens ascending, slightly exerted, involute in bud; anthers 1-celled, longitudinally dehiscent. Ovary with semitransparent, powdery protuberances. Style equally 2-cleft, lobes divergent. Nutlets dark brown, flattened, obovoid, abaxially somewhat wrinkled, adaxially hirsute, with glandular protuberances.

Monotypic: China, India, Malaysia, Myanmar.

1. *Eurysolen gracilis* Prain, Sci. Mem. Off. Med. Dept. Gov. India 11: 43. 1898.

宽管花属 kuan guan hua

Shrubs 0.5–2 m tall. Branches cylindrical, directed outward, yellow or brownish strigose. Petiole 1.5–3.5 cm, densely strigose; leaf blade obovate-rhomboid or oblong-obovate, 4–8(–9) × 3–5(–7.2) cm, sparsely hirsute, yellowish glandular, hirsute along veins abaxially, base cuneate or slightly decurrent, margin serrate to crenate, apex acute.

densely yellow-brown puberulent; leaf blade broadly ovate, 10–15 × 5–10 cm, membranous, sparsely white strigose except for puberulent veins when young, adaxially sparsely white strigose with age, base broadly cuneate, abruptly attenuate-decurrent, margin crenate-dentate above base, apex acuminate. Spikes terminal (2–)5–10(–15) cm, densely puberulent; verticillasters 6-flowered; peduncle ca. 1 cm; bracts oblate or subcircular, ca. 6 × 7 mm, membranous, apex abruptly acuminate, ciliolate. Pedicel ca. 2 mm. Calyx ca. 6 mm, sparsely puberulent, 15-veined, membranous, nearly 2-lipped; teeth subequal, broadly ovate-triangular, apex acute. Corolla white, sometimes tinged reddish, ca. 1.3 cm, sparsely puberulent; tube slender, cylindrical with slightly dilated throat; lobes of lower lip subcircular. Anther cells 2. Ovary apex tuberculate, hairy. Fl. Aug-Sep.

Hillsides, evergreen broad-leaved forests; 800–1400 m. Xizang (Medog Xian) [India (Sikkim), Myanmar].

Spikes 4–9 cm; bracts triangular-ovate, margin entire, acuminate. Pedicel ca. 1 mm. Calyx 3–4 mm, sparsely pilose outside, glandular; teeth triangular, ca. 1 mm, apex acute, ciliate; anterior teeth slightly longer. Corolla white, ca. 7 mm, hirsute, glandular; upper lip erect, 2-lobed. Filaments white pubescent. Nutlets with basal and inconspicuous areolae. Fl. Dec-Feb, fr. Mar-Jun.

Rain forests; 600–1900 m. Yunnan [India, Malaysia, Myanmar].

52. ANISOMELES R. Brown, Prodr. 503. 1810.

广防风属 guang fang feng shu

Herbs erect, robust. Leaves dentate. Verticillasters many flowered, in dense or interrupted, long, terminal spikes; upper floral leaves reduced, bractlike; bracts linear, minute. Calyx campanulate, inconspicuously 10-veined, apex netted; teeth 5, equal, straight, slightly dilated in fruit. Corolla 2-lipped; tube as long as calyx, finely pilose annulate inside; upper lip erect, margin entire, slightly concave; lower lip longer, spreading, 3-lobed; middle lobe largest, emarginate or 2-lobulate. Stamens 4, exerted, didynamous, anterior 2 usually longer; anterior anthers transversely 2-celled, posterior anthers 1-celled. Style apex 2-cleft, lobes subulate, subequal. Disc cupulate, crenate. Nutlets black, subglobose, shiny.

About five or six species: SE Asia, Australia; one species in China.

Subsequent authors (Bakhuizen van den Brink, Fl. Java 2: 624. 1965; Keng, Fl. Males. ser. 1, 8: 328. 1978) have rejected Rothmaler's claim (Repert. Spec. Nov. Regni Veg. 53: 12. 1944) that the type of *Epimeredi* is an *Anisomeles*.

1. *Anisomeles indica* (Linnaeus) Kuntze, Revis. Gen. Pl. 2: 512. 1891.

广防风属 guang fang feng

Nepeta indica Linnaeus, Sp. Pl. 2: 571. 1753; *Anisomeles ovata* R. Brown; *Epimeredi indica* (Linnaeus) Rothmaler; *Marrubium indicum* (Linnaeus) Burman.

Stems erect, 1–2 m tall, branched, densely appressed white pubescent. Petiole 1–4.5 cm; leaf blade broadly ovate,

4–9 × 2.5–6.5 cm, adaxially finely strigose especially on veins, abaxially densely white minutely tomentose, tomentose on veins, base broadly truncate-cuneate, margin irregularly dentate, apex acute or short acuminate. Spikes ca. 2.5 cm in diam.; floral leaves short petiolate or ± sessile, longer than verticillasters; bracts 3–4 mm. Calyx ca. 6 mm, hirsute, glandular pubescent, yellow glandular; teeth purple-red, triangular-lanceolate, ca. 2.7 mm, ciliate. Corolla purplish, ca. 1.3 cm, glabrous outside; tube funnellform, mouth to 3.5 mm

wide; upper lip oblong, 4.5–5 × 3 mm, margin entire; lower lip subhorizontally spreading, ca. 9 × 5 mm; middle lobe obcordate, ca. 3 × 4.5 mm, slightly undulate, bearded; lateral lobes ovate. Ovary glabrous. Nutlets ca. 1.5 mm in diam. Fl. Aug-Sep, fr. Sep-Nov.

Forest margins, waste areas; 0–2400 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Cambodia, India, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

Used medicinally for rheumatism, colds, fevers, abdominal pain, skin sores, and snake bites.

53. CRANIOTOME Reichenbach, Iconogr. Bot. Exot. 1: 39. 1825.

簇序草属 cu xu cao shu

Herbs erect, perennial, branched, densely spreading hirsute throughout. Leaves long petiolate, margin dentate. Cymes pedunculate, many flowered, helicoid or sometimes dichotomous, in axillary or terminal panicles; upper floral leaves bractlike; bracteoles linear, ciliate. Flowers pedicellate; pedicel 1-bracteolate. Calyx ovoid, ± urceolate-globose in fruit, slightly constricted at throat, villous beyond throat inside, 10-veined; teeth 5, subequal, uppermost tooth larger. Corolla exserted, 2-lipped; tube straight, cylindrical, throat slightly dilated; upper lip straight, margin entire, concave; lower lip longer, spreading, 3-lobed, lobes ovate; middle lobe largest. Stamens 4, reaching underside of upper lip of corolla, anterior 2 longer; anther cells 2, divaricate. Style apex slightly dilated, subequally 2-cleft. Nutlets triquetrous, subglobose, shiny.

Monotypic: Bhutan, China, India (Sikkim), Laos, Myanmar, Nepal, Vietnam.

1. *Craniotome furcata* (Link) Kuntze, Revis. Gen. Pl. 2: 516. 1891.

簇序草 cu xu cao

Ajuga furcata Link, Enum. Hort. Berol. Alt. 2: 99. 1822; *Anisomeles* (Link) *furcata* Sweet; *Anisomeles nepalensis* Sprengel; *C. versicolor* Reichenbach; *Nepeta versicolor* Trevisan de Saint-Léon.

Stems 1–2 m tall, base subwoody, densely spreading hirsute, sometimes branched. Petiole 2.5–7 cm, densely hirsute; leaf blade broadly ovate-cordate, membranous,

densely spreading hirsute, golden glandular, margin crenate. Panicles 14–18 cm; peduncle ca. 6 mm; lower floral leaves leaflike, upper leaves spatulate; bracteoles shorter than calyx tube. Calyx ca. 1.5 mm, hirsute, glandular; teeth narrowly triangular. Corolla reddish or purple-red, 3–4 mm, hairy outside, sparsely hairy on limb inside. Fl. Aug-Sep, fr. Oct-Feb.

Forests, thickets; 900–3200 m. Sichuan, Xizang, Yunnan [Bhutan, India (Sikkim), Laos, Myanmar, Nepal, Vietnam].

54. MICROTOENA Prain, Hooker's Icon. Pl. 19: t. 1872. 1889.

冠唇花属 guan chun hua shu

Herbs erect. Leaf blade margin dentate. Cymes dichotomous, axillary and/or in terminal panicles; bracts and bracteoles linear, early deciduous. Calyx campanulate, 10-veined; teeth 5, triangular to linear, subequal or posterior teeth much longer; fruiting calyx dilated or saccate-dilated, base rounded. Corolla yellow, rarely white, marked with purple-red or brown on upper lip; tube exserted, straight, base narrow, dilated above middle, annulus absent inside; upper lip straight, galeate, base obliquely cuneate or sometimes short clawed; lower lip spreading, 3-lobed, middle lobe ligulate to ovate, lateral lobes ovate or circular. Stamens 4, subequal, included in upper lip or slightly exserted; filaments complanate, usually glabrous; anther cells 2, apically divaricate, becoming confluent. Style as long as stamens, anterior lobe subulate, posterior lobe short to inconspicuous. Nutlets ovoid, glabrous, adaxially veined, abaxially rounded, constricted at base, areole small.

About 24 species: Asia, 20 species in China.

1a. Middle lobe of lower corolla lip narrow, ligulate; upper corolla lip always purple-red or brown.

2a. Dichotomous cymes 2- or 3-flowered, axillary 2. *M. pauciflora*

2b. Dichotomous cymes many flowered, axillary or in terminal panicles.

3a. Leaf base broadly truncate-cuneate, decurrent into winged petiole 5. *M. insuavis*

3b. Leaf base cordate.

4a. Calyx ca. 3 mm; leaves triangular-ovate, rarely oblong-ovate; stem spreading villous, retrorsely minutely tomentose 1. *M. patchoulii*

4b. Calyx 6.5 mm; leaves ovate-cordate; stem sparsely glandular villous, spreading hispid 3. *M. mollis*

1b. Middle lobe of lower lip of corolla circular to ovate or obovate; upper corolla lip yellow (yellow and purple-red in *M. delavayi*).

5a. Cymes ± sessile, in terminal ± spicate panicles 4. *M. subspicata*

5b. Cymes pedunculate and/or axillary, not in terminal ± spicate panicle.

6a. Calyx teeth triangular-subulate, apex slightly curved or hooked.

7a. Posterior tooth of calyx ca. 2 × as long as other teeth 16. *M. urticifolia*

7b. Calyx teeth subequal, or posterior tooth only slightly longer.

8a. Panicle compact; calyx glabrous except for ciliolate margins 18. *M. prainiana*

8b. Panicle lax; calyx glandular hairy.

9a. Leaves subglabrous except sometimes for veins; calyx broadly campanulate, finely

glandular puberulent outside 20. *M. megacalyx*

- 9b. Leaves hairy; calyx campanulate.
- 10a. Leaves ovate-cordate to triangular-ovate, adaxially finely strigose, abaxially densely appressed tawny hispidulous along veins 17. *M. moupinensis*
- 10b. Leaves oblong-ovate, adaxially sparsely minutely hispid, abaxially spreading hispid along veins 19. *M. longisepala*
- 6b. Calyx teeth triangular to linear, if triangular-subulate and apically slightly curved, then posterior tooth linear, long.
- 11a. Posterior calyx tooth 2.5–3 × as long as other teeth, anterior 4 teeth minute, narrowly triangular to triangular-subulate, equal.
- 12a. Stems, petioles, and abaxial leaf surface densely hairy; cymes in short compact panicles; posterior calyx tooth linear, ca. 3 × as long as other teeth; upper corolla lip not auriculate 13. *M. miyiensis*
- 12b. Stem, petioles, and abaxial leaf surfaces sparsely hairy; cymes in elongated loose panicles; posterior calyx tooth lanceolate ca. 2.5 × as long as other teeth; upper corolla lip basally ligulate-auriculate 12. *M. maireana*
- 11b. Posterior calyx tooth up to 2 × as long as anterior teeth.
- 13a. Calyx teeth lanceolate to linear-lanceolate.
- 14a. Cymes 1–3-flowered, axillary.
- 15a. Cymes 2- or 3-flowered; peduncle 3–5 mm 11. *M. albescens*
- 15b. Cymes 1-flowered; peduncle 6–15 mm 10. *M. affinis*
- 14b. Cymes many flowered, in terminal panicles though sometimes also axillary.
- 16a. Upper corolla lip often purple-red (yellow in var. *lutea*); terminal panicles ca. 2–3 × 3–41 cm 6. *M. delavayi*
- 16b. Corolla uniformly yellow; terminal panicles 4.5–13 × ca. 3.5 cm 9. *M. stenocalyx*
- 13b. Calyx teeth triangular-lanceolate, triangular, or oblong.
- 17a. Calyx teeth only slightly unequal, posterior tooth longer, oblong, apex subacute 14. *M. robusta*
- 17b. Calyx teeth obviously unequal, posterior tooth much longer, triangular-ovate to triangular-lanceolate.
- 18a. Calyx teeth triangular-ovate; panicle of 3(–5)-flowered cymes, terminal on lateral branches, or a few cymes solitary, nearly apical 15. *M. vanchingshanensis*
- 18b. Calyx teeth triangular-lanceolate; inflorescences not as above.
- 19a. Cymes axillary and terminal, lax, branches 1-sided; at least some peduncles over 2 cm; bracts reduced, minute, or absent 7. *M. muliensis*
- 19b. Cymes all dichotomous, axillary; peduncles (1–)1.6 cm; bracts lanceolate, 2–3 mm 8. *M. omeiensis*

1. *Microtoena patchoulii* (C. B. Clarke ex J. D. Hooker) C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 44. 1965.

滇南冠唇花 dian nan guan chun hua

Plectranthus patchoulii C. B. Clarke ex J. D. Hooker, Fl. Brit. India 4: 624. 1885; *Microtoena cymosa* Prain; *M. insuavis* (Hance) Prain ex Dunn.

Herbs. Stems 1–2 m tall, spreading villous, retrorse tomentose, base semiwoody, much branched. Petiole of stem leaves 1.5–4 cm; leaf blade usually triangular-ovate, 2.5–9 × 2–7.5 cm, strigose, densely so abaxially on veins, base broadly cuneate to subcordate, margin coarsely mucronate-serrate, apex acute. Cymes ± 1-sided, axillary or in terminal panicles; floral leaves 0.8–2.1 × 0.3–1.5 cm, gradually reduced toward stem apex; bracts linear, ca. 2–3 mm. Calyx ca. 3 × 1.7 mm, densely glandular pubescent and hirtellous; teeth subequal, lanceolate, to as long as calyx; fruiting calyx dilated, conspicuously netted. Corolla ca. 1.5 cm, glabrous, mouth ca. 3 mm wide; upper lip purple or brown, ca. 7 mm, base truncate, apex emarginate; lower lip oblong, middle lobe narrowly ligulate, ca. 0.7 × 0.4 mm; lateral lobes ovate, ca. 2 mm wide. Nutlets black-brown, triquetrous, ovoid, ca. 1.6 × 1.3 mm, smooth. Fl. Oct–Feb, fr. Feb–Mar.

Forests, open grassy slopes; (600–)1100–2000 m. Yunnan [India, Myanmar].

An aromatic herb used medicinally for coughs, asthma, abdominal pain, and enteritis.

2. *Microtoena pauciflora* C. Y. Wu ex Hsuan, Acta Phytotax. Sin. 10: 44. 1965.

少花冠唇花 shao hua guan chun hua

Herbs slender, erect. Stems spreading pilose, retrorse minutely tomentose. Petiole 0.6–1.8 cm; leaf blade ovate to ovate-oblong, 2–3 × 1.1–2.5 cm, strigose, densely so abaxially, base rounded to broadly cuneate, margin denticulate, apex acute. Cymes axillary, dichotomous, 2- or 3-flowered; peduncle ca. 5 mm, glandular pubescent; bracts oblong to narrowly oblong, linear toward apex, ca. 5 × 3 mm. Calyx narrowly campanulate, ca. 4 × 1.5 mm, puberulent; teeth as long as to slightly longer than calyx tube, lanceolate, posterior teeth slightly longer. Corolla ca. 1.3 cm, throat ca. 6 mm wide, glabrous; upper lip purple-brown, ca. 6 mm, emarginate, arcuate at base; lower lip oblong, almost as long as upper lip; middle lobe narrowly ligulate, ca. 2 × 1 mm; lateral lobes ovate, shorter than and ca. 2 × as wide as middle lobe. Anthers slightly exerted; ovary glabrous. Nutlets unknown. Fl. Dec.

- Villages; 1600 m. Yunnan.

Used medicinally.

This species may only be a variety of *Microtoena patchoulii*.

3. *Microtoena mollis* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 222. 1911.

毛冠唇花 mao guan chun hua

Herbs. Stems sparsely glandular villous, spreading hispid. Petiole 2–4 cm; leaf blade ovate-cordate, 3.5–7 × 2.3–5.2 cm, adaxially appressed ciliate, abaxially spreading minutely hispid on veins, base cordate, margin mucronate crenate-serrate, apex short acuminate. Cymes dichotomous, axillary, (2–)5–11-flowered; peduncle 1–1.8 cm, glandular puberulent; floral leaves similar to stem leaves, densely hairy; bracts 4–5 mm. Calyx ca. 6.5 × 3.5 mm, glandular puberulent; teeth lanceolate, 2.8–3.2 mm. Corolla yellow, tinged red, ca. 1.7 cm, throat to 4.5 mm wide; upper lip ca. 1 cm, emarginate, base subtruncate; lower lip ca. 8 mm, lateral lobes semicircular; middle lobe ligulate, reflexed, ca. 2 × 1 mm. Nutlets black-brown, ca. 1.5 × 1.2 mm, adaxially obtusely ribbed, glabrous. Fl. Feb–Mar, fr. Apr–May.

• Forests, forest margins; 1000 m. Guangxi, Guizhou, Yunnan.

4. *Microtoena subspicata* C. Y. Wu ex Hsuan, Acta Phytotax. Sin. 10: 45. 1965.

近穗状冠唇花 jin sui zhuang guan chun hua

Herbs robust. Stems ca. 43 cm tall, white pubescent. Petiole 2–6 cm; leaf blade ca. 10 × 1.5 cm, papery, adaxially sparsely white minutely hispid except for finely strigose veins, abaxially pubescent, base broadly truncate-cuneate, apex abruptly long acuminate; lateral veins 5-paired. Inflorescences terminal ± spicate panicles 2.5–11 × ca. 2 cm, glandular hairy; cymes dichotomous, 2–5-flowered; peduncle to 2 mm; lower bracts leaflike, rhombic, ca. 1.5 × 1 cm; upper bracts ovate, to 6 × 3 mm. Calyx ca. 3 mm, sparsely pubescent; teeth triangular-ovate, ca. 1 mm, apex acute, posterior tooth somewhat longer; fruiting calyx to 7 × 3.5 mm. Corolla yellow, sparsely minutely hispid outside, ca. 1.6 cm, erect, throat to 4 mm wide; upper lip ca. 8 mm; lower lip somewhat shorter, middle lobe obovate; lateral lobes circular, wider than middle lobe. Nutlets triquetrous, subglobose, ca. 1.4 × 1.1 mm, glabrous. Fl. Oct, fr. Nov.

• Valleys, hillsides; 700–1000 m. Guangxi, Guizhou, Yunnan.

- 1a. Panicle ± spicate, 2.5–4.5 cm; leaves ovate, regularly crenate-serrate 4b. var. *intermedia*
1b. Panicle ± spicate, 7–11 cm; leaves triangular-ovate, irregularly crenate-dentate 4a. var. *subspicata*

4a. *Microtoena subspicata* var. *subspicata*

近穗状冠唇花 jin sui zhuang guan chun hua

Leaf blade triangular-ovate, margin irregularly crenate-serrate. Panicle ± spicate, 7–11 cm.

• Valleys, hillsides; 900–1000 m. Guangxi, Guizhou.

4b. *Microtoena subspicata* var. *intermedia* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 46. 1965.

中间变种 zhong jian bian zhong

Leaf blade ovate, margin regularly crenate-serrate. Panicle ± spicate, 2.5–4.5 cm.

• Shady areas in valleys; 700 m. Yunnan.

5. *Microtoena insuavis* (Hance) Prain ex Briquet, Nat. Pflanzenfam., div. 4, 3a: 269. 1895.

冠唇花 guan chun hua

Gomphostemma insuave Hance, J. Bot. 22: 231. 1884;
Microtoena esquirolii H. Léveillé.

Herbs or subshrubs. Stems 1–2 m tall, appressed pubescent. Petiole 3–8.5 cm; leaf blade ovate to broadly ovate, 6–10 × 4.5–7.5 cm, papery, pubescent, densely so on veins, base broadly truncate-cuneate, decurrent into a winged petiole, margin serrate-crenate, apex acute. Cymes dichotomous with 1-sided branches, in open terminal panicles. Calyx ca. 2.5 × 1.5 mm, puberulent; teeth triangular-lanceolate, ca. 1/2 as long as calyx, posterior tooth somewhat longer; fruiting calyx dilated. Corolla red, purple on upper lip, ca. 1.4 cm, throat to ca. 3 mm wide; upper lip ca. 7 mm, base truncate, apex emarginate; lower lip longer, middle lobe ligulate, lateral lobes triangular. Nutlets ca. 1.2 × 1 mm in diam., slightly corrugate. Fl. Oct–Dec, fr. Dec–Jan.

Forests, forest margins; 700–1000 m. Guangdong, Guizhou, Yunnan [Indonesia, Vietnam].

6. *Microtoena delavayi* Prain, Bull. Soc. Bot. France 42: 424. 1895.

云南冠唇花 yun nan guan chun hua

Herbs perennial, rhizomatous. Stems 1–2 m, pubescent, sometimes also spreading minutely hispid. Petiole 2–10 cm; leaf blade cordate to oblong-ovate, 5–16.5(–18) × 3–14 cm, papery, finely strigose, abaxially sometimes also spreading minutely hispid on veins, base truncate-cuneate to cordate, margin mucronate crenate-serrate, apex short caudate-acuminate. Cymes dichotomous, many flowered, axillary or in terminal panicles ca. 2–3 × 3–4 cm; peduncle 1.5–6 cm; bracts lanceolate to linear, 6–10 mm. Calyx ca. 6.5 × 3 mm, puberulent, sparsely minutely hispid; teeth narrowly oblong to lanceolate, 1.5–2 mm, apex obtuse to acuminate, posterior tooth ca. 3 mm; fruiting calyx saccate-dilated, netted. Corolla yellow, sometimes tinged red or purple-red on upper lip, ca. 1.5–2.6 cm, throat to 5.5 mm wide; upper lip ca. 6.5 mm, back rounded, base subtruncate; lower lip as long as upper, lobes circular, middle lobe largest. Nutlets black-brown, flattened, triquetrous, globose, ca. 2 mm in diam. Fl. Aug, fr. Sep–Oct.

• Shady, wet areas in forests, forest margins, grassy slopes, thickets; 2000–2900 m. Sichuan, Yunnan.

- 1a. Calyx teeth narrowly oblong, apex obtuse 6d. var. *amblyodon*
1b. Calyx teeth narrowly lanceolate, apex acute or acuminate.
2a. Corolla ca. 1.5 cm 6a. var. *delavayi*
2b. Corolla to 2.6 cm.
3a. Corolla yellow 6c. var. *lutea*
3b. Corolla yellow with purple-red on upper lip, white on lower lip 6b. var. *grandiflora*

6a. *Microtoena delavayi* var. *delavayi*

云南冠唇花 yun nan guan chun hua

Microtoena delavayi Prain var. *vera* Prain; *M. tenuiflora* C. Y. Wu.

Leaf blade cordate to cordate-ovate. Calyx teeth narrowly lanceolate, apex acute or acuminate. Corolla yellow tinged red on upper lip, ca. 1.5 cm.

• Shady wet areas in forests, forest margins, grassy slopes, thickets; 2200–2600 m. Yunnan.

6b. *Microtoena delavayi* var. *grandiflora* Prain, Bull. Soc. Bot. France 42: 425. 1895.

大花变种 da hua bian zhong

Leaf blade cordate to oblong-ovate. Corolla ca. 2.6 cm, yellow, tinged purple-red on upper lip, white on lower lip.

• Sparse forests, forest margins; 2800 m. Sichuan, Yunnan.

6c. *Microtoena delavayi* var. *lutea* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 48. 1965.

黄花变种 huang hua bian zhong

Leaf blade cordate to oblong-ovate. Corolla ca. 2.6 cm, yellow.

• Shaded wet areas in evergreen broad-leaved forests; 2000 m. Yunnan.

6d. *Microtoena delavayi* var. *amblyodon* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 48. 1965.

钝齿变种 dun chi bian zhong

Cymes with short branches, ca. 3 × 2.5 cm; peduncle 3–7 cm. Calyx teeth narrowly oblong, apex obtuse. Corolla yellowish.

• Shaded wet areas in broad-leaved forests; 2700–2900 m. Yunnan.

7. *Microtoena muliensis* C. Y. Wu ex Hsuan, Acta Phytotax. Sin. 10: 50. 1965.

木里冠唇花 mu li guan chun hua

Herbs robust. Stems glabrous. Petiole 3–6 cm, adaxially dusty pubescent in shallow groove; leaf blade oblong-ovate, 6.5–15 × 4–8.5 cm, membranous, adaxially sparsely minutely hispid, abaxially glabrous, base subtruncate, attenuate-decurrent into narrowly winged petiole, margin coarsely mucronate-crenate, apex caudate-acuminate; lateral veins 4–6-paired. Panicles axillary and terminal, 5–13.5 × 2.5–5.5 cm, with lax, dichotomous, 3–15-flowered cymes, branches 1-sided; bracts absent or minute. Calyx ca. 4 × 2.5 mm, dusty glandular outside; teeth triangular-lanceolate, 1.1–1.7 mm, posterior tooth ca. 2 mm. Corolla yellow, ca. 2.5 cm, sparsely puberulent; tube ca. 2 mm wide at base, dilated to 7 mm at throat; upper lip ca. 9 mm, base with 2 triangular teeth; lower lip subcircular, reflexed, middle lobe circular, lateral lobes ovate-triangular. Filaments black-brown at apex. Nutlets black-brown, triquetrous, ovoid, ca. 1.6 × 1 mm, smooth, glabrous. Fl. Sep.

• Broad-leaved forests on sunny slopes; 2700 m. Sichuan.

8. *Microtoena omeiensis* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 51. 1965.

峨眉冠唇花 e mei guan chun hua

Herbs robust. Stems 1–2 m tall, sparsely villous or puberulent. Petiole to 13 cm; leaf blade oblong-ovate to triangular-ovate, 4–13 × 3–10 cm, membranous, adaxially sparsely minutely hispid, abaxially sparsely fine strigose on veins, rarely glabrous, base truncate-cuneate to cordate, margin coarsely mucronate-crenate, apex caudate-acuminate. Cymes dichotomous, axillary, ca. 3 cm; peduncle to 1.6 cm,

slender, sparsely villous or puberulent; bracts lanceolate, 2–3 mm. Calyx ca. 5 × 3 mm, dusty glandular, finely bristly on veins and margins; teeth triangular-lanceolate, anterior teeth 4, 0.6–1 mm, posterior tooth ca. 2 × as long; fruiting calyx saccate-dilated, conspicuously netted. Corolla ca. 3 cm, puberulent outside; throat ca. 7 mm wide; upper lip ca. 8 mm, base truncate, sides dentate; lower lip ca. 1 cm, middle lobe oblong, ca. 2.5 mm. Nutlets dark brown, lenticular-obovoid, ca. 1.9 × 1.5 mm, glabrous. Fl. Aug, fr. Aug-Sep.

• Open grasslands; 1500–4000 m. Sichuan.

Used medicinally for colds and rheumatism.

9. *Microtoena stenocalyx* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 49. 1965.

峡弯冠唇花 xia e guan chun hua

Herbs perennial, rhizomatous. Stems 1–2 m, base semiwoody, tawny pilose, glabrescent. Petiole 1–3.7 cm; leaf blade ovate-cordate to triangular-ovate, 4.5–8.5 × 2.4–5 cm, densely tawny setose, base cordate to truncate-cuneate, margin coarsely dentate, apex long acuminate. Panicles compact, terminal, 4.5–13 × ca. 3.5 cm; cymes 3–7-flowered; lower peduncles 1–3.5 cm; bracts lanceolate, ca. 1.5 × 3–4.5 mm; bracteoles to 1.2 cm. Calyx ca. 12 × 3 mm, glandular puberulent, tawny setose on veins and teeth; teeth linear-lanceolate, subulate-acuminate, straight, posterior tooth ca. 6 mm, others ca. 4.5 mm; fruiting calyx transversely veined. Corolla yellow-white, ca. 2.5 cm, subglabrous, puberulent on back, throat to 5.5 mm wide; upper lip ca. 7 mm, with a lateral basal tooth; lower lip subequal to upper, oblong; middle lobe subcircular, ca. 3 mm in diam.; lateral lobes smaller, triangular-ovate. Nutlets black-brown, triquetrous, obovoid, base acute, ca. 1.8 × 1.2 mm. Fl. Jul, fr. Sep.

• Forests, thickets; 2000–2400 m. Yunnan.

10. *Microtoena affinis* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 48. 1965.

相近冠唇花 xiang jin guan chun hua

Stems woody, short glandular hairy. Leaves on new shoots; petiole 1.7–2.2 cm; leaf blade ovate to ovate-orbicular, 1.1–2.5 × 1–2.6 cm, papery, puberulent, base rounded or truncate-cuneate, remotely crenate, apex acuminate or obtuse. Cymes axillary, 1-flowered; floral leaves reduced; peduncle 0.6–1.5 cm, slender, glandular puberulent; bracts 4–6 × ca. 1 mm. Calyx ca. 8.5 × 2 mm, glandular puberulent outside, glabrous inside; teeth linear-lanceolate, posterior tooth ca. 5 mm, other teeth ca. 2.5 mm. Corolla purple, ca. 1.7 cm, throat to 4 mm wide; upper lip ca. 5.5 mm; lower lip as long, middle lobe circular. Nutlets not seen. Fl. Nov.

• Evergreen broad-leaved forests; 2800 m. Yunnan.

This species may be a form of *Microtoena delavayi*.

11. *Microtoena albescens* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 49. 1965.

白花冠唇花 bai hua guan chun hua

Herbs. Stems ca. 60 cm tall, sparsely bristly pubescent. Petiole 1–5 cm, slender; leaf blade broadly ovate, 5.2–5.7 × ca. 4.2 cm on main stem, 2.1–2.4 × 1.4–1.7 cm on lateral

branches, sparsely hirsute, base truncate to rounded, margin mucronate crenate-serrate, apex short acuminate to acute. Cymes axillary, 2- or 3-flowered, secund; peduncle 3–5 mm, pilose; bracts ca. 2 mm. Calyx ca. 5 × 2.5 mm, glandular puberulent, finely floccose-pilose at base, margins ciliolate; teeth lanceolate, 1.5–1.7 mm, posterior tooth ca. 3 mm; fruiting calyx tubular, 8.5–10 × 4.5 mm, base rounded, distinctly netted; teeth 3–3.5 mm, posterior tooth to 6 mm. Corolla white, ca. 2.3 cm; tube ca. 1.5 mm wide at base, dilated to 6 mm at throat; upper lip ca. 5.5 mm; lower lip subequal to upper, middle lobe circular, 2 mm in diam. Nutlets unknown. Fl. Oct.

- Forests. Guizhou.

12. *Microtoena maireana* Handel-Mazzetti, Symb. Sin. 7: 927. 1936.

石山冠唇花 shi shan guan chun hua

Herbs. Stems much branched, glabrous except for floccose-pilose grooves. Petiole 1–2.5 cm; leaf blade broadly ovate-triangular, 2–3 × 2–3 cm, adaxially sparsely strigose, abaxially subglabrous or very sparsely spreading pilose on very elevated veins, base truncate to broadly cuneate, margin narrowly serrate, apex acuminate. Panicles terminal, lax, spreading glandular pilose, cymes 3–6-flowered, in axils of gradually reduced leaves; peduncle 5–10 mm; bracts lanceolate, ± shorter than calyx. Calyx broadly tubular, 5–7 mm; teeth acuminate, posterior tooth lanceolate, ca. 2.5 × as long as other teeth, anterior teeth narrowly triangular; fruiting calyx dilated, to 1 cm, subglabrous. Corolla yellow, 2–2.5 cm, pilose; upper lip semicircular, 5–8 mm, ligulate, base with curved auricles 1–2 mm; lower lip spreading, subequal upper, undulate; middle lobe longer, ovate; lateral lobes narrowly elliptic. Nutlets black-brown, triquetrous, obovoid, somewhat corrugate.

- Rocky mountains; 2600 m. Yunnan.

13. *Microtoena miyiensis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis. Sin. 66: 579. 1977.

米易冠唇花 mi yi guan chun hua

Herbs perennial. Stems ca. 45 cm, base prostrate, ± flexuous, stramineous, densely white pilose and strigose; axillary branchlets 1–3 cm, sterile. Petiole slender, 2–5.5 cm; leaf blade rhombic-ovate, 3.5–6 × 2.5–4.5 cm, papery, adaxially sparsely appressed bristly, strigose on veins, abaxially densely white bristly, with scattered glands, base cuneate, margin coarsely serrate, apex acuminate. Cymes 2- or 3-flowered, short pedunculate, in compact ovoid panicles 2.5–3 cm; floral leaves short petiolate, ca. 8 × 5 mm; bracts and bracteoles ca. 4 × 1 mm. Calyx ca. 5 × 1.5 mm, densely pilose, 5-veined; teeth triangular-subulate, ca. 1 mm, equal, slightly curved, posterior tooth ca. 3 × as long as other teeth. Corolla white or yellow-green, ca. 2.2 cm, slightly puberulent, glandular; tube slender, ca. 1.4 cm, throat abruptly dilated; upper lip semicircular, ca. 8 mm, apex emarginate; lower lip ca. 8 mm, middle lobe obovate, 2.5 × 2 mm; lateral lobes subcircular, ca. 2 mm wide. Nutlets unknown. Fl. Aug.

- Shady areas in forests; 2500 m. Sichuan.

14. *Microtoena robusta* Hemsley, J. Linn. Soc., Bot. 26: 307. 1890.

粗壮冠唇花 cu zhuang guan chun hua

Herbs aromatic, ± pilose. Stems robust, 1.2–1.8 m, hollow. Petiole to as long as blade; leaf blade broadly cordate-ovate to circular-cordate, to 15 × 10 cm, abaxially mostly sparsely puberulent, base cordate, margin coarsely crenate, apex acuminate. Panicles terminal and axillary, to 15 cm; cymes short pedunculate. Calyx pilose, dilated in fruit, rigid, conspicuously netted; teeth oblong, subequal, apex subacute, posterior tooth somewhat larger, with transverse veins. Corolla reddish, ca. 2.5 cm, pubescent, straight; tube narrow; upper lip with 2 acute lobes; lower lip lobes circular, lateral ones much shorter. Stamens bearded at middle. Nutlets black-brown, flattened, obovoid, glabrous.

- Hubei, Sichuan.

15. *Microtoena vanchingshanensis* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 52. 1965.

梵净山冠唇花 fan jing shan guan chun hua

Herbs. Stems ca. 60 cm tall, base prostrate, yellowish-brown when dry, pilose pubescent, subglabrous at base. Petiole 2–5.2 cm; leaf blade ovate-cordate, 4.5–7.5 × 3–4.5 cm, much reduced on lateral branches, membranous, brown, finely bristly, base cordate, margin mucronate-crenate, apex short acuminate. Cymes 3(–5)-flowered, 5–7 in terminal panicles, or axillary; peduncle 3–6 mm; lower floral leaf blades ovate-cordate, 11–13 × 7–8 mm; bracts 2.5–4 mm. Calyx ca. 8 × 3.5 mm, pilose outside; teeth triangular-ovate, posterior teeth ca. 3 mm, middle tooth largest, anterior teeth ca. 1.5 mm; fruiting calyx with very conspicuous transverse veins. Corolla white, ca. 2.3 cm, glabrous, throat ca. 6 mm wide; upper lip ca. 7 mm; lower lip longer, elliptic, lateral lobes obtuse at apex; middle lobe obovate, ca. 2 × 1.5 mm. Nutlets unknown. Fl. Aug.

- Streamsides; 1700 m. Guizhou.

16. *Microtoena urticifolia* Hemsley, J. Linn. Soc., Bot. 26: 308. 1890.

麻叶冠唇花 ma ye guan chun hua

Herbs robust, sparsely fine pilose, minutely hispid, or puberulent. Stems 1–1.2 m. Petiole slender, 5–12.5 cm; leaf blade ovate to cordate-ovate, 7.5–12.5 cm, membranous, sparsely finely strigose, spreading villous on veins especially abaxially, base cordate to cuneate, margin coarsely serrate, apex long acuminate. Cymes lax, in terminal panicles or dichotomous and axillary, pedunculate. Flowers aromatic, short pedicellate. Calyx minutely hispid; teeth subulate to lanceolate, posterior tooth to 2 × as long as others. Corolla 2.5–3.1 cm, puberulent; tube nearly straight, abruptly dilated at apex; upper lip acute lobed in front below middle; middle lobe of lower lip longer than lateral lobes. Filaments bearded below middle. Nutlets brown, flattened, ovoid or ellipsoid, shiny.

- Wet areas on sunny hillsides; 900 m. Hubei, Hunan.

- 1a. Cymes in loose, terminal panicles, long pedunculate; calyx teeth subulate 16a. var. *urticifolia*
- 1b. Cymes dichotomous, axillary, short pedunculate; calyx teeth lanceolate 16b. var. *brevipedunculata*

16a. *Microtoena urticifolia* var. *urticifolia*

麻叶冠唇花 ma ye guan chun hua

Cymes in loose, terminal panicles, long pedunculate. Calyx teeth subulate, posterior tooth ca. $2 \times$ as long as other teeth (specimens not seen).

- Wet areas on sunny slopes; 900 m. Hubei.

16b. *Microtoena urticifolia* var. *brevipedunculata* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 54. 1965.

短梗变种 duan geng bian zhong

Cymes dichotomous, axillary, short pedunculate; peduncles 5–10 mm. Calyx teeth lanceolate, posterior tooth longer than other teeth.

- Hillsides. Hunan.

17. *Microtoena moupinensis* (Franchet) Prain, Bull. Soc. Bot. France 42: 426. 1895.

宝兴冠唇花 bao xing guan chun hua

Clerodendron moupinense Franchet, Nouv. Arch. Mus. Hist. Nat., ser. 2, 10: 68. 1887.

Herbs perennial. Stems 60–100 cm, base spreading hispid, apex sometimes short glandular hairy. Petiole 0.8–5.8 cm; leaf blade ovate-cordate to triangular-ovate, $2.5\text{--}7.2 \times 2\text{--}6$ cm, much reduced on branches, adaxially brownish finely strigose, abaxially densely tawny, appressed hispidulous on veins, base cordate to truncate-cuneate, margin coarsely mucronate crenate-dentate, apex short caudate-acuminate. Cymes 2–7-flowered, axillary or in terminal panicles; peduncle 0.3–2.3 cm; bracts slightly shorter than calyx. Calyx ca. 8×2.5 mm, sparsely minutely hispid, short glandular hairy; teeth triangular-subulate, posterior tooth ca. 4 mm, anterior teeth ca. 3 mm; fruiting calyx dilated, netted. Corolla yellowish or white, ca. 3.3 cm, puberulent on back outside, throat 5.2 mm wide; upper lip ca. 9 mm; lower lip subequal to upper, elliptic; middle lobe oblong, ca. 4×2 mm; lateral lobes smaller, triangular. Nutlets black-brown, triquetrous, obovoid, ca. 2×1.2 mm, glabrous, base acute. Fl. Aug-Sep, fr. Oct.

- Grasslands, forest margins; 1600–2200 m. Sichuan.

18. *Microtoena prainiana* Diels, Bot. Jahrb. Syst. 29: 556. 1900.

南川冠唇花 nan chuan guan chun hua

Herbs. Stems ca. 1 m tall, subglabrous or retrorse minutely tomentose. Petiole to 8 cm; leaf blade triangular-ovate to ovate-oblong, $6.5\text{--}14 \times 4\text{--}8$ cm, adaxially sparsely hirtellous, puberulent on veins, abaxially glabrous, base subtruncate to abruptly attenuate, margin coarsely crenate-serrate, apex long acuminate. Cymes dichotomous, axillary or 6–10 in terminal panicles ca. 2 cm in diam.; peduncle 1.4–3 cm; bracts $1\text{--}3 \times 0.8\text{--}1.6$ cm, margin serrate or subentire. Calyx ca. 8×3.5 mm, \pm membranous, glabrous, margin ciliolate; teeth subequal, triangular-subulate, ca. 3 mm; fruiting calyx dilated, scarious, distinctly transverse veined, teeth hooded at apex. Corolla yellowish, ca. 2.8 cm, finely

puberulent, throat ca. 6 mm wide; upper lip ca. 7 mm, apex emarginate; lower lip slightly shorter, subcircular; middle lobe circular, ca. 2 mm in diam.; lateral lobes triangular-ovate, ca. 1.5×2 mm. Nutlets dark brown, obovoid-oblong, 1.8×1 mm, base acute, glabrous. Fl. Jul-Aug, fr. Sep.

- Forests, forest margins, streamsides, sloping waste areas; 1000–2000 m. Guizhou, Sichuan, Yunnan.

19. *Microtoena longisepala* C. Y. Wu ex Hsuan, Acta Phytotax. Sin. 10: 55. 1965.

长萼冠唇花 chang e guan chun hua

Herbs. Stems ca. 1.5 m tall, usually glabrescent, glandular puberulent. Petiole to 6.5 cm; leaf blade oblong-ovate, $9.5\text{--}12 \times 5\text{--}8$ cm, adaxially sparsely minutely hispid, abaxially spreading hispid on veins, base truncate-cuneate, margin coarsely dentate, apex acuminate. Cymes subterminal, in panicles to 12×3 cm, few flowered, crowded; peduncle ca. 1 cm; bracts 2–5 mm. Calyx ca. 1.2 cm, narrowly campanulate, densely short yellow glandular hairy, margins sparsely 2- or 3-septate hispid; teeth ca. 6 mm, subulate, apex caudate-acuminate, posterior tooth to 8 mm. Corolla yellow, ca. 2.7 cm, puberulent outside; tube straight, ca. 1.9 cm, throat 5–6.5 mm wide; upper lip straight, ca. 7 mm, apex emarginate; lower lip dark yellow, spreading; middle lobe ovate-orbicular, ca. 4×2.5 mm; lateral lobes ovate-triangular, ca. $1/2$ as long as middle lobe. Nutlets dark-brown, flattened, triquetrous, obovoid, ca. 1.8 mm.

- Dense forests on shady slopes; 2300 m. Sichuan.

20. *Microtoena megacalyx* C. Y. Wu, Acta Phytotax. Sin. 8: 48. 1959.

大萼冠唇花 da e guan chun hua

Herbs. Stems 30–150 cm, densely fine puberulent, subglabrous or glandular puberulent at apex. Petiole to 11 cm; leaf blade ovate, $5\text{--}14 \times 3.5\text{--}10$ cm, subglabrous, densely glandular puberulent on veins adaxially, sparsely minutely hispid abaxially, base truncate-cuneate, attenuate into winged petiole, margin mucronate crenate-serrate, apex abruptly acuminate. Cymes dichotomous, 5–15-flowered, usually in terminal panicles ca. 11 cm; peduncle 1–4 cm; bracts leaflike, lanceolate. Calyx campanulate, $5\text{--}6 \times 3\text{--}4$ mm, glandular puberulent; teeth triangular, 2–3 mm, long setaceous, capitate glandular, hirsute; fruiting calyx to 12×5 mm, netted; teeth ca. 3 mm, hooked, posterior tooth ca. 4.5 mm. Corolla yellowish to white, ca. 2.5 cm; tube straight, slender, ca. 1.5 cm, densely puberulent, throat abruptly dilated; upper lip nearly straight; middle lobe of lower lip subcircular; lateral lobes subtriangular, wider, reflexed. Filaments puberulent. Nutlets black-brown, triquetrous, obovoid, base acute, $1.5\text{--}2.1$ mm, $1\text{--}1.2$ mm in diam., smooth, glabrous. Fl. Aug, fr. Sep.

- Broad-leaved forests, grassy slopes near streams, streamsides in forests; 1500–2200 m. Guizhou, Yunnan.

55. CHAMAESPACOS Schrenk ex Fischer & C. Meyer, Enum. Pl. Nov. 1: 27. 1841.

矮刺苏属 ai ci su shu

Herbs annual, subglabrous. Leaves petiolate, subulate-serrate, teeth spinescent. Verticillasters 2–6-flowered, widely spaced basally, crowded apically; bracts subulate. Calyx tubular-campanulate, 10- or 11-veined, dilated in fruit, upper lip 3-toothed, lower lip 2-toothed; teeth triangular, apex subulate-acuminate. Corolla tube slender, much exserted; upper lip straight; lower lip shorter, spreading, 3-lobed; lobes subequal, obovate. Stamens 4, anterior 2 longer; filaments inserted on corolla throat, shorter than upper corolla lip; anthers oblong, cells 2, divaricate. Style apex subequally 2-cleft, lobes subulate. Nutlets black, oblong, smooth, sometimes scaly spotted, narrowly membranous winged.

Monotypic: Afghanistan, China, Kazakhstan, Russia, Tajikstan, Turkmenistan, Uzbekistan; SW Asia.

1. *Chamaesphacos ilicifolius* Schrenk ex Fischer & C. Meyer, Enum. Pl. Nov. 1: 28. 1841.

矮刺苏 ai ci su

Chamaesphacos longiflorus Bornmüller & Sintenis.

Stems erect, 1410–17 cm, spreading branched from base. Petiole ca. 1 cm; leaf blade oblong-ovate to oblong, 1.2–3 cm × 5–7 mm, base cuneate, margin spinescent-serrate, apex subacute. Floral leaves short petiolate or ± sessile, similar to stem leaves. Calyx 6–8 mm, to 1 cm

and campanulate in fruit, apex ± floccose-villous outside; teeth narrowly triangular, apex subulate-acuminate, posterior teeth longer. Corolla purple, puberulent outside, 1.1–1.4 cm, limb ca. 3 mm; upper lip oblong, apex emarginate or ± entire; lower lip shorter, lobes spreading. Nutlets ca. 3 × 1 mm. Fl. Apr–May, fr. May.

Sandy areas. Xinjiang [Afghanistan, Kazakhstan, Russia, Tajikstan, Turkmenistan, Uzbekistan; SW Asia].

56. SALVIA Linnaeus, Sp. Pl. 1: 23. 1753.

鼠尾草属 shu wei cao shu

Herbs, subshrubs, or shrubs. Leaves simple or pinnately compound. Verticillasters 2- to many flowered, in racemes, panicles, or spikes, rarely solitary, axillary; bracteoles minute. Calyx tubular to campanulate, hairy or glabrous on throat inside, 2-lipped; upper lip entire, 2-toothed, or 3-mucronate; lower lip 2-toothed. Corolla 2-lipped; tube straight, horizontal, curved upward or adaxially dilated, with or without hairy annulus inside; upper lip folded, straight or falcate, apex entire or emarginate; lower lip spreading, 3-lobed; middle lobe widest, margin entire, apex emarginate, fringed, or 2-lobulate; lateral lobes oblong or circular, spreading or reflexed. Stamens 2; filaments short, horizontal or erect; connectives prolonged, linear, T-shaped; upper arms with fertile elliptic or linear anther cells; lower arms robust or slender, with fertile or sterile anther cells, separated or connected to each other; staminodes 2, small or absent. Style 2-cleft, lobes subulate, linear or circular, equal, anterior lobe larger or posterior lobe indistinct. Disc slightly swollen in front or ringlike. Nutlets triquetrous, ovoid or oblong, glabrous, smooth.

About 900(–1100) species: tropical and temperate zones of the Old and New World, 84 species in China.

There are many taxonomic problems in the flora area, especially in Sichuan and Yunnan provinces; collation with the situation in the Himalaya is much needed.

- 1a. Connectives ± curved, semicircular or arcuate; upper arms longer than or equal to lower arms; anther cells on ends of upper and lower arms fertile.
- 2a. Cultivated small shrubs or shrubby herbs; upper calyx lip conspicuously 3-toothed 45. *S. officinalis*
- 2b. Herbs; upper calyx lip entire or very approximately 3-tipped; lower anther cells united.
- 3a. Annual or biennial; stem much branched; leaves nearly all on stem.
 - 4a. Corolla 1–1.3(–1.6) cm, yellow 44. *S. roborowskii*
 - 4b. Corolla more than 2 cm.
 - 5a. Corolla yellow; leaves triangular-hastate to sagittate, basal lobes horizontally prolonged, triangular 42. *S. tricuspis*
 - 5b. Corolla blue-purple or purple; leaves triangular to ovate-triangular, basal lobes scarcely prolonged 43. *S. umbratica*
- 3b. Perennial herbs; stem unbranched; leaves nearly all basal.
 - 6a. Filaments longer than connectives.
 - 7a. Calyx 2-lipped to 1/2 its length 18. *S. schizocalyx*
 - 7b. Calyx 2-lipped 1/4–1/3 its length, rarely to 1/2 after anthesis.
 - 8a. Filaments more than 3 × as long as connectives, connectives 1.8–2.7(–6) mm.
 - 9a. Petiole narrowly long winged; lower surface of blades densely gray tomentose 15. *S. alatipetiolata*
 - 9b. Petiole not winged, rarely dilated into wing or sheath.
 - 10a. Adaxial corolla lip 2-lobed to its base; lobes ovate, apex subacute 23. *S. schizochila*
 - 10b. Apex of upper corolla lip emarginate, not 2-lobed to base.
 - 11a. Corolla 1.2–1.8 cm, upper lip densely villous or white bearded.
 - 12a. Leaf base cordate or subhastate, basal lobes mostly circular; corolla violet or purple,

- upper lip densely white bearded outside 21. *S. mairei*
- 12b. Leaf base cordate or hastate, basal lobes acute; corolla blue-purple, upper lip densely villous outside 22. *S. pogonochila*
- 11b. Corolla mostly more than 2 cm, upper lip pilose or subglabrous outside.
- 13a. Stems and petioles retrorse pilose; leaves shallowly cordate or hastate, basal lobes acute sometimes rounded, apex acute or short acuminate; bracts broadly ovate 19. *S. brachyloma*
- 13b. Stems and petioles densely spreading pilose, brown pilose or glabrescent; leaves cordate or subtruncate, rarely shallow hastate at base; bracts ovate or oblong-elliptic.
- 14a. Leaves elliptic-ovate, base subtruncate or shallow cordate; corolla 1.7–1.9 cm 20. *S. lankongensis*
- 14b. Leaves ovate or triangular-ovate, strongly emarginate or cordate rarely shallow hastate at base; corolla 2.6–3.5 cm 16. *S. evansiana*
- 8b. Filaments to ca. 2 × as long as connectives, mostly more than 3 mm (except *S. sonchifolia*).
- 15a. Abaxial surface of leaves densely white or brown tomentose.
- 16a. Corolla double zigzag; tube narrowly cylindrical, zigzag basally; exerted portion abruptly dilated, curved upward, purple-brown, chestnut brown, or dark purple; leaves elliptic-lanceolate or oblong-ovate, base rounded to subcordate 33. *S. castanea*
- 16b. Corolla spreading, not curved upward.
- 17a. Leaves oblong-elliptic, base rounded or shallow cordate; corolla yellow 5. *S. digitaloides*
- 17b. Leaves triangular-hastate or elliptic-hastate, rarely cordate-ovate, sometimes with rounded lateral lobes, base cordate or hastate; corolla purple-red to red-brown 6. *S. przewalskii*
- 15b. Abaxial surface of leaves not tomentose.
- 18a. Corolla straight, 4–5 cm, rarely shorter.
- 19a. Calyx 1.7–2.2 cm, upper lip shorter than lower lip; leaves cordate-ovate to hastate-ovate, irregularly mucronate crenate-dentate 3. *S. dolichantha*
- 19b. Calyx 0.8–1.9 cm; leaves ovate to oblong-hastate, rarely crenate.
- 20a. Corolla yellowish; upper leaf surface finely strigose, pilose, lower surface obscurely glandular 2. *S. potaninii*
- 20b. Corolla red, violet, blue and white, or purplish on upper lip; upper leaf surface with hairs of 1 kind only, lower leaf surface conspicuously glandular.
- 21a. Leaves 3.5–9.5 cm, oblong-hastate or ovate-cordate, apex obtuse; calyx 1.6–1.5 cm 1. *S. prattii*
- 21b. Leaves 7–16 cm, subhastate, apex acute; calyx 1.2–1.5 cm 4. *S. wardii*
- 18b. Corolla straight or curved upward, less than 3.6 cm, rarely to 4 cm.
- 22a. Corolla straight; upper leaf surface subglabrous or pilose.
- 23a. Leaves oblong, subglabrous or puberulent on veins, undulate or obscurely crenate; corolla long tubular 41. *S. sonchifolia*
- 23b. Leaves ovate or triangular-ovate, with long hairs.
- 24a. Leaves ovate or triangular-ovate, pilose; stem spreading pilose 7. *S. brevilabris*
- 24b. Leaves triangular-ovate, adaxially sparsely ± appressed strigose, lower floccose-villous mainly along veins; stem slender, ascending, floccose-villous 11. *S. paohsingensis*
- 22b. Corolla ± curved upward.
- 25a. Leaves elliptic, elliptic-lanceolate, or oblong-ovate, rarely obovate or circular, base cuneate-attenuate to rounded or shallowly cordate, rarely subtruncate.
- 26a. Corolla orange, white, dark blue, or purple, tube straight but exerted part curved upward; leaf base rounded to cuneate, rarely shallowly cordate 8. *S. aerea*
- 26b. Corolla purple-brown, chestnut brown, or dark purple, tube double zigzag, narrowly tubular, zigzag basally but exerted part abruptly dilated and curved upward; leaf base rounded to subcordate 33. *S. castanea*
- 25b. Leaves ovate, broadly ovate, or circular, base cordate or subtruncate, rarely truncate.
- 27a. Bracts subcircular, broadly ovate, or ovate, apex rounded, acute or obtuse, adaxially glabrous; stem or floral leaves with spreading veins; petioles sometimes winged or sheathed; stem and leaves densely villous.
- 28a. Corolla white, yellowish, or cream-yellow, sometimes with few gray (except purplish or reddish in *S. cyclostegia* var. *purpurascens*), tube cylindrical, dilated adaxially, curved upward 12. *S. cyclostegia*
- 28b. Corolla purplish or blue-purple, tube zigzag, tubular toward base, gradually dilated adaxially, curved at an angle above middle 38. *S. subpalmatinervis*
- 27b. Bracts ovate or rhombic-ovate, apex abruptly attenuate or short acuminate, adaxially subglabrous; leaves mostly basal, rarely on stem; blades strigose or pubescent, spreading pinnately veined; petioles villous, not winged; stem villous, base covered by brown scales 25. *S. sikkimensis*

- 6b. Filaments shorter than to as long as connectives.
- 29a. Abaxial leaf blade surface densely gray cobwebby-tomentose.
- 30a. Adaxial leaf blade surface densely pubescent, finely corrugate; calyx spreading villous outside; bracts adaxially slightly pubescent or subglabrous, abaxially densely villous 31. *S. atropurpurea*
- 30b. Adaxial leaf blade surface glabrous, not corrugate; calyx glandular pilose outside; bracts adaxially subglabrous or slightly pilose, abaxially cobwebby-villous 30. *S. heterochroa*
- 29b. Abaxial leaf blade surface not gray cobwebby-tomentose, with different hairs or subglabrous.
- 31a. Calyx with basal purple-black hairs outside 29. *S. smithii*
- 31b. Calyx without basal purple-black hairs outside.
- 32a. Corolla straight, not curved.
- 33a. Calyx 5–7 mm; verticillasters 2-flowered 17. *S. pauciflora*
- 33b. Calyx more than 7 mm; verticillasters few to many flowered.
- 34a. Calyx 2-lipped to 1/2 its length 36. *S. bifidocalyx*
- 34b. Calyx 2-lipped less than 1/2 its length.
- 35a. Stems and leaves densely brown pilose; corolla purple or white with purple spots, rarely yellow; leaves coarsely dentate-crenate; bracts ovate, apex acuminate to acute 9. *S. himmelbaurii*
- 35b. Stems and leaves glandular pilose to minutely hispid or subglabrous; corolla yellow, limb tinged purple or purple; leaves coarsely crenate-dentate; bracts lanceolate to ovate-lanceolate, apex long acuminate 10. *S. maximowicziana*
- 32b. Corolla ± curved downward.
- 36a. Calyx tubular to tubular-campanulate; leaf apex acuminate; corolla yellow.
- 37a. Abaxial surface of leaf green; calyx tubular, 1.7–2.1 cm; corolla tube hairy annulate inside 13. *S. cynica*
- 37b. Abaxial surface of leaf purple; calyx tubular-campanulate, 1–1.5 cm; corolla tube inside without an hairy annulus or obscurely pilose annulate (*S. omeiana* var. *grandibracteata*) 14. *S. omeiana*
- 36b. Calyx campanulate; leaf apex not acuminate, rarely apical tooth acute or broadly acuminate (e.g., *S. hupehensis*).
- 38a. Leaves broadly ovate to broadly cordate, subequal to equal in size; corolla slightly curved upward, not abruptly dilated adaxially or abaxially beyond calyx.
- 39a. Corolla purple, 3–4.5 cm; leaf apex rounded, or apical tooth acute or broadly acuminate 28. *S. hupehensis*
- 39b. Corolla yellow, less than 4 cm; leaf apex obtuse to acute.
- 40a. Calyx 1.7–2.2 cm, broadly tubular-campanulate, greenish 27. *S. hylocharis*
- 40b. Calyx 1–1.6 cm, campanulate.
- 41a. Leaves cordate to ovate-hastate, 4–18 × 3.5–13.5 cm, irregularly double incised-crenate, mostly on stem; corolla yellow 24. *S. campanulata*
- 41b. Leaves broadly ovate-triangular to subcircular, 8–19 × 4–19 cm, irregularly double crenate or dentate, mostly basal; corolla green-white, sometimes with violet spots 26. *S. handelii*
- 38b. Leaves ovate to oblong-ovate, wider than long; corolla mostly double zigzag, base narrowly cylindrical, abruptly dilated adaxially or abaxially beyond calyx.
- 42a. Verticillasters crowded in strobiloid inflorescences when young, covered by subcircular bracts; leaves ovate, 4–15 × 2–10 cm 37. *S. kiaometiensis*
- 42b. Verticillasters not crowded, not in strobiloid inflorescences when young; bracts not subcircular.
- 43a. Corolla dark purple, purple, to red.
- 44a. Calyx mouth subtruncate or obscurely 2-lipped; corolla red; leaves ovate, (5–)6–10.5 × (3–)4–8 cm, ± membranous, densely tomentose-villous 34. *S. atrorubra*
- 44b. Calyx conspicuously 2-lipped; corolla purple-blue; leaves ovate to ovate-triangular, (2.5–)3.5–6(–9.2) × (1.5–)3–5(–6) cm, papery, finely pilose 32. *S. bulleyana*
- 43b. Corolla yellow.
- 45a. Petioles retrorse bristly-hirsute; upper corolla lip upright 40. *S. nipponica*
- 45b. Petioles not retrorse bristly hirsute; upper corolla lip spreading, not upright.
- 46a. Leaves ovate to oblong-ovate, rarely subcircular or elliptic, 3–9 × 2–8 cm, apex obtuse or rounded or acute, base cordate or shallowly hastate, adaxially appressed villous or appressed pubescent, abaxially spreading pilose on veins or densely villous when young 39. *S. mekongensis*
- 46b. Leaves ovate to triangular-ovate, 2–7 × 3.5–5 cm, apex acute or obtuse, base hastate, rarely cordate, adaxially strigose-pilose, abaxially pubescent along veins 35. *S. flava*

- 1b. Connectives \pm straight, not curved, semicircular; anther cells of lower arms sterile.
- 47a. Abaxial arms of connectives united.
- 48a. Herbs annual or biennial, much branched; leaves simple; corolla 4–6 mm 64. *S. plebeia*
- 48b. Perennial herbs; unbranched or few branched; leaves simple or odd-pinnate compound; corolla longer.
- 49a. Apex of upper calyx lip conspicuously 3-toothed, teeth erect; corolla tube without hairy annulus inside 62. *S. grandifolia*
- 49b. Apex of upper calyx lip entire or 3-mucronate; corolla tube with hairy annulus or imperfect hairy annulus inside, rarely without.
- 50a. Leaves simple; bracts colored.
- 51a. Plants wild; corolla tube included 63. *S. deserta*
- 51b. Plants cultivated; corolla tube exerted.
- 52a. Herbs; leaves hairy, abaxially gray minutely tomentose; corolla campanulate-tubular, 2–2.3 cm, scarlet or blood red 66. *S. coccinea*
- 52b. Subshrubs; leaves glabrous; corolla tubular, 4–4.2 cm, red, purple, to white 65. *S. splendens*
- 50b. Leaves compound, mostly ternate or odd-pinnate, rarely simple; bracts green.
- 53a. Corolla straight, narrowly tubular, slightly longer to 2–3 \times longer than calyx.
- 54a. Calyx hirsute annulate on throat inside; plants densely white lanate 61. *S. nanchuanensis*
- 54b. Calyx without a hairy annulus inside; plants subglabrous, pubescent, or pilose.
- 55a. Corolla tube slightly longer than calyx; connectives ca. 0.3 mm 60. *S. brevicomnectivata*
- 55b. Corolla tube 2–3 \times longer than calyx; connectives 3–4 mm 59. *S. plectranthoides*
- 53b. Corolla tube curved, apex dilated.
- 56a. Middle lobe of lower corolla lip 2-lobulate; lobules irregularly crenate-denticulate apically, fringed, or fringed on 1 side.
- 57a. Middle lobe of lower corolla lip strongly 2-lobulate, Y-shaped; lobules obtriangular, repand-crenate, apex denticulate or fringed; calyx finely shiny-pilose beyond middle inside; anthers finely puberulent; connectives glandular pubescent at joints 58. *S. meiliensis*
- 57b. Middle lobe of lower corolla lip shallowly 2-lobulate, T-shaped; lobules subcircular, fringed on 1 side; calyx white villous annulate on throat inside; anthers and connectives glabrous 57. *S. honania*
- 56b. Middle lobe of lower corolla lip emarginate or 2-lobulate; lobules never fringed apically or on 1 side.
- 58a. Corolla less than 1.3 cm.
- 59a. Calyx tube hirsute annulate inside; stem and leaves white hirsute 54. *S. prionitis*
- 59b. Calyx tube without hairy annulus inside; stem and leaves glabrous or puberulent 55. *S. cavaleriei*
- 58b. Corolla more than 1.5 cm.
- 60a. Leaves simple, triangular-ovate; corolla 3–4 mm 56. *S. nubicola*
- 60b. Leaves pinnately compound, sometimes with simple.
- 61a. Corolla tube more than 3 \times longer than calyx, spreading or slightly curved upward; limb shorter than exerted part of corolla tube, upper lip erect; leaves ternate compound, leaflets short petiolulate 46. *S. trijuga*
- 61b. Corolla tube included or slightly exerted beyond calyx; limb longer than exerted part of corolla tube, upper lip falcate or galeate, upright, almost at a right angle to lower lip.
- 62a. Calyx without a hairy annulus inside; petioles and stem spreading white villous 47. *S. yunnanensis*
- 62b. Calyx white hirsute annulate within; petioles and stem villous or glabrescent.
- 63a. Corolla tube without a conspicuous hairy annulus inside.
- 64a. Leaves and stem retrorse pilose; leaf blade crenulate 52. *S. paramiltiorrhiza*
- 64b. Leaves and stem pubescent; leaf blade serrate 53. *S. vasta*
- 63b. Corolla tube with a conspicuous hairy annulus inside.
- 65a. Calyx tubular; corolla tube included or slightly exerted beyond calyx, upper lip slightly arcuate.
- 66a. Calyx base white lamellate inside 50. *S. dabiashanensis*
- 66b. Calyx not white lamellate inside 49. *S. bowleyana*
- 65b. Calyx campanulate; corolla tube exerted or curved upward, upper lip conspicuously arcuate.
- 67a. Root scarlet outside; leaflets ovate, elliptic, to broadly lanceolate, pilose, apex acute or obtuse; racemes simple; upper corolla lip 1.2–1.5 cm 48. *S. miltiorrhiza*
- 67b. Root purplish or gray-brown to blackish brown or dark brown outside; leaflets oblong-ovate, oblong-lanceolate, to lanceolate, subglabrous, apex acuminate to acute; racemes compound, sometimes simple; upper corolla lip 0.9–1.1 cm 51. *S. sinica*

- 47b. Abaxial arms of connectives separated.
- 68a. Calyx with a hairy annulus or imperfect hairy annulus on throat, rarely with 2 rows of hirsute hairs on middle of upper lip inside.
- 69a. Plants ca. 11 cm tall; leaves mostly basal, stem leaves 1 pair, leaflets less than 9 mm 75. *S. adoxoides*
- 69b. Plants more than 11 cm tall; leaflets larger.
- 70a. Calyx with 2 rows of hirsute hairs on middle of upper lip, otherwise apex finely strigose inside; lobes of lower corolla lip similar, subequal or middle lobe larger, circular 74. *S. chunganensis*
- 70b. Calyx throat hirsute inside; lobes of lower corolla lip dissimilar, middle lobe largest, apex emarginate.
- 71a. Leaves simple or 3-foliolate; leaf or leaflet blade ovate to ovate-elliptic, base rounded to cordate 73. *S. chinensis*
- 71b. Leaves 1–4-pinnately compound.
- 72a. Leaves 1- or 2-pinnately compound; terminal leaflet lanceolate or rhombic, apex acuminate to caudate-acuminate, base narrowly cuneate; inflorescence rachis glandular pilose or pilose 72. *S. japonica*
- 72b. Leaves 3- or 4-pinnately compound; leaflets narrow elliptic to linear-lanceolate or oblanceolate, apex obtuse to acuminate, base attenuate; inflorescence rachis gray puberulent or glandular pilose 76. *S. filicifolia*
- 68b. Calyx without a hairy annulus or hairy rows inside.
- 73a. Corolla tube without a hairy annulus inside.
- 74a. Stems prostrate or ascending; basal leaves simple, stem leaves ternate compound; apex of upper calyx lip truncate 70. *S. substolonifera*
- 74b. Stems erect; leaves simple or compound; upper calyx lip not truncate.
- 75a. Leaves simple, oblong, 6.5–7 × 3.2–3.7 cm 83. *S. weihaiensis*
- 75b. Leaves ternate compound or 3–5-foliolate.
- 76a. Stems spreading villous at base, glandular pilose at apex; mid stem leaves 5-foliolate, terminal leaflet 1.8 × 1.2 cm; bracts lanceolate; upper calyx lip acute 84. *S. piasezkii*
- 76b. Stems densely retrorse puberulent; all leaves 3-foliolate, terminal leaflet 3–4 × 1.5–2 cm; bracts linear; upper calyx lip 3-mucronate 82. *S. fragarioides*
- 73b. Corolla tube with a hairy annulus inside.
- 77a. Verticillasters secund; middle lobe of lower corolla lip entire or emarginate at apex, ligulate, narrowly elliptic, to oblong.
- 78a. Middle lobe of lower corolla lip ligulate, narrowly elliptic, much narrower than lateral lobes; leaves simple, oblong 67. *S. liguliloba*
- 78b. Middle lobe of lower corolla lip semicircular to oblong, apex emarginate, larger than lateral lobes; leaves simple, or ternate compound, simple leaves ovate-lanceolate; leaflets ovate to ovate-lanceolate 68. *S. chienii*
- 77b. Verticillasters not secund; middle lobe of lower corolla lip emarginate or 2-lobulate at apex, not ligulate.
- 79a. Connectives with a subulate lamellate appendage at junction with filament 77. *S. appendiculata*
- 79b. Connectives without appendage.
- 80a. Adaxial corolla lip curved outward or suberect; leaves 1–3-pinnately compound; lateral leaflets much smaller than terminal leaflet 81. *S. adiantifolia*
- 80b. Adaxial corolla lip erect, plane or folded.
- 81a. Leaves always simple.
- 82a. Style sparsely retrorse pubescent 79. *S. qimenensis*
- 82b. Style glabrous 78. *S. kiangsiensis*
- 81b. Leaves simple, ternate, or 1- or 2-pinnately compound.
- 83a. Leaves 1- or 2-pinnately compound, leaflets irregularly lobulate or coarsely dentate, less than 2.5 cm 80. *S. hayatae*
- 83b. Leaves simple or ternate compound.
- 84a. Stems sparsely retrorse puberulent or subglabrous; leaves cordate-ovate, 2–4.3 × 1.3–3.6 cm; petioles glabrous or slightly puberulent; inflorescence rachis pubescent 71. *S. scapiformis*
- 84b. Stems densely puberulent, villous; leaves narrowly ovate to obovate, (2.5–)3–13 × (1.5–)2–8 cm; petioles densely villous; inflorescence rachis densely retrorse puberulent or villous 69. *S. baimaensis*

1. *Salvia prattii* Hemsley, J. Linn. Soc., Bot. 29: 316. 1893.

康定鼠尾草 kang ding shu wei cao

Salvia prattii var. *souliei* (H. Léveillé) Kudô; *S. souliei* H. Léveillé.

Plants perennial. Stems to 45 cm, sparsely pilose. Leaves mostly basal, long petiolate; petiole 3–17 cm, finely strigose; leaf blade oblong-hastate to ovate-cordate, 3.5–9.5 × 2–5.3 cm, adaxially finely strigose, abaxially densely strigose, dark purple glandular, base cordate or subhastate, margin crenate,

apex obtuse. Verticillasters 2–6-flowered, in terminal racemes; rachis densely villous; bracts elliptic to obovate, 1.2–2.3 × 0.4–1 cm, margin entire, apex mucronate, abaxially purple veined. Pedicel to 7 mm, densely villous. Calyx campanulate, 1.6–1.9 cm, villous especially on veins, purple glandular; upper lip semicircular, 6 × 10 mm, short 3-tipped; lower lip as long as upper, teeth triangular, apex acute. Corolla red or violet, 4–5 cm, villous outside; tube 4–6 cm, pilose annulate at base inside, suberect or projected from calyx, ca. 4 mm wide at base, to 1.4 cm wide beyond middle; upper lip oblong, ca. 11 × 8 mm, slightly arcuate; lower lip longer than upper, middle lobe obcordate, ca. 7 × 1.3 mm; lateral lobes ovate, ca. 5 mm wide. Filaments ca. 8 mm; connectives arcuate, ca. 5.5 mm, arms equal. Style exerted. Nutlets yellow-brown, obovoid, ca. 3 mm, apex rounded. Fl. Jul-Sep.

- Grassy slopes; 3700–4800 m. Qinghai, Sichuan.

2. *Salvia potaninii* Krylov, Trudy Bot. Muz. Imp. Akad. Nauk 14: 141. 1915.

洪桥鼠尾草 hong qiao shu wei cao

Plants perennial. Stems erect 30–38 cm, unbranched, densely pilose toward apex. Petiole of basal leaves, ca. 2.5 × as long as blade, petiole of upper leaves obsolete; leaf blade ovate to oblong-ovate, 3–7 × 1.2–5.3 cm, papery, adaxially fine strigose, pilose, abaxially fine strigose, obscurely glandular, base cordate to subhastate, margin crenate, apex obtuse. Verticillasters 6-flowered, in terminal racemes 6–10 cm; rachis densely pilose; bracts ovate to oblong-ovate, 0.8–3.5 × 0.5–1.5 cm. Pedicel ca. 3 mm. Calyx narrowly campanulate, 1.5–1.9 cm, densely pilose especially on veins; upper lip broadly triangular-ovate, ca. 4 × 9 mm, margin entire; lower lip ± as long as upper, teeth triangular-ovate. Corolla yellowish, 3.5–4 cm, villous; tube 3–3.8 cm, ± pilose annulate inside, erect, projected from calyx, ca. 4 mm wide at base, abruptly dilated at apex, to 8 mm wide at exerted part; upper lip straight, subcircular, ca. 7 mm wide; lower lip slightly longer than upper, middle lobe ca. 5 × 6 mm. Filaments complanate, ca. 7 mm; connectives arcuate, ca. 4.5 mm, upper arms subequal to lower ones. Nutlets unknown.

- Thickets; 4000 m. Sichuan.

3. *Salvia dolichantha* E. Peter, Acta Horti Gothob. 9: 113. 1934.

长花鼠地草 chang hua shu di cao

Plants perennial. Stems (15–)35–80 cm, unbranched, with deciduous pilose hairs, subglabrous basally, striate in grooves. Petiole to 15 cm; leaf blade cordate-ovate to hastate-ovate, 6.5–9 × 5.5–9 cm, adaxially sparsely pilose, densely so on veins, abaxially subglabrous or pilose along veins, densely dark purple glandular, base cordate to hastate, margin double crenate-dentate, mucronate, apex acute. Verticillasters 3–6-flowered, in racemes 16–18 cm; rachis densely brown villous; bracts subcircular to ovate, margin ciliate. Pedicel 4–7 mm, densely brown villous. Calyx campanulate, dark purple to purplish when dry, 1.7–2 cm abaxially, 2–2.2 cm adaxially, villous on veins, glandular, glabrous inside; upper lip broadly oblate, ca. 6 × 13 mm; lower lip longer than upper, 2 teeth broadly triangular, ca. 5 mm, margin ciliate, apex acuminate; fruiting calyx dilated, membranous. Corolla dark purple, 4.5–5 cm, pendulous, subglabrous or pilose, finely pilose annulate inside; tube 3.5–6 cm, ca. 4 mm wide, abruptly dilated

adaxially, to 1.3 cm wide at throat; upper lip straight, oblong, ca. 9 mm; middle lobe of lower lip subcircular, margin slightly crenulate; lateral lobes semicircular. Filaments ca. 9 mm; connectives semicircular, arms subequal. Style slightly exerted.

- Hills; 3700 m. Sichuan.

4. *Salvia wardii* E. Peter, Repert. Spec. Nov. Regni Veg. 39: 176. 1936.

西藏鼠尾草 xi zang shu wei cao

Plants perennial. Stems robust, 40–75 cm, densely spreading glandular hairy mainly toward apex, hairs ca. 0.5 mm. Basal leaves numerous; petiole ca. 2 × as long as blade, shorter in stem leaves; basal leaf blades ovate to subhastate, 7–16 × 3.5–8 cm, adaxially slightly corrugate, sparsely appressed short hairy, abaxially pilose, densely so on veins, densely red glandular, base strongly cordate with rounded or subacute lobes, margin crenate, apex acute; stem leaf blades circular. Racemes or panicles terminal, ± compact; rachis densely glandular pilose; bracts glandular ciliate, lower leaflike, narrowly ovate, upper ones shorter, to 1.5 cm. Calyx broadly campanulate, 1.2–1.5 cm, ca. 1 cm wide at mouth, tinged purple, densely glandular pilose mainly along veins; upper lip entire, broadly triangular-ovate; teeth of lower lip triangular, apex acute. Corolla 3.5–4 cm, blue with white on lower lip; tube gradually dilated upward, straight, pilose annulate; upper lip ca. 1/3–1/2 as long as exerted part of tube, erect, broadly ovate, finely pilose; lower lip longer than upper, middle lobe obcordate, margin finely erose; lateral lobes semiovate. Connectives curved, semicircular (specimens not seen).

- Alpine gravelly grasslands, thickets; 3600–4500 m. Xizang.

5. *Salvia digitaloides* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 234. 1912.

毛地黄鼠尾草 mao di huang shu wei cao

Plants perennial. Stems 30–60 cm, densely villous. Leaves usually basal; petiole 6–8 cm; leaf blade oblong-elliptic, 3.5–11 × 2–5 cm, base rounded to cordate, margin crenate, apex obtuse to rounded. Verticillasters 4–6-flowered, 3–8 in terminal racemes or panicles ca. 13 cm; rachis densely villous; bracts obovate to ovate. Pedicel 3–4 mm, densely villous. Calyx campanulate, 1–1.2 cm, ca. 1 cm wide when open, green, purple veined, villous; upper lip broadly triangular, 2–2.5 × 5.6 mm, apex 3-mucronate; lower lip slightly longer, teeth broadly triangular, apex acute. Corolla yellow with purplish spots, 3.3–3.5 cm, finely pilose; tube pilose annulate inside, exerted, ca. 2.4 cm, ca. 2.5 mm wide at base, gradually curved, dilated upward, to 1 cm wide at throat; upper lip oblong, ca. 8 × 7 mm; lower lip longer than upper, ca. 1.2 × 1.3 cm; middle lobe obcordate, to 1 cm wide; lateral lobes semicircular, ca. 4 mm wide. Stamens slightly exerted; filaments ca. 7 mm; connectives ca. 6 mm, arcuate, arms subequal. Style much exerted. Nutlets gray-black, obovoid, adaxially ribbed, ca. 4 × 2.5 mm. Fl. Apr-Jun.

- Dry shady pine forests, grassy hillsides, valleys; 2300–3400 m. Guizhou, Sichuan, Yunnan.

- 1a. Blades adaxially pilose, abaxially densely white tomentulose, base rounded 5a. var. *digitaloides*
- 1b. Blades subglabrous, densely glandular, abaxially spreading pilose along veins, base shallowly

cordate 5b. var. *glabrescens*

5a. *Salvia digitaloides* var. *digitaloides*

毛地黄鼠尾草 ma di huang shu wei cao

Leaf blade base rounded, adaxially pilose, abaxially densely white tomentulose.

• Dry shady pine forests, grassy hillsides; 2500–3400 m. Yunnan.

Used medicinally.

5b. *Salvia digitaloides* var. *glabrescens* E. Peter, Acta Horti Gothob. 9: 114. 1934.

无毛变种 wu mao bian zhong

Leaf blade base shallowly cordate, subglabrous, densely glandular except abaxially patently pilose along veins.

• Valleys; 2300–2500 m. Guizhou, Sichuan, Yunnan.

6. *Salvia przewalskii* Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg, sér. 3, 27: 526. 1881.

甘西鼠尾草 gan xi shu wei cao

Plants perennial. Stems to 60 cm, branched from base, ascending, densely pubescent. Petiole 6–21 cm, 1–4 cm in stem leaves; leaf blade triangular-hastate to oblong-lanceolate, rarely cordate-ovate, 5–11 × 3–7 cm, adaxially minutely hirsute, base cordate to hastate, margin crenate-dentate, apex acute. Verticillasters 2–4-flowered, widely spaced, in terminal racemes or panicles 8–20 cm; rachis densely pilose; bracts ovate to elliptic, 3–8 × 2.5–3.5 mm, villous. Pedicel 1–5 mm, densely pilose. Calyx campanulate, ca. 1.1 cm, densely red-brown glandular, villous; upper lip triangular-semicircular, ca. 4 × 5 mm, ± 3-mucronate; lower lip ca. 3 × 6 mm, 2-cleft; teeth triangular, apex acute. Corolla purple-red and red-brown or white, 2.1–3.5(–4) cm, pilose, sparsely red-brown glandular on upper lip; tube obliquely pilose annulate inside, ca. 1.7 cm, ca. 2 mm wide below annulus, gradually dilated beyond annulus, exerted, to ca. 8 mm wide at throat; upper lip oblong, ca. 5 mm, margin entire, slightly concave, ciliate; lower lip ca. 7 × 11 mm; middle lobe obovate, apex subtruncate; lateral lobes semicircular. Stamens exerted; filaments ca. 4.5 mm; connectives ca. 3.5 mm, arcuate, arms subequal. Style slightly exerted. Nutlets gray-brown, obovoid, ca. 3 × 2 mm. Fl. May–Aug.

Forest margins, hillsides, streamsides, thickets; 1100–4000 m. Gansu, Hubei, Sichuan, Xizang, Yunnan.

1a. Leaf blade abaxially ± pubescent or subglabrous 6c. var. *glabrescens*

1b. Leaf blade abaxially densely gray tomentose, tawny, or brownish tomentose.

2a. Leaf blade abaxially tawny or brownish tomentose 6b. var. *mandarinorum*

2b. Leaf blade abaxially densely gray tomentose.

3a. Inflorescences unbranched, racemose; corolla white; leaf blade lanceolate to oblong-lanceolate, short petiolate..... 6d. var. *alba*

3b. Inflorescences unbranched and branched, racemose and paniculate; corolla purple-red to red-brown; leaf blade triangular-hastate, rarely cordate-ovate, long petiolate

..... 6a. var. *przewalskii*

6a. *Salvia przewalskii* var. *przewalskii*

甘西鼠尾草 gan xi shu wei cao

Salvia tatsiensis Franchet.

Leaves long petiolate, blade triangular-hastate, rarely cordate-ovate, abaxially gray-white, densely gray tomentose. Inflorescences unbranched and branched, racemose and paniculate. Corolla purple-red to red-brown.

• Forest margins, streamsides, thickets; 1100–4000 m. Gansu, Sichuan, Xizang, Yunnan.

Used medicinally.

6b. *Salvia przewalskii* var. *mandarinorum* (Diels) E. Peter, Acta Horti Gothob. 9: 115. 1934.

褐毛变种 he mao bian zhong

Salvia mandarinorum Diels, Bot. Jahrb. Syst. 29: 557. 1900; *S. feddei* H. Léveillé; *S. labellifera* H. Léveillé; *S. tibetica* H. Léveillé.

Leaf blade abaxially tawny or brownish tomentose.

• Forest margins, streamsides, thickets; 2100–3500 m. Gansu, Hubei, Sichuan, Yunnan.

6c. *Salvia przewalskii* var. *glabrescens* E. Peter, Acta Horti Gothob. 9: 115. 1934.

少毛变种 shao mao bian zhong

Leaf blade abaxially ± pubescent or subglabrous.

• Forests, forest margins, grasslands, along creeks; 2100–3500 m. Sichuan, Yunnan, Xizang.

6d. *Salvia przewalskii* var. *alba* X. L. Huang & H. W. Li, Acta Phytotax. Sin. 19: 245. 1981.

白花变种 bai hua bian zhong

Leaves short petiolate, blade lanceolate to oblong-lanceolate. Inflorescences unbranched, racemose. Corolla white.

• Hillsides; 2600–3000 m. Yunnan (Lijiang Xian).

7. *Salvia brevilabra* Franchet, Bull. Soc. Philom. Paris, ser. 8, 3: 149. 1891.

短唇鼠尾草 duan chun shu wei cao

Salvia blinii H. Léveillé; *S. souliei* Duthie ex J. H. Veitch, non H. Léveillé.

Plants perennial. Stems to 60 cm, ascending, spreading pilose. Petiole of basal leaves to 13 cm, 0.5–2.5 cm in stem leaves; basal leaf blades ovate to triangular-ovate, 9–11 × 5–7 cm, papery, pilose especially on veins, abaxially densely red-brown glandular, base cordate or hastate, margin coarsely crenate-serrate or double serrate, apex acute; stem leaves smaller, broadly triangular-ovate to triangular. Verticillasters 2–6-flowered, widely spaced, lower ca. 2.5 cm apart, upper somewhat compact, in racemes or panicles ca. 13 cm; rachis densely pilose; bracts elliptic to lanceolate. Pedicel 2–4 mm, densely pilose. Calyx campanulate, ca. 1 cm, pilose mainly along veins, densely dusty pubescent, margin pilose; upper lip triangular, ca. 5 × 8 mm, margin entire, apex ± 3-mucronate; lower lip ca. 6 mm, teeth ovate-triangular, apex short acuminate. Corolla blue-purple, ca. 2.5 cm, pilose; tube pilose annulate inside, campanulate, ca. 2 cm, adaxially dilated

above middle, throat slightly constricted, ca. 9 mm in diam; upper lip ca. 5 × 8 mm; lower lip ca. 1 × 1.4 cm, middle lobe broadly obovate, 5 × 6–7 mm; lateral lobes semicircular, ca. 4 mm wide. Filaments ca. 7 mm; connectives arcuate, arms subequal. Nutlets dark brown, ellipsoid, glabrous, apex rounded. Fl. Jul-Aug.

- Hillsides, grasslands, forests; 3200–3800 m. Sichuan.

8. *Salvia aerea* H. Léveillé., Repert. Spec. Nov. Regni Veg. 12: 532. 1913.

橙色鼠尾草 cheng se shu wei cao

Salvia lichiangensis W. Smith; *S. pinetorum* Handel-Mazzetti.

Plants perennial. Stems 6–40 cm, densely yellow-brown villous. Leaves mostly basal; petiole 2–4 cm, shorter or absent in stem leaves; leaf blades elliptic to elliptic-lanceolate, rarely obovate or circular, 2.5–8.5(–20) × 2.5–4.5(–8) cm, adaxially densely brown villous, abaxially villous, sparsely purple-brown glandular, base attenuate to shallowly cordate, margin irregularly crenate, apex obtuse; stem leaf blades elliptic, oblong to ovate or obovate, 1–5.8(–8) × 1–4.5(–5) cm, margin crenate. Verticillasters 2–6-flowered, lower widely spaced, in racemes to 15 cm; rachis densely brown villous; bracts elliptic to obovate, upper 5–14 × 3–8 mm, margin densely villous-ciliate. Pedicel 2–4 mm, densely brown villous. Calyx campanulate, 9–10 mm, brown villous, margin villous; upper lip semicircular, ca. 5 × 8 mm, apex 3-mucronate; lower lip ca. 5 × 7 mm, teeth triangular, acute; fruiting calyx dilated, broad campanulate, conspicuously veined, densely villous on veins and margin. Corolla orange, white, dark blue, and purple, 2.6–3.5 cm, finely pilose; tube obliquely pilose annulate inside, gradually dilated to ca. 8 mm wide at throat; upper lip narrowly ovate, ca. 7 × 6 mm; lower lip ca. 1.2 × 1.7 cm, middle lobe obcordate, ca. 4 × 5 mm; lateral lobes semicircular, to 4 mm wide. Filaments complanate, ca. 9 mm. Nutlets brown, obovoid, adaxially ribbed, ca. 3 × 2 mm, slightly netted, apex glandular.

- Grasslands, hillsides, thickets, forests; 2500–3300 m. Guizhou, Sichuan, Yunnan.

Used medicinally.

9. *Salvia himmelbaurii* E. Peter, Acta Horti Gothob. 9: 117. 1934.

瓦山鼠尾草 wa shan shu wei cao

Plants perennial. Stems 30–45 cm, densely brown pilose. Petiole of stem leaves to 3 × as long as blades; leaf blade cordate-ovate, 5–10 × 3.5–7.5 cm, adaxially densely pilose, abaxially pilose especially along veins, sparsely brownish glandular, glabrescent, base cordate, margin dentate-crenate, apex acute to short acuminate. Verticillasters 2–4-flowered, widely spaced, lower ones longer than calyx, upper shorter, in terminal racemes or panicles 7–20 cm; rachis pilose; bracts ovate. Pedicel to 4 mm, pilose. Calyx campanulate, 1–1.4 cm, densely pubescent, intermixed with red-brown glands; upper lip broadly triangular-ovate, ca. 4 × 5 mm, apex short acuminate; lower lip 5.5–6 × 5 mm, teeth triangular, apex long acuminate; fruiting calyx dilated, membranous, conspicuously veined, glabrescent, mouth ca. 1.2 cm wide, upper margin 1–3 cm, lower margin ca. 1.5 cm.

Corolla purple or white, purple spotted or yellow on limb, 2.5–3.5 cm, pubescent; tube pilose annulate inside, 2–4.2 cm, adaxially gradually dilated, to 6 mm wide at throat; upper lip straight, emarginate; middle lobe of lower lip subcircular. Filaments 5–6 mm; connectives arcuate, 4–5 mm, arms subequal. Style slightly exserted. Fl. Jun-Jul.

- Grassy slopes; 3300 m. Sichuan.

10. *Salvia maximowicziana* Hemsley, J. Linn. Soc., Bot. 26: 285. 1890.

鄂西鼠尾草 e xi shu wei cao

Plants perennial. Stems 10–90 cm, glandular pilose. Petioles of basal leaves 2–2.5 × as long as blades, shorter in stem leaves; leaf blade circular-cordate to ovate-cordate, 3–8(–12) × 6–8(–12) cm, adaxially subglabrous or sparsely minutely hispid, abaxially pubescent along veins, glandular, base cordate to subhastate, margin coarsely crenate-dentate, sometimes double dentate and incised, apex rounded to abrupt acuminate. Verticillasters 2-flowered, widely spaced, in loose racemes or panicles; rachis glandular pilose; upper bracts lanceolate to ovate-lanceolate, 3–7 mm, margin glandular pilose. Pedicel 1–2 mm, glandular pilose. Calyx campanulate, ca. 6 mm, sparsely pilose; upper lip broadly triangular, ca. 2.5 × 5 mm, 3-veined, slightly reflexed, apex abrupt acuminate; lower lip ca. as long as upper teeth triangular, spinescent, slightly curved, apex mucronate; fruiting calyx dilated, ca. 0.8 × 1.2 cm, mouth wide open. Corolla ca. 2.2 cm, sparsely puberulent, pilose annulate inside; tube erect, adaxially slightly dilated, to 8 mm wide at throat; upper lip slightly galeate, ovate, ca. 5 × 4 mm, emarginate; lower lip subequal upper, middle lobe cordate, ca. 3 × 4 mm, margin entire; lateral lobes semicircular to subtruncate. Stamens exserted; filaments ca. 5 mm; connectives ca. 5.5 mm, arcuate, upper arms ca. 3 mm, lower arms ca. 2.5 mm. Style exserted. Nutlets yellow-brown, obovoid, slightly flattened, ca. 2.5 × 1.5 mm, apex rounded, base slightly acute. Fl. Jul-Aug.

- Grasslands, forest margins, hills, forests; 1800–3800 m. Gansu, Hubei, Shaanxi, Sichuan, Xizang, Yunnan.

1a. Stems erect, to 90 cm; leaf blade 6–8(–12) cm; bracts lanceolate to ovate-lanceolate, apex long acuminate; corolla yellow

..... 10a. var. *maximowicziana*

1b. Stems ascending, 10–40 cm; leaf blade 3–5(–8) cm; bracts ovate-lanceolate, apex acuminate;

corolla purple 10b. var. *floribunda*

10a. *Salvia maximowicziana* var. *maximowicziana*

鄂西鼠尾草 e xi shu wei cao

Salvia fargesii H. Léveillé.

Stems erect, to 90 cm tall. Leaf blade 6–8(–12) cm. Inflorescences raceme-panicles; bracts lanceolate to ovate-lanceolate, apex long acuminate. Corolla yellow.

- Grassy slopes, forest margins, hills, forests; 1800–3400 m. Gansu, Hubei, Shaanxi, Sichuan, Xizang, Yunnan.

10b. *Salvia maximowicziana* var. *floribunda* E. Peter, Acta Horti Gothob. 9: 116. 1934.

多花变种 duo hua bian zhong

Stems ascending, 10–40 cm tall. Leaf blade 3–5(–8) cm. Inflorescences racemes or raceme-panicles; bracts ovate-lanceolate, apex acuminate. Corolla purple.

- Grasslands, hillsides, forests; 2800–3800 m. Sichuan.

11. *Salvia paohsingensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 580. 1977.

宝兴鼠尾草 bao xing shu wei cao

Plants perennial. Stems slender, ascending to suberect, to 20–40 cm, floccose-villous especially toward apex, unbranched. Petiole of basal leaves ca. 1.5–2 × as long as blades, to 10 cm, obsolete in upper leaves; leaf blade triangular-ovate, 2.5–5 × 1–3 cm, adaxially sparsely strigose, abaxially floccose-villous, glabrescent, base cordate to subhastate, margin serrate-crenate or double serrate-crenate, apex obtuse to acute. Verticillasters 2-flowered, widely spaced, in racemes or panicles to 15 cm; rachis densely villous, finely glandular pilose; bracts lanceolate-ovate to ovate, 1–4 × 2–3.5 mm. Pedicel 3–5 mm, densely villous, finely glandular pilose. Calyx campanulate, 6–7 mm, villous, finely glandular pilose; upper lip semicircular, margin ciliolate, apex mucronate; lower lip slightly longer, 2-cleft; teeth triangular, apex acute. Corolla purple, white spotted on upper lip, ca. 2 cm, finely pilose; tube finely pilose annulate inside, ca. 1.5 cm, base narrow, exserted, equally dilated at apex, ca. 8 mm wide at throat; upper lip subcircular, ca. 4 × 4 mm; lateral lobes less than 2 mm wide. Filaments ca. 5 mm; connectives arcuate, ca. 3 mm, arms subequal. Style slightly exserted. Nutlets unknown. Fl. Jul.

- Forests; 2800 m. Sichuan.

Related to the previous species but stems villous and leaves triangular-ovate.

12. *Salvia cyclostegia* E. Peter, Acta Horti Gothob. 9: 118. 1934.

圆苞鼠尾草 yuan bao shu wei cao

Plants perennial. Stems robust, brown villous. Petiole of basal leaves 2–8 cm, shorter to obsolete in upper leaves, brown villous; leaf blade broadly ovate to circular, 2.3–13 × 1.2–6.5 cm, densely glandular, pilose on veins, base cordate to hastate, margin crenate, apex rounded to obtuse. Verticillasters 2–6-flowered, in racemes or panicles to 20 cm; rachis densely brown villous; lower bracts subcircular, 1–2 cm in diam., upper bracts broadly ovate to ovate. Pedicel ca. 2 mm, densely brown villous. Calyx broadly campanulate, 1–1.5 cm, sparsely glandular, brown villous along veins; upper lip entire, emarginate; lower lip slightly longer, teeth triangular, apex short mucronate. Corolla sparsely pubescent, densely so on upper lip outside; tube pilose annulate inside, base cylindrical, apex dilated on upper side, 2–3 cm, slightly curved upward; upper lip erect, circular-ovate, ca. 9 mm; lower lip longer, middle lobe obcordate, ca. 0.8 × 1.2 cm, margin slightly undulate, glabrous; lateral lobes semicircular, ca. 5 mm wide, ciliate. Filaments ca. 7 mm; connectives ca. 6 mm, arcuate, arms subequal. Style exserted. Nutlets unknown. Fl. Apr–May.

- Forests, hillsides, grasslands, bamboo forests, pine forests; 2700–3300 m. Sichuan, Yunnan.

- 1a. Corolla white, yellowish, or cream-yellow, sometimes with few gray spots 12a. var. *cyclostegia*
1b. Corolla purplish or reddish 12b. var. *purpurascens*

12a. *Salvia cyclostegia* var. *cyclostegia*

圆苞鼠尾草 yuan bao shu wei cao

Corolla white, yellowish, or cream-yellow, sometimes with few gray spots.

- Hillsides, grasslands, bamboo forests, pine forests; 2700–3300 m. Sichuan, Yunnan.

12b. *Salvia cyclostegia* var. *purpurascens* C. Y. Wu, Fl. Yunnan. 1: 664. 1977.

紫花变种 zi hua bian zhong

Corolla purplish or reddish.

- Forests; 2900–3200 m. Sichuan, Yunnan.

13. *Salvia cynica* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 164. 1913.

犬形鼠尾草 quan xing shu wei cao

Plants perennial. Stems erect, 30–50 cm, sparsely pubescent. Petiole of stem leaves 1–11 cm; leaf blade broadly ovate to broadly hastate-ovate or subcircular, 5–20 × 3–18 cm, sparsely hirtellous, abaxially sparsely yellow-brown glandular, base cordate-hastate, margin double dentate or serrate, apex acuminate. Verticillasters 2–6-flowered, widely spaced, in raceme-panicles to 20 cm; rachis pubescent; bracts lanceolate, 5–10 mm. Pedicel ca. 5 mm, pubescent. Calyx tubular, always purplish, pilose, sparsely red-brown glandular; tube 1.3–1.5 cm; upper lip broadly triangular, ca. 4 × 10 mm, apex with a mucro to 1.5 mm; lower lip ca. 6 × 8 mm, teeth narrowly triangular, apex acuminate; fruiting calyx slightly dilated, membranous. Corolla yellow, to 4 cm, subglabrous; tube finely pilose annulate inside; upper lip oblong, ca. 10 × 8 mm; lower lip subequal upper, spreading; middle lobe obcordate, margin shallow undulate; lateral lobes nearly semicircular. Filaments ca. 8 mm; connectives ca. 1.1 cm, upper arms ca. 7 mm, lower ca. 4 mm. Style slightly exserted. Nutlets brown, globose, ca. 2.8 mm in diam. Fl. Jul–Aug.

- Streamsides, forests; 1500–3200 m. Sichuan.

14. *Salvia omeiana* E. Peter, Acta Horti Gothob. 9: 119. 1934.

峨眉鼠尾草 e mei shu wei cao

Plants perennial. Stems erect, 40–100 cm, robust, to 6 mm in diam. at base, striate, puberulent or subglabrous. Stem leaf blades broadly cordate-ovate to hastate-ovate, 10–16 × 6.5–14.5 cm, adaxially sparsely fine strigose, abaxially purple, sparsely puberulent along veins, sparsely yellowish glandular, base cordate to subhastate, margin double crenate or dentate, apex acuminate or caudate-acuminate. Verticillasters 2(–6)-flowered, widely spaced, in raceme-panicles; rachis glandular pubescent or subglabrous; bracts lanceolate to broadly ovate, 5–8(–10) × 1.5–3 mm. Pedicel ca. 2 mm, glandular pubescent or subglabrous. Calyx narrow campanulate, 1–1.5 cm, glandular pilose on veins, sparsely yellowish glandular; upper lip subtruncate, entire, apical mucro 1–2 mm; lower lip longer than upper, teeth triangular, apex acuminate; fruiting calyx dilated, ca. 1.3 cm wide at mouth. Corolla yellow, 2.5–3.5 cm, puberulent outside; tube gradually dilated adaxially at apex, curved upward from base, ca. 2–3.5 cm; upper lip broadly ovate, 7–8 × ca. 3.5 mm; lower lip longer than upper, middle lobe obcordate, ca. 4 × 6

mm; lateral lobes ca. 3 mm wide. Filaments ca. 6 mm; connectives arcuate, ca. 6 mm, arms subequal. Style exerted. Nutlets obovoid, ca. 3 mm in diam., brown. Fl. Jul-Sep.

- Forest margins, hillsides; 1400–3100 m. Sichuan.

- 1a. Bracts broadly ovate to subcircular, apex short mucronate to caudate, nearly as long as calyx; corolla tube slightly pilose annulate inside 14b. var. *grandibracteata*
- 1b. Bracts lanceolate to broadly lanceolate, apex long acuminate, shorter than calyx; corolla tube without hairy annulus inside 14a. var. *omeiana*

14a. *Salvia omeiana* var. *omeiana*

峨眉鼠尾草 e mei shu wei cao

Bracts lanceolate to broadly lanceolate, apex long acuminate, shorter than calyx. Corolla tube without hairy annulus inside.

- Forest margins, hillsides; 2200–3100 m. Sichuan.

14b. *Salvia omeiana* var. *grandibracteata* E. Peter, Acta Horti Gothob. 9: 120. 1934.

宽苞变种 kuan bao bian zhong

Bracts broadly ovate to subcircular, apex short mucronate to caudate, nearly as long as calyx. Corolla tube slightly pilose annulate inside.

- Forests, grassy hillsides; 1400–2300 m. Sichuan.

15. *Salvia alatipetiolata* Sun, Bull. Nanjing Coll. Pharmacy 5: 63. 1960.

翅柄鼠尾草 chi bing shu wei cao

Plants perennial. Stems erect, ca. 40 cm, purple-brown, densely glandular pubescent. Basal leaves numerous; petiole 5–14 cm, narrowly winged; blade ovate-hastate, 3.5–6 × 1.5–4.5 cm, adaxially glabrescent, abaxially densely gray tomentose, base cordate to subhastate, cuneate-decurrent, margin irregularly crenulate, apex obtuse to acute; stem leaf petioles 0.5–5 cm, blade gradually reduced toward apex, ovate to ovate-hastate, 1–3 × 0.8–1.5 cm. Verticillasters 2–4-flowered, widely spaced, in loose raceme-panicles; rachis densely glandular pubescent; bracts ovate to oblong, 4–7 mm. Pedicel 3–5 mm, densely glandular pubescent. Calyx campanulate, purple, ca. 1.1 cm, finely pilose; upper lip broadly triangular, ca. 3 × 7 mm; lower lip ca. 5 × 8 mm, teeth triangular, apical spine less than 1 mm; fruiting calyx slightly enlarged, papery. Corolla yellowish, ca. 2 cm, white villous; tube pilose annulate inside, ca. 1.6 cm, gradually dilated adaxially, ca. 9 mm wide at throat; upper lip ca. 4 × 5 mm; lower lip ca. 5 × 13 mm, middle lobe ca. 4 × 8 mm, flabellate, emarginate; lateral lobes to 4 mm wide. Filaments ca. 7 mm; connectives arcuate, ca. 1.8 mm, upper arms ca. 0.8 mm, lower arms ca. 1 mm. Nutlets yellow-brown, globose, ca. 2 mm in diam., glabrous. Fl. Jul-Aug.

- Grassy hillsides; 3800 m. Sichuan.

16. *Salvia evansiana* Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien Math.-Naturwiss. Kl., Anz. 62: 236. 1925.

雪山鼠尾草 xue shan shu wei cao

Plants perennial. Stems erect, 13–45 cm, striate, densely brown villous or glabrescent. Petiole 2–10(–20) cm; leaf

blade ovate to triangular-ovate, 2–11 × 1–11 cm, adaxially densely strigose-villous, spreading brown villous, sparsely dark brown glandular along veins, base cordate, rarely shallow hastate, margin crenate, apex acute to rounded. Verticillasters 6-flowered, crowded apically, lax basally, in racemes or panicles 10–20 cm; rachis brown villous; bracts villous, ciliate at margin, abruptly acuminate to acute at apex; upper bracts ovate, to 1.7 cm. Pedicel ca. 8 mm, brown villous. Calyx broadly campanulate, 1–1.7 cm, sparsely dark brown glandular outside, villous on veins; upper lip broad ovate, ca. 5 × 13 mm, entire or 3-mucronate; lower lip longer than upper, teeth triangular, apical spine to 1 mm. Corolla straight, 2.6–3.5 cm, pilose; tube pilose annulate inside, 2–3.4 cm, ca. 5 mm wide below annulus, adaxially abruptly dilated beyond annulus, ca. 1.1 cm wide at throat; upper lip semicircular, 5–7 mm; lateral lobes ovate, ca. 4 mm wide. Filaments ca. 4.5 mm; connectives short, 2–3 mm, arcuate, upper arms shorter than to as long as lower arms. Fl. Jul-Oct.

- Alpine meadows, hillsides, forests; 3400–4300 m. Sichuan, Yunnan.

- 1a. Leaves basal and on stem; lower bracts shorter than to as long as calyx; calyx 1.4–1.7 cm; corolla blue-purple except yellow at base 16a. var. *evansiana*
- 1b. Leaves basal or on stem base; lower bracts longer than calyx; calyx 1–1.2 cm; corolla white or cream-yellow 16b. var. *scaposa*

16a. *Salvia evansiana* var. *evansiana*

雪山鼠尾草 xue shan shu wei cao

Leaves basal and on stem. Lower bracts shorter than to as long as calyx. Calyx 1.4–1.7 cm. Corolla blue-purple except yellow at base.

- Alpine meadows, hillsides, forests; 3400–4200 m. Sichuan, Yunnan.

Used medicinally.

16b. *Salvia evansiana* var. *scaposa* E. Peter, Acta Horti Gothob. 9: 122. 1934.

葶花变种 ting hua bian zhong

Salvia rockiana E. Peter.

Leaves basal or on stem base. Lower bracts longer than calyx. Calyx 1–1.2 cm. Corolla white or cream-yellow.

- Alpine meadows; 3400–4300 m. Yunnan.

17. *Salvia pauciflora* E. Peter, Acta Horti Gothob. 9: 122. 1934.

少花鼠尾草 shao hua shu wei cao

Plants perennial. Roots sometimes dilated. Stems 2–4, slender, ascending or suberect, unbranched, with widely spaced leaves, densely villous or glabrescent. Petiole 2–2.5 × as long as blades, shorter to obsolete in upper leaves; leaf blade broadly ovate to ovate-triangular, 2.5–6(–7) × 1.2–5 cm, hispid or strigose, rusty, brown glandular, base cordate to hastate, margin crenate, apex acute or obtuse to rounded. Inflorescences spreading brown villous, glandular pilose; verticillasters 2-flowered, widely spaced, in racemes or panicles 2–8 cm; lower bracts leaflike, upper ones ovate,

shorter than calyx, slightly strigose, ciliate. Pedicel ca. 2 mm. Calyx campanulate, 5–7 mm, glandular pilose; upper lip \pm semicircular, entire, apex acute; lower lip slightly longer than adaxial, teeth ovate-triangular, apex subacute. Corolla purplish red or purple-white, rarely purplish, white spotted on lower lip, 1.3–2 cm or rarely more, sparsely pilose or subglabrous; tube fine pilose annulate inside, gradually dilated at apex, slightly curved upward, 1–1.4 cm, ca. 6 mm wide at throat; upper lip subcircular, ca. 5.5×5 mm, emarginate; middle lobe of lower lip flabellate, ca. 3×5.5 mm, undulate; lateral lobes \pm semicircular, ca. 2.5 mm wide. Filaments ca. 4 mm; connectives ca. 4 mm, arcuate, arms subequal. Style slightly exerted. Nutlets unknown.

- Forest margins, forests; 2800–3400 m. Yunnan.

18. *Salvia schizocalyx* E. Peter, Acta Horti Gothob. 9: 123. 1934.

裂萼鼠尾草 lie e shu wei cao

Plants perennial. Stems ca. 45 cm, 1 to few, ascending to erect, unbranched, densely yellow-brown villous, with widely spaced leaves. Petiole ca. $3 \times$ as long as blade to obsolete, densely villous; leaf blade broadly ovate to narrowly triangular-ovate, rarely oblong-ovate, $2-5(-10) \times 1.2-4.5(-5)$ cm, papery, corrugate when young, adaxially villous, abaxially subglabrous, spreading villous on veins, without glands, base cordate to rounded, margin irregularly double crenate, apex obtuse to rounded. Verticillasters 2–4-flowered, in terminal racemes; lower bracts leaflike, broadly ovate to rhombic-ovate, subequal to calyx, gradually reduced toward apex, glandular hairy, margin dentate, apex acuminate to subacute. Calyx campanulate, 2-lipped to $1/2$ its length, ca. 1 cm in flower, to 1.5–1.8 cm in fruit, villous, glandular hairy, tube as long as limb; upper lip broadly triangular, margin entire, with 3 minute, ovate-lanceolate acuminate teeth. Corolla violet or blue, 2–2.5 cm, pilose; tube obliquely interrupted pilose annulate inside, ca. 2 cm, base cylindrical, adaxially gradually dilated beyond hairy annulus, erect; upper lip ca. 5 mm, straight, broadly ovate to circular. Connectives arcuate, lower arms slightly shorter than upper. Fl. and fr. Jul–Aug.

- Hills; 4000 m. Yunnan.

19. *Salvia brachyloma* E. Peter, Acta Horti Gothob. 9: 124. 1934.

短冠鼠尾草 duan guan shu wei cao

Plants perennial. Stems 1 to few, 20–57 cm, erect, retrorse villous. Petiole 1–13 cm; leaf blade hastate to narrowly ovate, $3.5-11 \times 2-5$ cm, densely red-brown glandular, adaxially densely white pubescent when young, pubescent with age, abaxially densely white pubescent when young, glabrous except for puberulent veins, base shallowly cordate to hastate, margin irregularly crenulate, apex acute to short acuminate. Inflorescences densely spreading villous, glandular pilose; verticillasters 2-flowered, widely spaced, in terminal racemes or panicles 1–15 cm; bracts broadly ovate, 6–9 mm, slightly pilose, red-brown glandular, ciliate, apex abruptly acuminate. Pedicel ca. 2 mm. Calyx campanulate, (1–)1.3–1.6 cm, villous especially on veins, red-brown glandular; upper lip broadly triangular, $4-5 \times$ ca. 9 mm, margin entire, apex mucronate; lower lip slightly longer than upper, teeth triangular, apex mucronate. Corolla purplish, 2–2.3 cm, pubescent; tube obliquely and continuously pilose

annulate inside, ca. 1.6 cm, ca. 2.5 mm wide at base, adaxially gradually dilated to apex, slightly constricted, ca. 8 mm wide at throat; upper lip obcordate, ca. 3×5 mm; lower lip enlarged, ca. 5×11 mm; middle lobe subflabellate, ca. 3×6 mm, undulate; lateral lobes semicircular, to 3 mm. Filaments ca. 5 mm; connectives 1.8–2 mm, arms equal. Style slightly exerted. Nutlets obovoid, ca. 2 mm, black. Fl. Jun–Jul.

- Grassy slopes, forested grasslands; 3200–3800 m. Sichuan, Yunnan.

20. *Salvia lankongensis* C. Y. Wu, Fl. Yunnan. 1: 666. 1977.

洱源鼠尾草 er yuan shu wei cao

Plants perennial. Stems erect, 23–28 cm, densely pilose. Petiole 0.5–12 cm; leaf blade elliptic-ovate, (2.5–) $3-6 \times 1.5-4.5$ cm, papery, adaxially pilose, abaxially pilose along veins, red-brown glandular, base subtruncate to shallowly cordate, margin shallowly crenate, apex rounded. Inflorescences pilose; verticillasters 6-flowered, in terminal racemes or raceme-panicles; bracts oblong-elliptic, acute, shorter than calyx. Pedicel 2–3 mm. Calyx campanulate, 9–10 mm, villous, glandular, minutely hispid inside, blackish when dry; upper lip semicircular, ca. 2.5×6 mm, 5-veined; lower lip 2-toothed, teeth triangular, apex short acuminate to acute. Corolla blue, 1.7–1.9 cm; tube ca. 1 cm, base glabrous, apex pilose outside, obliquely pilose annulate inside, straight, adaxially gradually dilated to apex; upper lip straight, ca. 6×7 mm; lower lip ca. 8×9 mm, middle lobe subobcordate, ca. 4×7 mm; lateral lobes ovate. Filaments ca. 5 mm, glabrous; connectives 2–2.5 mm, arcuate. Style exerted. Nutlets unknown. Fl. Jul.

- Grasslands, thickets; 3800 m. Yunnan.

21. *Salvia mairei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 12: 532. 1913.

东川鼠尾草 dong chuan shu wei cao

Salvia calthaefolia H. Léveillé; *S. leclerei* H. Léveillé.

Plants perennial. Stems 1 to few, 20–40 cm, erect to ascending, densely brown villous. Stem leaves 1 or 2 pairs; petiole 6.5 cm to obsolete; leaf blade cordate-ovate to subhastate-ovate, $3.5-5(-8) \times$ ca. $1.8-5(-8)$ cm, finely corrugate, adaxially densely villous, abaxially densely pubescent, sparsely brown glandular, base cordate to subhastate, margin irregularly crenate, apex acute to obtuse. Inflorescences densely brownish villous, glandular pilose; verticillasters 4-flowered, in terminal racemes or panicles 8–11 cm; lower bracts leaflike, gradually reduced upward, broadly ovate, shorter than calyx. Pedicel 3–4 mm. Calyx campanulate, ca. 1.2 cm, villous mainly on veins, sparsely glandular pilose, 2-lipped to ca. $1/3$ its length; upper lip \pm semicircular, ca. 5×7 mm, strongly 2-toothed; teeth triangular-ovate, 3–4 mm, apex acute. Corolla violet or purple, 1.5–1.8 cm; tube adaxially gradually dilated, slightly longer than calyx, pilose, pilose annulate inside; upper lip obcordate, ca. 5 mm, densely white bearded; middle lobe of lower lip cordate-orbicular, margin shallowly undulate; lateral lobes broadly ovate, ciliate. Filaments ca. 6 mm; connectives ca. 2 mm, slightly curved. Style exerted. Nutlets unknown. Fl. Jul–Aug.

- Hillsides. Yunnan.

22. *Salvia pogonochila* Diels ex Limpricht, Repert. Spec. Nov. Regni Veg. Beih. 12: 478. 1922.

毛唇鼠尾草 mao chun shu wei cao

Herbs. Stems ascending, 30–50 cm, white pilose. Petiole 1–12 cm; stem leaf blades broadly ovate to triangular-hastate, 2.5–8 × 1.5–7 cm, adaxially pubescent, glabrous on veins, abaxially densely pubescent, sparsely rusty brown glandular, base cordate to hastate, margin crenate-dentate, apex acute. Inflorescences densely white villous, glandular hairy; verticillasters 2(–4)-flowered, in raceme-panicles to 25 cm; peduncle to 3.5 cm; bracts ovate-lanceolate. Pedicel ca. 3 mm. Calyx campanulate, violet when fresh, black-purple on veins, brownish or yellow-brown on upper lip when dry, 8–9 mm, villous, rusty brown glandular, 2-lipped to ca. 1/3 its length; upper lip broadly triangular, ca. 3 × 6 mm, apex 3 dentate; lower lip 2-cleft, teeth triangular, apex acute. Corolla blue-purple, 1.4–1.8 cm, tube campanulate, pilose, pilose annulate inside; upper lip suborbicular, ca. 4 × 5 mm, densely villous outside; middle lobe of lower lip broadly obovate, apex emarginate, ca. 3 × 5.5 mm; lateral lobes semicircular, ca. 3.5 mm wide. Filaments ca. 5 mm; connectives ca. 2 mm. Style exerted. Nutlets yellow-brown, obovoid, ca. 2.5 mm, apex rounded. Fl. Jul-Sep.

• Alpine meadows; 3800 m. Sichuan.

23. *Salvia schizochila* E. Peter, Acta Horti Gothob. 9: 126. 1934.

裂瓣鼠尾草 lie ban shu wei cao

Plants perennial. Stems erect, unbranched, 20–25 cm, densely white villous, sparsely glandular, glabrescent toward base. Petiole ca. 2 × as long as blade, slightly thickened, villous; leaf blade broadly cordate-ovate, 4–9 × 4–9 cm, margin mucronulate denticulate-crenulate, apex subacute. Racemes dense, 2–6.5 cm; rachis densely fine villous; lower bracts leaflike, upper bracts broadly ovate, long acuminate, shorter than to subequal to calyx. Pedicel fine villous, 3–5 mm. Calyx campanulate, 1.2–1.5 cm, sparsely glandular, pilose on veins, 2-lipped to ca. 1/3 its length; upper lip subcircular, with 3 teeth 0.5–1 mm; teeth of lower lip ovate-triangular, ca. 4 mm. Corolla purplish, 1.8–2.2 cm; tube slightly exerted to 2 cm, adaxially gradually dilated, ca. 8 mm wide at mouth, projected, subglabrous, pilose annulate inside; upper lip ca. 5 mm, straight, 2-lobed nearly to its base; lobes ovate, subacute, finely white villous outside, glabrous on margin; lower lip almost as long as upper, middle lobe subcircular; lateral lobes ovate-triangular. Connectives 2–3 mm (specimens not seen).

• Forests; 3800–4300 m. Yunnan.

24. *Salvia campanulata* Wallich ex Benth, Pl. Asiat. Rar. 1: 67. 1830.

钟萼鼠尾草 zhong e shu wei cao

Plants perennial. Stems erect, 43–80 cm, finely strigose or villous. Petiole (1–)3–25 cm; leaf blade cordate to ovate-truncate, 4–18 × 3.5–13.5 cm, abaxially pilose to pubescent or densely pilose along veins, base cordate to truncate, margin incised-crenate, apex acuminate. Inflorescences densely villous, glandular pilose; verticillasters 2–6-flowered, widely spaced, in terminal raceme-panicles; bracts ovate, 4–9 mm. Pedicel 2–5 mm. Calyx campanulate, ca. 1.3 cm, shallowly 2-

cleft to strongly 2-lipped, villous, glandular pilose, sparsely black-brown glandular, margin ciliolate; upper lip broadly ovate, ca. 3 × 10 mm, apex acute; lower lip as long as upper, ca. 9 mm wide, apex with 2 triangular acute teeth. Corolla yellow, ca. 2.7 cm, subglabrous except upper lip villous; tube pilose annulate inside, gradually curved, dilated beyond hairy annulus, to 8 mm at throat; upper lip ovate, ca. 7 × 5 mm, slightly arcuate; lower lip 1–1.2 × 1.2 cm, obliquely spreading; middle lobe obcordate, ca. 4 × 8 mm, slightly constricted at base; lateral lobes triangular-ovate, ca. 3 mm wide. Stamens slightly exerted or nearly included; filaments ca. 6.5 mm; connectives ca. 1 cm, upper arms ca. 6 mm, lower arms ca. 4 mm. Style slightly exerted. Nutlets brown, narrowly obovoid. Fl. Jul-Sep.

Forest margins, forests, hillsides, valleys; 800–3800 m. Xizang, Yunnan [Bhutan, India (Sikkim), Myanmar, Nepal].

Four varieties have sometimes been recognized as follows:

- 1a. Calyx apex shallowly 2-cleft to subtruncate; leaf blade subglabrous, adaxially ± densely pilose on veins, margin ciliate; bracts acuminate to acute 24b. var. *codonantha*
- 1b. Calyx apex ± 2-cleft; leaf blade appressed villous adaxially, pilose or pubescent along veins abaxially; bracts acuminate.
 - 2a. Calyx strongly 2-lipped 24c. var. *fissa*
 - 2b. Calyx 2-lipped to shallowly so.
 - 3a. Stems and leaves finely strigose; bracts caudate 24d. var. *hirtella*
 - 3b. Stems villous; leaf blade appressed villous adaxially, pilose or pubescent along veins abaxially; bracts acuminate 24a. var. *campanulata*

24a. *Salvia campanulata* var. *campanulata*

钟萼鼠尾草 zhong e shu wei cao

Stems villous. Leaf blade adaxially appressed villous, abaxially pilose or pubescent along veins. Bracts acuminate. Calyx 2-lipped to shallowly so.

Forest margins; 3200 m. Yunnan [India (Sikkim), Nepal].

24b. *Salvia campanulata* var. *codonantha* (E. Peter) E. Peter, Repert. Spec. Nov. Regni Veg. 39: 180. 1936.

截萼变种 jie e bian zhong

Salvia codonantha E. Peter, Acta Horti Gothob. 9: 127. 1934.

Leaf blade subglabrous except adaxially ± densely pilose on veins and margin ciliate. Bracts acuminate to acute.

Broad-leaved forests, grassy hillsides; 800–3800 m. Yunnan [Myanmar].

24c. *Salvia campanulata* var. *fissa* E. Peter, Repert. Spec. Nov. Regni Veg. 39: 179. 1936.

裂萼变种 lie e bian zhong

Calyx strongly 2-lipped, upper lip 1–1.2 cm, lower lip 1.2–1.5 cm, teeth of lower lip ca. 5 mm.

Yunnan [India (Sikkim)].

24d. *Salvia campanulata* var. *hirtella* E. Peter, Repert. Spec. Nov. Regni Veg. 39: 179. 1936.

微硬毛变种 wei ying mao bian zhong

Stems and leaves finely strigose. Bracts caudate.

Shady valleys; 2800 m. Xizang, Yunnan [Bhutan, India (Sikkim), Nepal].

25. *Salvia sikkimensis* E. Peter, Repert. Spec. Nov. Regni Veg. 39: 177. 1936.

锡金鼠尾草 xi jin shu wei cao

Plants perennial. Stems 1 or 2, erect to ascending, villous, unbranched. Petiole of lower stem leaves ca. 2 × as long as blades; leaf blade ovate, to 12 × 9.5 cm, ± membranous, adaxially fine strigose, abaxially pubescent mainly on veins, glandular, base cordate to subhastate, margin mucronulate-crenate, apex obtuse to subacute. Inflorescences densely to sparsely villous, glandular pilose; verticillasters 2(–6)-flowered, in terminal raceme-panicles 6–15 cm; bracts ovate to rhombic-ovate, apex abruptly acuminate, glandular pilose. Pedicel 3–10 mm. Calyx funnelform-campanulate to campanulate, ca. 1 cm in flower, slightly dilated to 1.5 cm in fruit, villous, glandular pilose, intermixed with yellow-brown glands; upper lip triangular-ovate, ca. 3 × 10 mm, apex spiny-acute; teeth of lower lip broadly triangular, apex short spiny. Corolla yellow-white or reddish and purple spotted, ca. 2.8 cm, sparsely pilose especially on upper lip; tube obliquely pilose annulate on basal 3–5 mm inside, ca. 1.8 cm, base tubular, constricted at hairy annulus but gradually dilated, to 1 cm wide at throat; upper lip projected, subobovate, ca. 7 × 6 mm. Filaments ca. 5 mm; connectives ca. 6 mm, arms equal. Style exerted. Nutlets unknown. Fl. Aug.

Forests, forest margins, hillsides, streamsides; 3300 m. Xizang [Bhutan, India (Sikkim)].

- 1a. Calyx campanulate, gradually dilated from base; plants not robust 25a. var. *sikkimensis*
1b. Calyx funnelform-campanulate, attenuate at base, dilated, 2-lipped at apex; plants robust 25b. var. *chaenocalyx*

25a. *Salvia sikkimensis* var. *sikkimensis*

锡金鼠尾草 xi jin shu wei cao

Plants not robust. Calyx campanulate, gradually dilated from base.

Forests, grassy forest margins, gravelly hillsides, streamsides; 3300 m. Xizang [Bhutan, India (Sikkim)].

25b. *Salvia sikkimensis* var. *chaenocalyx* E. Peter, Repert. Spec. Nov. Regni Veg. 39: 178. 1936.

张萼变种 zhang e bian zhong

Plants robust. Calyx funnelform-campanulate, base attenuate, apex dilated, 2-lipped.

Xizang [Bhutan, India (Sikkim)].

26. *Salvia handelii* E. Peter, Acta Horti Gothob. 9: 129. 1934.

木里鼠尾草 mu li shu wei cao

Plants perennial. Stems 1 or 2, ascending, 50–80 cm, finely pubescent or glabrescent. Petiole 2–3 × as long as blade; leaf blade broadly ovate-triangular to subcircular, 8–19 × ca. 4–19 cm, adaxially pubescent, abaxially spreading pilose especially on veins, without glands, base cordate to hastate, margin irregularly double crenate to subdentate, ciliate, apex acute to subobtuse. Verticillasters 2-flowered, in terminal racemes or raceme-panicles; rachis somewhat

densely tawny or brownish pilose, glandular hairy; bracts broadly ovate to subcircular, 0.5–1.5 cm, mostly entire but lower bracts dentate. Calyx broadly campanulate, truncate at mouth, scarcely 2-lipped, tinged a brilliant color, 1–1.5 × 1–1.5 cm, sparsely glandular, glandular pilose on margin and veins. Corolla green-white, with violet spots, 1.8–2.2 cm; tube short tubular at base, adaxially dilated at apex, exerted, subglabrous, densely white pilose annulate inside; upper lip circular, 3–4 mm wide, densely white pubescent; lower lip subequal upper, middle lobe circular, undulate; lateral lobes ovate, ciliate. Connectives short, arcuate (specimens not seen).

• Grassy slopes on limestone mountains; 3800–3900 m. Sichuan.

27. *Salvia hylocharis* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 236. 1912.

林华鼠尾草 lin hua shu wei cao

Salvia forrestii Diels; *S. hylocharis* var. *subsimplax* C. Y. Wu.

Plants perennial. Stems 1 or 2, 45–90 cm tall, ascending to erect, unbranched, villous toward apex, glabrescent toward base. Petiole 2–13 cm; leaf blade ovate-triangular to ovate-hastate, 3–8.5(–14) × ca. 8.5(–14) cm, papery, adaxially pilose, abaxially pilose along veins, sparsely yellow-brown glandular, base cordate, margin irregularly crenate, apex obtuse to acute. Inflorescences densely villous; verticillasters 2–4-flowered, in racemes or raceme-panicles; bracts broadly ovate to subcircular, shorter than calyx. Pedicel ca. 4 mm. Calyx broadly tubular-campanulate, 1.7–2.2 cm, villous mainly along veins and margin, sparsely yellow-brown glandular; tube ca. 1.5 cm; upper lip semicircular-triangular, ca. 4 × 13 mm; lower lip shallowly 2-toothed, teeth broadly triangular, apex acute. Corolla yellow, (2.2–)3.5–3.8 cm; tube sparsely pilose or subglabrous, pilose annulate inside, ca. 3 mm wide at base, adaxially gradually dilated to 1.4 cm wide at throat; limb pilose, ciliate; upper lip ca. 1 cm, straight; lower lip to 1.7 cm, middle lobe flabellate, ca. 0.6 × 1.3–1.5 cm; lateral lobes obliquely ovate, to 5 mm. Filaments ca. 6 mm; connectives ca. 9 mm, upper arms ca. 6 mm. Style exerted. Nutlets obovoid. Fl. Jul-Sep.

• Grassy slopes, forest margins, streamsides, tufts of grass; 2800–4000 m. Xizang, Yunnan.

28. *Salvia hupehensis* E. Peter, Acta Horti Gothob. 9: 130. 1934.

湖北鼠尾草 hu bei shu wei cao

Plants perennial. Stems 35–55 cm, erect, glabrescent except for ± densely villous nodes. Petiole subequal to blade; leaf blade cordate-orbicular, 4–8 cm, mid stem blades largest, adaxially densely appressed villous, abaxially sparsely villous, densely glandular, margin crenate-serrate, apex rounded or acuminate with apical tooth enlarged. Verticillasters 2-flowered, widely spaced, in loose raceme-panicles; rachis densely glandular pilose; bracts caudate-acuminate, glandular pilose; upper bracts broadly ovate, 3–5 mm. Pedicel 3–5 mm. Calyx campanulate, 8–10 mm, 4–5 mm wide at mouth, ciliolate, 2-lipped to 1/3 its length, veins spreading glandular villous; upper lip entire, broadly ovate-triangular, apex short acuminate; teeth of lower lip ovate, apex long acuminate, 3–4 mm; fruiting calyx adaxially dilated, upper lip reflexed. Corolla purple, 3–4.5 cm, tube to 3

cm, adaxially gradually dilated to 1–1.5 cm wide at mouth, slightly curved upward, glabrous, pilose annulate inside; upper lip broadly ovate, 1–1.4 cm, curved upward at 45° from base; lobes circular, ciliolate, fine pilose abaxially; lower lip ca. 1.5 × as long as upper, middle lobe broadly obcordate, shallowly undulate, violet when dry. Connectives curved, 0.8–1.2 cm, finely pilose on joints, lower arms ca. 1/2 as long as upper. Immature nutlets chestnut brown, subglobose (specimens not seen).

- Hubei.

29. *Salvia smithii* E. Peter, Acta Horti Gothob. 9: 131. 1934.

橙香鼠尾草 cheng xiang shu wei cao

Plants aromatic, perennial. Stems 30–90 cm, densely pubescent with a mixture of villous and glandular pilose hairs. Petiole 2–16 cm; leaf blade broadly cordate-ovate to ovate-hastate, 4–22 × 3–18 cm, adaxially finely strigose, abaxially spreading pilose on veins, sparsely red-brown glandular, base cordate to hastate, margin dentate-crenate, apex acuminate. Inflorescences densely glandular pilose, villous; verticillasters 2-flowered, in loose, much branched raceme-panicles; bracts ovate to lanceolate-ovate, nearly as long as pedicels or slightly shorter than calyx. Pedicel ca. 5 mm. Calyx campanulate, 1.4–1.7 cm, enlarged in fruit, glandular villous, yellow-brown glandular outside; upper lip broadly triangular-ovate, margin entire, apex acuminate; lower teeth ovate-triangular, 4–5 mm, apex acuminate. Corolla yellow, 4–4.5 cm; tube ca. 3.3 cm, subglabrous, pilose annulate inside, slightly dilated at base, dilated and curved upward, ca. 1.1 cm wide at mouth; upper lip broadly ovate, ca. 1.2 cm, margin ciliate, densely brown glandular pilose outside; lower lip ca. 1.3 × 1.4 cm, middle lobe broadly obovate, ca. 0.9 × 1.3 cm, margin undulate; lateral lobes obliquely triangular-ovate, ca. 4 mm wide. Filaments ca. 8 mm; connectives ca. 1 cm, curved, semicircular, arms equal. Style slightly exerted. Nutlets brown, obovoid, ca. 2 mm, apex rounded. Fl. Aug–Sep.

- Hillsides, riverbanks, valleys; 2600–3500 m. Sichuan.

30. *Salvia heterochroa* E. Peter, Acta Horti Gothob. 9: 132. 1934.

异色鼠尾草 yi se shu wei cao

Plants perennial. Stems 1 (or 2), striate, black-brown, densely brownish pilose apically, glabrescent basally. Petiole 1–22 cm; leaf blade elliptic-ovate, 4–13 × 2.5–10 cm, papery, adaxially glabrous, abaxially yellow-brown on veins when dry, gray cobwebby-tomentose, minutely glandular, base shallowly cordate to subtruncate, margin coarsely double crenate, apex obtuse to rounded. Inflorescences densely brownish silky-villous, glandular pilose; verticillasters 2–6-flowered, widely spaced, in raceme-panicles; bracts leaflike basally, gradually reduced apically, margin crenate, longer than calyx, upper bracts entire. Pedicel 3–6 mm. Calyx campanulate, 1–1.5 cm, glandular pilose, 2-lipped to ca. 1/3 its length; upper lip broadly triangular-ovate, margin entire, apex acute or 3-mucronate; lower teeth ovate-triangular, apex acute. Corolla blue-purple or dark purple, 2.5–3 cm; tube slightly zigzag, projected, adaxially abruptly dilated, curved upward, white cobwebby-pilose, pilose annulate inside; upper lip broadly ovate, ca. 9 mm, glandular pilose; lower lip slightly longer than upper, middle lobe obcordate-orbicular, ca. 1 × 2 cm, glabrous; lateral lobes obovate. Filaments ca. 3

mm; connectives curved, ca. 5 mm, arms equal. Style as long as corolla. Nutlets dark brown, globose-ovoid, ca. 4 mm. Fl. Sep.

- Grassy slopes; 3500–3800 m. Yunnan.

31. *Salvia atropurpurea* C. Y. Wu, Fl. Yunnan. 1: 676. 1977.

暗紫鼠尾草 an zi shu wei cao

Plants perennial. Stem 1, erect, ca. 50 cm, brown, brownish villous, glabrescent toward base. Petiole of lower stem leaves longest, 12–15 cm, 5–10 mm in upper leaves; leaf blade ovate to broadly ovate, 3.5–10.5 × 2.5–9 cm, finely corrugate, adaxially densely pubescent, abaxially densely gray cobwebby-tomentose, base shallowly cordate, margin double crenate, apex obtuse to acute. Inflorescences densely brown villous, glandular pilose; verticillasters 2–6-flowered, remote basally, crowded apically, in terminal racemes or panicles 6–15 cm; bracts ovate, 0.6–1.5 cm × 4–10 mm. Pedicel 3–4 mm. Calyx campanulate, 1.3–1.5 cm, densely spreading villous on veins, 2-lipped to ca. 1/3 its length; upper lip broadly triangular, ca. 6 × 8.5 mm; lower lip subequal upper, teeth triangular, apex acute. Corolla dark purple, 2.5–3 cm, pilose, pilose annulate inside; tube straight, slightly dilated apically, to 1 cm wide at mouth; upper lip straight, slightly concave, ca. 7.5 × 7–7.5 mm; middle lobe of lower lip obcordate, ca. 5 × 8.5 mm. Filaments ca. 5.5 mm; connectives ca. 8 mm, arms subequal. Nutlets unknown. Fl. Jul.

- Grassy slopes; 3400 m. Yunnan.

Only differing from the previous species in indumentum characters.

32. *Salvia bulleyana* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 233. 1912.

戟叶鼠尾草 ji ye shu wei cao

Plants perennial. Stems few branched, densely yellow-brown villous, glandular pilose apically, glabrescent basally. Stem leaves 2–4 pairs; petiole 0.5–12 cm; leaf blade ovate to ovate-triangular, (2.5–)3.5(–6) cm wide, adaxially finely pilose, abaxially pilose on veins, sparsely purple-brown glandular, base cordate to hastate, margin crenate or crenate-serrate, apex acute, rarely subobtusate. Inflorescences densely yellow-brown villous; verticillasters 4-flowered, in loose racemes or panicles 15–30 cm; bracts broadly ovate to ovate, to 1 cm. Pedicel 4–6 mm. Calyx campanulate, ca. 1 cm in flower, to 1.3 cm in fruit, yellow-brown villous, sparsely purple-brown glandular, 2-lipped to 1/3 its length; upper lip broadly triangular-ovate, ca. 4 × 7 mm, apex 3-mucronate; lower lip ca. 5 × 7 mm, teeth triangular-ovate, apex acute to subacuminate. Corolla purple-blue, ca. 2 cm, villous outside especially abaxially; tube obliquely pilose annulate inside, ca. 1.5 cm, narrowed at base, adaxially dilated beyond calyx, slightly curved at apex; upper lip ca. 5 mm; lower lip slightly longer, middle lobe subflabellate; lateral lobes obliquely ovate. Filaments ca. 5 mm; connectives ca. 8 mm, arms subequal. Style exerted. Nutlets brown with purple spots, ca. 1.5 mm. Fl. and fr. Aug.

- Hillsides; 2100–3400 m. Yunnan.

33. *Salvia castanea* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 233. 1912.

栗色鼠尾草 su se shu wei cao

Plants perennial. Stems 1 to few, 30–65 cm, pilose toward base, densely villous upward. Petiole 2–13 cm; leaf blade elliptic-lanceolate to oblong-ovate, 2–22 × 2–9 cm, glabrescent or ± hairy, abaxially subglabrous, base rounded to subcordate, rarely subtruncate, margin irregularly crenate to dentate, apex obtuse to subacute. Inflorescences densely villous, glandular pilose; verticillasters 2–4-flowered, widely spaced, in racemes or panicles; bracts ovate to broadly ovate, 4–10 × 2.5–8 mm. Pedicel 4–5 mm. Calyx campanulate, 0.9–1.5 cm, densely glandular villous, yellow-brown glandular, 2-lipped to ca. 1/3 its length; upper lip broadly triangular-semicircular, ca. 3 × 6 mm; lower lip slightly longer, ca. 4 × 6 mm; teeth triangular, apex acute. Corolla purple-brown, chestnut brown, or dark purple, 3–3.2 cm, pilose; tube obliquely pilose annulate inside, ca. 2.6 cm, zigzag toward base, curved upward beyond calyx, to 1 cm wide at mouth; upper lip ovate, ca. 6 mm, erect, falcate/slightly galeate; lower lip triangular, ca. 0.8 × 1.4 cm; middle lobe obcordate, ca. 4 × 6 mm; lateral lobes semicircular, ca. 5 mm wide. Filaments ca. 7 mm; connectives ca. 5 mm, arms subequal. Nutlets obovoid, ca. 3 mm, apex rounded. Fl. May-Sep.

Forests, hillsides, grasslands; 2500–3800 m. Sichuan, Xizang, Yunnan [Nepal].

The forms *castanea*, *glabrescens*, *pubescens* E. Peter (Acta Horti Gothob. 9: 134. 1934), and *tomentosa* E. Peter (Repert. Spec. Nov. Regni Veg. 39: 181. 1936) have been differentiated largely on differences in hairiness of leaf surfaces.

34. *Salvia atrorubra* C. Y. Wu, Fl. Yunnan. 1: 679. 1977.

暗红鼠尾草 an hong shu wei cao

Plants perennial. Stems erect, to 55 cm, floccose-villous. Petiole 10(–12) cm; leaf blade ovate, (5–)6–10.5 × (3–)4–8 cm, ± membranous, densely brownish or brown floccose-tomentose-villous when young, adaxially sparsely villous, abaxially villous especially along veins, sparsely yellowish glandular with age, base cordate to hastate, margin irregularly crenate to shallowly obtuse serrate, apex acute. Inflorescences densely pubescent, villous; verticillasters 2–4-flowered, in axillary racemes ca. 10 cm and terminal ones 10–12 cm, interrupted toward base, ± continuous toward apex; peduncle to 5 cm; lower bracts leaflike, margin dentate; upper bracts subcircular to broadly ovate, 1–1.5 × 0.6–1.2 cm, margin entire. Pedicel 3–4 mm. Calyx campanulate, ca. 1.8 cm, subtruncate or obscurely 2-lipped, veins slightly villous; upper lip truncate; lower lip longer, ca. 2 mm; teeth triangular, apex acute, mucronate. Corolla red, ca. 3.5 cm, villous, adaxially constricted just below hairy annulus, adaxially dilated, slightly curved upward beyond middle, slightly constricted, ca. 1.1 cm wide at throat; upper lip subcircular, ca. 1 cm in diam.; lower lip ± semicircular, ca. 1.7 cm wide; middle lobe subobcordate, ca. 7 mm wide. Filaments ca. 8 mm, slightly curved; connectives ca. 8 mm. Style exerted. Nutlets unknown. Fl. Jun.

- Forests; 2700 m. Yunnan.

Close to *Salvia castanea*, but with reddish corollas and subtruncate, scarcely 2-lipped calyces.

35. *Salvia flava* Forrest ex Diels, Notes Roy. Bot. Gard. Edinburgh 5: 235. 1912.

黄花鼠尾草 huang hua shu wei cao

Plants perennial. Stems erect, 20–50 cm, pilose or glabrescent. Petiole 0–14 cm; leaf blade ovate to triangular-

ovate, 2–7 × 3.5–5 cm, adaxially appressed pilose, abaxially pubescent along veins, purple-brown glandular, base hastate or rarely cordate, margin crenate or double crenate, apex acute to subobtusate. Inflorescences densely villous, glandular pubescent; verticillasters 4-flowered, 4–8 ± remote in terminal racemes or panicles; bracts ovate, shorter to longer than calyx. Pedicel ca. 3 mm. Calyx campanulate, ca. 1–1.5 cm in flower, glandular pilose or pilose, sparsely purple-brown glandular, 2-lipped to ca. 1/3 its length; upper lip triangular-ovate, ca. 3 × 6 mm, apex 3-mucronate; lower lip slightly longer than upper, ca. 5 × 6 mm; teeth triangular, apex acute. Corolla yellow or brown or purple spotted on middle lobe, 2.3–3 cm; tube obliquely pilose annulate inside, cylindrical toward base, curved upward, dilated at throat; upper lip ± falcate/galeate, 7–10 mm; middle lobe of lower lip subobovate to subflabellate, ca. 0.8–1.8 cm wide; lateral lobes nearly semicircular; filaments ca. 7 mm; connectives ca. 9 mm, upper arms ca. 5 mm, lower arms ca. 4 mm. Style slightly exerted. Nutlets unknown. Fl. Jul.

- Forests, forest margins, hillsides, grasslands; 2400–4000 m. Sichuan, Yunnan.

Closely related to *Salvia bulleyana* and often regarded as a synonym of it.

- 1a. Calyx ca. 1 cm; middle lobe of lower corolla lip yellow, ca. 0.8 cm wide 35a. var. *flava*
- 1b. Calyx 1.3–1.5 cm; middle lobe of lower corolla lip yellow, conspicuously brown or purple spotted, to 1.8 cm wide 35b. var. *megalantha*

35a. *Salvia flava* var. *flava*

黄花鼠尾草 huang hua shu wei cao

Salvia chingii C. Y. Wu ex Sun.

Calyx ca. 1 cm. Middle lobe of lower corolla lip yellow, ca. 8 mm wide.

- Forests, hillsides, grasslands, 2500–4000 m. Sichuan, Yunnan.

35b. *Salvia flava* var. *megalantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 236. 1912.

大花变种 da hua bian zhong

Calyx 1.3–1.5 cm. Middle lobe of lower corolla lip to 1.8 cm wide, yellow, conspicuously brown or purple spotted.

- Open hillsides, grasslands, wet forest margins; 2400–3900 m. Yunnan.

36. *Salvia bifidocalyx* C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 675. 1977.

开萼鼠尾草 kai e shu wei cao

Plants perennial. Stems few, slender, ascending, to 33 cm, densely puberulent, apex villous. Leaves 2 or 3 pairs; petiole of basal leaves 7–9 cm, 1–4.5 cm in stem leaves; leaf blade hastate, 2–5 × 1.7–3 cm, papery, adaxially pubescent except for veins, abaxially sparsely purple-black glandular, pubescent on veins, base hastate, margin crenulate, apex ± acute. Verticillasters 2(–4)-flowered, in terminal racemes or panicles (1–)2–9 cm; lower bracts leaflike; upper bracts ovate, shorter than calyx, purple-black glandular. Pedicel 3–5 mm. Calyx campanulate, 1–1.2 cm, densely villous, glandular pilose, 2-lipped to ca. 1/2 its length; upper lip triangular-ovate, ca. 6 mm; lower lip ca. 5 mm, teeth ovate-triangular; fruiting calyx dilated, broadly campanulate, membranous.

Corolla yellow-brown with purple-black spots on lower lip, 1.5–1.7 cm; tube imperfectly hairy annulate inside; upper lip slightly reflexed, slightly concave, purple-black glandular; middle lobe of lower lip largest, obcordate, 5–5.5 mm wide. Stamens exserted; filaments ca. 4 mm; connectives ca. 6 mm. Nutlets unknown. Fl. Jul.

- Rocky mountains; 3500 m. Yunnan.

Distinguished in the original description from *Salvia flava* by the smaller corolla only slightly longer than the calyx.

37. *Salvia kiaometiensis* H. Léveillé, Bull. Acad. Géogr. Bot. 25: 25. 1915.

荞麦地鼠尾草 qiao mai di shu wei cao

Plants perennial. Stems 25–50 cm, yellow-brown tomentose-villous or glabrescent. Petiole 9–21 cm; leaf blade ovate, 4–15 × 2–10 cm, adaxially minutely hispid to densely pilose, abaxially gray tomentulose to subglabrous, sparsely yellow-brown glandular, base cordate, margin crenate, apex acute. Inflorescences densely yellow-brown villous, glandular pilose; verticillasters 2–4-flowered, compact, in terminal racemes; bracts broadly ovate to subcircular, 1–2.4 cm, obtuse, base rounded, apex mucronate. Pedicel ca. 3 mm. Calyx ± narrow campanulate, 1.3–1.5 cm, yellow villous, 2-lipped nearly ca. 1/3 its length; upper lip broadly semicircular-triangular, ca. 3.5 × 9 mm, apex mucronate; lower lip subequal adaxial, ca. 8 mm wide; teeth triangular-ovate, apex mucronate; fruiting calyx slightly dilated, ca. 1.7 cm, veins conspicuously elevated outside. Corolla purple-brown or red, 2.8–3.5 cm, pilose; tube imperfectly pilose annulate inside, cylindrical, ca. 3.5 mm wide at base, to 9 mm wide at throat; upper lip straight, slightly concave or falcate, ca. 7 mm; lower lip slightly longer than upper, middle lobe obcordate, ca. 4 × 6 mm. Filaments ca. 5.5 mm; connectives 6–7 mm, arcuate, upper arms slightly longer than lower. Nutlets dark brown, obovoid, ca. 4 mm, rounded, abaxially striate. Fl. May–Nov, fr. Nov.

- Hillside grasslands; 2300–3200 m. Sichuan, Yunnan.

Used medicinally.

The forms *kiaometiensis*, *pubescens*, and *tomentella* E. Peter (Acta Horti Gothob. 9: 134. 1934) have been differentiated largely on differences in leaf surface hairs.

38. *Salvia subpalmatinervis* E. Peter, Acta Hort. Gothob. 9: 135. 1934.

近掌脉鼠尾草 jin zhang mai shu wei cao

Plants perennial. Taproot blackish, to 1.5 cm in diam. Stems 1–3, erect, to 50 cm, glandular villous. Leaves mostly basal, stem leaves ca. 2-paired; petiole nearly as long as to longer than blade; leaf blade ovate to circular, 3.5–10(–13.5) × to 10(–13.5) cm, adaxially densely appressed villous, abaxially glandular, spreading pilose on veins, base cordate or ± hastate, margin crenate, apex obtuse to rounded or subacute. Inflorescences densely glandular villous; verticillasters 2–6-flowered, in terminal racemes 10–15 cm; lower bracts leaflike, upper bracts ovate, to ca. 2 cm. Pedicel 4–5 mm. Calyx campanulate, 1.5–2 cm, narrower at mouth, spreading villous, glandular pilose mainly along veins, glandular ciliate at mouth; upper lip ca. 3 mm, margin entire, apex mucronate or 3-serrulate; lower lip ca. 5 mm, teeth triangular. Corolla purplish or blue-purple, ca. 3.5 cm, pilose, base imperfectly pilose annulate inside; tube zigzag, cylindrical toward base,

adaxially abruptly dilated above middle, curved downward at an angle; upper lip shallowly falcate/galeate. Filaments ca. 6 mm; connectives ca. 6 mm, arms subequal, lower anther cells smaller, apex united. Nutlets unknown. Fl. May–Jul.

- Thickets, forests, hilly grasslands; 3400–4000 m. Yunnan.

39. *Salvia mekongensis* E. Peter, Acta Horti Gothob. 9: 136. 1934.

湄公鼠尾草 mei gong shu wei cao

Plants perennial. Stems 1–5, ascending to erect, pilose or glabrescent. Stem leaves few; petiole of basal leaves 2–3 × as long as blade, petioles of upper leaves obsolete; leaf blade ovate to oblong-ovate, rarely subcircular or elliptic, 3–9 × 2–8 cm, adaxially appressed villous, abaxially glandular, spreading pilose on veins or densely villous when young, base cordate to shallowly hastate, apex obtuse to rounded. Inflorescences densely villous, glandular hairy; verticillasters 2-flowered, in terminal racemes or panicles 6–10 cm, crowded apically; upper bracts ovate to broadly ovate, villous, glandular. Pedicel ca. 4 mm. Calyx campanulate, 1–1.5 cm, glandular, glandular villous on veins, 2-lipped to more 1/2 its length; upper lip triangular-ovate, apex 3-mucronate; lower teeth narrowly triangular, apex acuminate. Corolla yellow, 3.5–4 cm, glandular pilose; tube imperfectly pilose annulate on basal 5–6 mm inside, ca. 3 × as long as calyx, tubular toward base, adaxially abruptly dilated on exserted part, straight or curved upward, to 1.1 cm at throat; upper lip straight or slightly reflexed, ca. 6 × 6 mm; lower lip slightly longer than upper, middle lobe obcordate, ca. 8 mm wide. Filaments ca. 5 mm; connectives ca. 6 mm, arcuate, arms equal. Nutlets unknown.

- Hilly grasslands; 2800–4100 m. Yunnan.

40. *Salvia nipponica* Miquel var. *formosana* (Hayata) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 157. 1929.

台湾琴柱草 tai wan qin zhu cao

Salvia formosana Hayata.

Plants perennial. Stems 20–50 cm, retrorse spiny-hirsute, unbranched. Stem leaves many paired; petiole 1–10 cm, retrorse spiny-hirsute; leaf blade triangular-ovate to triangular-hastate, 2–7(–9) × 1.3–6(–7) cm, minutely hispid, glandular, base hastate to subtruncate, margin irregularly dentate or serrate, apex caudate-acuminate. Inflorescences densely retrorse spiny-hirsute; verticillasters 2–6-flowered, somewhat widely spaced, in terminal racemes ca. 6 cm; bracts ovate to narrowly ovate, 6–12 mm. Pedicel 3–5 mm. Calyx campanulate, ca. 9 mm, dilated after anthesis, densely hirsute along veins, sparsely glandular, 2-lipped to ca. 1/3 its length; upper lip broadly triangular, margin entire, apex rounded. Corolla yellow with red spots, 2.2–2.4 cm, pubescent; tube transversely pilose annulate, ca. 1.3 cm; upper lip oblong, ca. 1.9 cm; lower lip almost as long as upper lip, middle lobe obcordate, lateral lobes narrowly triangular. Filaments, ca. 4 mm; connectives ca. 8 mm, upper arms ca. 5.5 mm, lower arms ca. 2.5 mm. Style much exserted. Nutlets unknown. Fl. Jul–Aug.

- Taiwan.

41. *Salvia sonchifolia* C. Y. Wu, Fl. Yunnan. 1: 679. 1977.

莛叶鼠尾草 ju ye shu wei cao

Plants perennial. Stems erect, ca. 30 cm, densely retrorse pubescent. Leaves mostly basal; stem leaves 1-paired; petiole 4–6.5 cm, puberulent; leaf blade oblong, 4–6.5 × 1.5–3 cm, papery, adaxially glabrous, abaxially glabrous or puberulent on veins, base cuneate or subtruncate, margin undulate or obscurely crenate, apex rounded. Inflorescences densely puberulent; verticillasters 2-flowered, in terminal racemes 4.5–7 cm; bracts shorter than pedicels. Pedicel 3–6 mm. Calyx campanulate, 8–8.5 mm, finely pilose along veins, finely pubescent, sparsely yellowish glandular, margin ciliolate, 2-lipped to ca. 1/3 its length; upper lip tinged dark purple, semicircular, ca. 2.5 × 5.5 mm, apex 3-mucronate; lower lip purplish, longer than upper, strongly 2-toothed. Corolla purple, to 3.5 cm, pubescent, indistinctly pilose annulate inside; upper lip subcircular, ca. 6 mm wide; lower lip longer than upper, ovate, ca. 7 × 9 mm; middle lobe obcordate, apex emarginate, margin undulate; lateral lobes ovate. Filaments ca. 3 mm; connectives ca. 1.5 mm, arms subequal, anther cells subequal. Fl. Apr–May.

• Wet forest humus on limestone mountains; 1300–1500 m. Yunnan.

42. *Salvia tricuspis* Franchet, Bull. Soc. Philom. Paris, ser. 8, 3: 150. 1891.

黄鼠狼花 huang shu lang hua

Salvia marretii H. Léveillé.

Herbs annual or biennial. Stems erect, 30–95 cm, pubescent, glandular villous, much branched. Petiole 1–11 cm, shorter toward stem apex, sparsely villous; leaf blade 3-lobed, triangular-hastate, or sagittate, 3–12 × 2.2–12 cm, adaxially pilose or pubescent, abaxially pubescent, glandular, base cordate, with ovate, acute basal lobes, margin serrate or crenate above base, apex acuminate to acute. Inflorescences pubescent, glandular villous; verticillasters 2(–4)-flowered, widely spaced; bracts narrowly lanceolate, 3–9 × 1.2–1.5 mm, margin entire or 2–4-toothed. Pedicel ca. 4 mm. Calyx campanulate, 0.9–1.1 cm, sparsely yellow-brown glandular, veins and margin glandular villous; upper lip triangular, ca. 3 × 6 mm, apex ± 3-mucronate; lower lip subequal upper, teeth obtusely triangular, apex short acuminate. Corolla yellow, 2.1–2.3 cm, pilose; tube ca. 1.5 cm, transversely pilose annulate inside, cylindrical toward base, abruptly dilated, curved upward beyond hairy annulus; upper lip oblong, ca. 6.5 × 6 mm; lower lip ca. 5 × 12 mm. Fertile stamens exerted; filaments ca. 5 mm; connectives ca. 6.5 mm, arcuate, upper arms longer. Nutlets obovoid, ca. 3 × 2 mm, brown, rounded. Fl. Jul–Sep, fr. Sep–Oct.

• Foothills, riverbanks, streamsides, grasslands; 1400–3000 m. Gansu, Shaanxi, Shanxi, Sichuan.

43. *Salvia umbratica* Hance, J. Bot. 8: 75. 1870.

荫生鼠尾草 yin sheng shu wei cao

Herbs annual or biennial. Stems erect, to 1.2 m, villous, sometimes glandular villous. Petiole 1–9 cm; leaf blade triangular to ovate-triangular, 3–16 × 2.3–16 cm, adaxially pubescent or minutely hispid, abaxially sparsely yellow-brown glandular, villous on veins, base cordate to subtruncate, basal lobes ovate, apex acute to obtuse, margin double crenate or dentate, apex acuminate to caudate-acuminate. Inflorescences villous, glandular pubescent; verticillasters 2-flowered, widely spaced, in terminal and

axillary racemes; upper bracts lanceolate, 3–6 × 1–3 mm. Pedicel ca. 2 mm. Calyx campanulate, 7–10 mm, slightly dilated after anthesis, villous, 2-lipped to ca. 1/3 its length; upper lip ca. 3 × 6 mm, apex 3-mucronate; lower lip somewhat larger than upper, teeth obliquely triangular, apex acute. Corolla blue-purple or purple, 2.3–2.8 cm, slightly pubescent; tube imperfectly pilose annulate inside, narrow, cylindrical toward base, exerted part abruptly dilated, curved upward, to 7 mm wide at throat; upper lip oblong-obcordate, 8 × 6–7 mm; lower lip ca. 7 × to 12 mm; lateral lobes lunate, ca. 3 mm wide. Filaments ca. 5 mm, glabrous; connectives ca. 7.5 mm, arcuate, upper arms ca. 4 mm, lower arms ca. 3.5 mm. Style as long as upper corolla lip to exerted. Nutlets ellipsoid. Fl. Aug–Oct.

• Hillsides, valleys; 600–2000 m. Anhui, Gansu, Hebei, Hubei, Shaanxi, Shanxi.

44. *Salvia roborowskii* Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg, sér. 3, 27: 527. 1881.

粘毛鼠尾草 zhan mao shu wei cao

Herbs annual or biennial. Stems erect, 30–90 cm, much branched, densely viscid-hirsute. Petiole 2–6 cm, gradually shorter toward stem apex; leaf blade hastate to hastate-triangular, 3–8 × 2.5–5.5 cm, strigose, abaxially yellowish glandular, base shallowly cordate to truncate, margin crenate, apex acute to obtuse. Verticillasters 4–6-flowered, in terminal and axillary racemes, widely spaced at base; upper bracts lanceolate to ovate, 0.5–1.5 cm, glandular villous, intermixed with yellow-brown glands, margin undulate or entire. Pedicel ca. 3 mm. Calyx campanulate, 6–8 mm in flower, dilated after anthesis, hirsute, glandular pubescent, intermixed with yellowish brown glands, 2-lipped to 1/3 its length; upper lip triangular-semicircular, ca. 3.5 × 5 mm, apex 3-mucronate; lower lip nearly as long as adaxial, teeth triangular, apical spine ca. 1 mm. Corolla yellow, 1–1.3(–1.6) cm, pilose or subglabrous; tube imperfectly pilose annulate inside, somewhat exerted, slightly constricted below middle, exerted part dilated, to ca. 5 mm wide at throat; upper lip straight, oblong, ca. 4.5 × 2.7 mm, margin entire; lower lip longer than upper, ca. 3.5 × 7 mm; middle lobe obcordate, ca. 1.5 × 3 mm. Filaments ca. 4 mm; connectives arcuate, ca. 4 mm, arms subequal. Nutlets obovoid, ca. 2.8 × 1.9 mm, dark brown. Fl. Jun–Aug, fr. Sep–Oct.

• Grasslands, hillsides, foothills, wet streamsides; 2500–3700 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan.

45. *Salvia officinalis* Linnaeus, Sp. Pl. 1: 23. 1753.

撒尔维亚 sa er wei ya

Herbs perennial. Stems erect, woody at base, minutely white tomentose, much branched. Petiole 0–3 cm; leaf blade oblong to elliptic or ovate, 1–8 × 0.6–3.5 cm, papery, finely corrugate, minutely white tomentose, base rounded or subtruncate, margin crenulate, apex acute to mucronate, rarely acute. Verticillasters 2–18-flowered, in terminal racemes 4–18 cm; upper bracts broadly ovate, apex acuminate. Pedicel ca. 3 mm. Calyx campanulate, 1–1.1 cm in flower, dilated to 1.5 cm in fruit, minutely tomentose on veins and margin, sparsely golden yellow glandular, ± tinged purple, 2-lipped to ca. 1/2 its length; upper lip shallowly 3-toothed, teeth subulate; lower teeth triangular, apex acuminate. Corolla purple or blue, 1.8–1.9 cm, minutely tomentose; tube imperfectly pilose annulate inside, straight, ca. 9 mm; upper lip straight, obovoid, ca.

6 × 5.5 mm; lower lip ca. 1 × 1 cm. Filaments ca. 5 mm; connectives ca. 3 mm, arms equal. Nutlets dark brown, subglobose, ca. 2.5 mm in diam. Fl. Apr-Jun.

Cultivated in China as a medicinal and aromatic herb [Europe].

46. *Salvia trijuga* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 237. 1912.

三叶鼠尾草 san ye shu wei cao

Herbs perennial. Stems erect, 30–60 cm, villous. Leaves simple or ternate compound, rarely 5-foliolate, lower stem leaves ternate, long petiolate, upper simple or ternate; petiole 5–7 cm, petiolule of terminal leaflet 0.8–3 cm; terminal leaflet ovate to elliptic-cordate, 5–6 × 4–5 cm, adaxially densely appressed bristly, abaxially sparsely yellowish glandular, pilose on veins, base cordate to truncate, margin crenate, apex obtuse; lateral leaflets ovate to circular-ovate, 1–4 × 0.5–2.8 cm. Inflorescences densely villous, glandular pubescent; verticillasters 2-flowered, widely spaced, in terminal racemes or panicles; bracts lanceolate to narrowly ovate, 5–12 × 1–3 mm, glandular ciliate. Pedicel ca. 3 mm. Calyx campanulate, 1–1.1 cm, glandular villous, 2-lipped to ca. 1/4 its length; upper lip 2.5 × 6 mm, 3 teeth broadly triangular, apex obtuse; lower lip as long as upper, 2 teeth triangular, apex acute to subacute. Corolla blue-purple with yellow spots; tube ca. 2 cm, cylindric toward base, abruptly dilated on exerted part, subglabrous or slightly pubescent, without conspicuous hairy annulus inside; upper lip falcate, ca. 9 mm, pubescent; lower lip longer, middle lobe transversely elliptic to subcircular, ca. 5 × 9 mm, margin undulate, apex emarginate; lateral lobes obliquely triangular, obtuse, ca. 2 mm wide. Filaments ca. 5 mm; connectives ca. 8 mm, arcuate, arms ± subequal. Nutlets blackish, narrowly ellipsoid. Fl. Jul-Sep.

• Hillsides, streamsides, grasslands, thickets, forests, valleys; 1900–3900 m. Sichuan, Xizang, Yunnan.

Used medicinally.

47. *Salvia yunnanensis* C. H. Wright, Bull. Misc. Inform. 1896: 164. 1896.

云南鼠尾草 yun nan shu wei cao

Salvia bodinieri Vaniot; *S. esquirolii* H. Léveillé.

Plants perennial. Tuberos roots 2 or 3, scarlet outside. Stems erect, ca. 30 cm, densely spreading white villous. Leaves mostly basal; petiole 2.5–10 cm, villous; blade simple, trifid, or pinnate; stem leaves 1- or 2-paired, short petiolate; blade of simple leaves oblong-elliptic, 2–8 × 1.5–3.5 cm, papery, abaxially purplish, densely or sparsely villous, rarely glabrescent, finely corrugate, base cordate to rounded, margin crenate, apex obtuse to rounded; terminal lobes of compound leaves largest, ovate to elliptic. Inflorescences villous, glandular puberulent; verticillasters 4–6-flowered, widely spaced, in terminal racemes or panicles 7–13 cm; bracts shorter than pedicels, pubescent. Pedicel ca. 3 mm. Calyx campanulate, 7–9 mm, abaxially tinged purple, glandular, villous on veins; upper lip broadly triangular, ca. 2.5 × 6.5 mm, apex mucronate; lower lip ca. 3 × 5 mm. Corolla blue-purple, 2.5–3 cm, pubescent; tube sparsely puberulent below middle inside, 1.3–1.5 cm, funnellform, ca. 2.5 mm wide at base, to 6 mm wide at throat; upper lip falcate, 9–11 × ca. 4.5 mm; middle lobe of lower lip with undulate margin; lateral lobes ovate, ca. 2.5 mm wide. Filaments ca. 3 mm;

connectives 6–10 mm, upper arms ca. 2 × as long as upper. Nutlets black, ellipsoid. Fl. Apr-Aug.

• Grassy hillsides, forest margins, dry thin forests; 1800–2900 m. Guizhou, Sichuan, Yunnan.

Used medicinally.

48. *Salvia miltiorrhiza* Bunge, Mém. Acad. Sci. St. Petersbourg Divers Savans 2: 124. 1833.

丹参 dan shen

Plants perennial. Taproot thickened, succulent, scarlet outside. Stems erect, 40–80 cm tall, villous, much branched. Leaves simple to odd-pinnate; petiole 1.3–7.5 cm, densely retrorse villous, petiolule 2–14 mm; leaflets 3–5(–7), 1.5–8 × 1–4 cm, blades or leaflets circular to broadly lanceolate, pilose, densely so abaxially, margin crenate, apex acute to acuminate. Inflorescences densely villous or glandular villous; verticillasters 6- to many flowered, basally remote, apically crowded, in terminal or axillary racemes 4.5–17 cm; bracts lanceolate. Pedicel 3–4 mm. Calyx campanulate, purplish, ca. 1.1 cm, slightly dilated after anthesis, sparsely villous or glandular villous, margin ciliate; upper lip entire, triangular, ca. 4 × 8 mm, apex 3-mucronate; lower lip almost as long as upper, 2-toothed. Corolla purple-blue or white, 2–2.7 cm, glandular pubescent, densely so on upper lip; tube imperfectly fine pilose annulate inside, exerted, shorter than limb, 2 mm wide at base, to 8 mm wide at throat; upper lip 1.2–1.5 cm, falcate; lower lip shorter, middle lobe ca. 5 × to 10 mm, 2-lobulate; lateral lobes rounded, ca. 3 mm wide. Filaments 3.5–4 mm; connectives 1.7–2 cm. Style much exerted. Nutlets ellipsoid, ca. 3.2 × 1.5 mm. Fl. Apr-Aug, fr. Sep-Oct.

Hillsides, streamsides, forests; 100–1300 m. Anhui, Hebei, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Shandong, Shanxi, Zhejiang [Japan].

- 1a. Leaves odd-pinnate; leaflets ovate or elliptic-ovate to broadly lanceolate 48a. var. *miltiorrhiza*
1b. Leaves simple or 3-foliolate; blades or leaflets orbicular to suborbicular 48b. var. *charbonnelii*

48a. *Salvia miltiorrhiza* var. *miltiorrhiza*

丹参 dan shen

Salvia anomala Vaniot; *S. miltiorrhiza* f. *alba* C. Y. Wu & H. W. Li; *S. pogonocalyx* Hance.

Leaves odd-pinnately compound; leaflets ovate or elliptic-ovate to broadly lanceolate.

Hillsides, streamsides, grassy places in forests; 100–1300 m. Anhui, Hebei, Henan, Hunan, Jiangsu, Shaanxi, Shandong, Shanxi, Zhejiang [Japan].

Used medicinally for coronary diseases.

48b. *Salvia miltiorrhiza* var. *charbonnelii* (H. Léveillé) C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 148. 1977.

单叶变种 dan ye bian zhong

Salvia charbonnelii H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 220. 1911.

Leaves simple, sometimes 3-foliolate; blades or leaflets orbicular to suborbicular.

• Hillsides, grassy places. Hebei, Henan, Hubei, Shanxi.

49. *Salvia bowleyana* Dunn, J. Linn. Soc., Bot. 38: 363. 1908.

南丹参 nan dan shen

Plants perennial. Stems robust, ca. 1 m. Leaves 1- (or 2)-pinnate, 10–20 cm, 5(–7)-foliolate; petiole 4–6 cm, concave-convex, retrorse villous or densely spreading bristly; terminal leaflet ovate-lanceolate, 4–7.5 × 2–4.5 cm, herbaceous, glabrous, finely pilose on veins, margin crenate-serrate or serrate, apex acuminate to caudate-acuminate; lateral leaflets smaller. Inflorescences densely glandular villous; verticillasters 8- to many flowered, in terminal racemes or panicles 14–30 cm; bracts lanceolate, 3–4 × ca. 1 mm, margin entire, ciliate. Pedicel ca. 4 mm. Calyx tubular, 8–10 mm, glandular pilose, pubescent, white bristly at throat inside, 2-lipped to ca. 1/4 its length; upper lip broadly triangular, ca. 2 × 5 mm, apex ± 3-mucronate; lower lip triangular, ca. 1.5 × 4 mm, apex shallowly 2-toothed. Corolla purple to blue-purple, 1.9–2.4 cm, puberulent; tube obliquely hairy annulate, gradually dilated at apex, to 7 mm wide at throat; upper lip slightly falcate, 0.8–1.2 cm × ca. 5 mm; lower lip oblong, ca. 1.1 × 1.2 cm; middle lobe obcordate, ca. 3 × 6 mm. Filaments ca. 4 mm; connectives ca. 1.9 cm; upper arms to 1.5 cm, lower arms ca. 4 mm. Nutlets brown, ellipsoid, ca. 3 mm, apex hairy. Fl. Mar–Jul.

• Hillsides, streamsides, forests, valleys; 0–1000 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Zhejiang.

- 1a. Leaves 1-pinnately compound; petioles and stem retrorse villous 49a. var. *bowleyana*
1b. Leaves 2-pinnately compound; petioles and stem densely spreading bristly 49b. var. *subbipinnata*

49a. *Salvia bowleyana* var. *bowleyana*

南丹参 nan dan shen

Salvia miltiorrhiza Bunge var. *australis* E. Peter.

Stems retrorse villous. Leaves 1-pinnately compound; petiole retrorse villous.

• Hillsides, streamsides, forests, valleys; 0–1000 m. Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Zhejiang.

Used medicinally.

49b. *Salvia bowleyana* var. *subbipinnata* C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 582. 1977.

近二回羽裂变种 jin er hui yu lie bian zhong

Stems densely patent setose. Leaves 2-pinnately compound; petiole densely patent setose.

• Zhejiang.

50. *Salvia dabieshanensis* J. Q. He, Acta Bot. Yunnan. 11: 409. 1989.

大别山丹参 da bie shan dan shen

Plants perennial. Stem solitary, rarely branched, erect, to 1 m, tawny pubescent, retrorse pilose toward base, densely glandular pilose and villous toward apex. Stem leaves odd-pinnate, leaflets (3–)5–7; petiole 5–15 cm, petiolule of terminal leaflet 0.8–3 cm; terminal leaflet ± ovate-lanceolate, 3–13 × 1.5–5 cm, margin irregularly crenate; lateral leaflets

elliptic-lanceolate, 2–12 × 0.8–4.5 cm. Inflorescences densely glandular pilose, villous; verticillasters 6–12-flowered. Pedicel 2–8 mm. Calyx tubular, 6–13 mm, densely glandular pilose, villous, throat white hirsute; upper lip broadly triangular, 1.5–3 × 4–6 mm, apex acute; lower lip as long as upper, teeth narrowly triangular. Corolla yellow or yellowish, 2–2.8 cm, pubescent; tube obliquely pilose annulate, white pilose at throat, 0.8–1.5 cm, gradually dilated apically; upper lip falcate; lower lip shorter, middle lobe flabellate, 1.5–3 × 4–6 mm, constricted at base, margin irregularly dentate; lateral lobes 1–2 × 2–3 mm. Filaments 3–5 mm; connectives slightly curved, 2–2.5 mm, upper arms 1–1.7 mm, lower arms 0.5–1.2 mm; lower anther cells sterile, apex united. Nutlets yellow-brown, ellipsoid, 0.8–1.2 mm, ca. 0.5 mm in diam. Fl. and fr. May–Jun.

• Hillsides, margins of thicket; 600–1100 m. Anhui.

51. *Salvia sinica* Migo, J. Shanghai Sci. Inst. 3: 226. 1937.

浙皖丹参 zhe wan dan shen

Salvia sinica f. *purpurea* H. W. Li.

Plants perennial. Stems 1 to few, erect, 50–100 cm tall, herbaceous, branched toward apex, pilose, spreading or retrorse tawny pilose. Stem leaves 1-pinnate, narrowly ovate, to 30 × 15–20 cm; petiole to 10 cm, densely pilose, ± clasping, petiolules short to ± absent; leaflets (3–)7, minutely hispid, hirsute on veins, margin crenate; terminal leaflet ovate to oblong-lanceolate, to 12 × 5 cm. Verticillasters 5–12-flowered, in terminal racemes; rachis densely glandular hirtellous; bracts sessile, lanceolate to narrowly ovate, 3–8 × 1–2 mm, minutely hispid, base cuneate, margin entire, apex acute. Pedicel 3–5 mm, purple. Calyx campanulate, 7–8 × ca. 5 mm in flower, 1–1.1 cm × 7 mm after anthesis, glandular pilose, white pilose annulate inside; upper lip triangular, reflexed; teeth of lower lip triangular. Corolla tawny, purplish or purple on upper lip 1.6–2.2 cm, glandular; tube obliquely pilose annulate inside; upper lip falcate, 0.9–1.1 cm; lower lip 6–9 mm, middle lobe obovate to subrhombic, ca. 2 × 3 mm, lobules lacerate-dentate; lateral lobes obliquely oblong, 2–4 mm, apex rounded. Filaments ca. 4 mm; upper arms ca. 1.3 cm; lower arms ca. 4 mm, sterile, apex united. Style filiform, much exerted. Nutlets yellow-brown, ± fusiform, triquetrous, apex acute, ca. 3 × 1–1.3 mm. Fl. Jun.

• Hills. Anhui, Zhejiang.

52. *Salvia paramiltiorrhiza* H. W. Li & X. L. Huang, Acta Phytotax. Sin. 19: 245. 1981.

拟丹参 ni dan shen

Salvia miltiorrhiza Bunge var. *hupehensis* E. Peter; *S. paramiltiorrhiza* f. *purpureorubra* H. W. Li.

Plants perennial. Rhizome prostrate, ca. 1 cm in diam. Stems 1 to few, tufted, erect, 50–100 cm, branched toward apex, retrorse pilose. Petiole 1–6.5 cm, pilose, terminal petiolule 2–4.3 cm, lateral petiolules 5–12 mm; stem leaves (3–)5(–7)-foliolate; leaflets ovate, 1.3–7.5 × 0.9–3.5 cm, pilose to subglabrous, margin crenate. Inflorescence glandular pilose; verticillasters 4–6-flowered, widely spaced. Pedicel 4(–6) mm. Calyx tubular, 1–1.4 cm, glandular pilose, throat densely white hirsute; upper lip triangular, ca. 3 × 4 mm; lower lip nearly as long as upper, teeth triangular, apex acute. Corolla yellowish, yellow, to purple-red, 2–2.5 cm, sparsely

glandular pilose, densely glandular pilose on upper lip; tube villous inside, slightly exerted, ca. 12 × 3 mm wide at base, 6–7(–8) mm wide at throat; upper lip folded-falcate, nearly at a right angle to lower lip; lower lip spreading, oblong, ca. 12 × 6 mm; middle lobe ca. 4 × 6 mm; lateral lobes ovate, ca. 2 mm wide. Connectives ca. 1.8 cm wide, semicircular-arcuate, glabrous, upper arms ca. 3 × as long as lower. Nutlets dark brown, ellipsoid, ca. 2.5 mm. Fl. Jul-Sep.

- Hillsides, streamsides. Anhui, Hubei.

53. *Salvia vasta* H. W. Li, Bull. Bot. Res. 3: 67. 1983.

野丹参 ye dan shen

Plants perennial. Rhizome prostrate. Stems erect, 30–40(–100) cm, pubescent, becoming subglabrous, purplish. Leaves pinnate, 10–20 cm, 5–7-foliolate; petiole 4.5–11 cm; terminal leaflet broadly ovate to ovate-elliptic, 3–6.5 × 1.8–3.5 cm, abaxially glabrous, pubescent on veins, base rounded to shallowly cordate, margin serrate, apex long acuminate; lateral leaflets smaller, base oblique. Inflorescences glandular pilose; verticillasters (2–)4–8-flowered, widely spaced, in terminal racemes or panicles 15–35 cm. Pedicel ca. 4 mm. Calyx tubular, ca. 9 mm, pilose, puberulent mainly toward base, white hirsute on throat, 2-lipped to 1/4 its length; upper lip broadly triangular, ca. 3 × 5 mm; lower lip larger, triangular, ca. 4 × 5 mm, teeth narrowly triangular. Corolla yellow or purple, to 2.5 cm, pilose; tube much exerted, to 1.5 cm, ca. 2 mm wide at base, to 6 mm wide at throat, not hairy annulate inside; upper lip folded-falcate, ca. 12 × 4 mm, nearly at a right angle to lower lip; lower lip spreading, oblong, ca. 8 × 6 mm; middle lobe obcordate, ca. 4 × 5 mm. Filaments ca. 4 mm; anthers ca. 5 mm, connectives ca. 1.4 cm, upper arms ca. 1 cm, lower arms ca. 4 mm. Nutlets brownish, ellipsoid, ca. 2.5 mm, apex slightly pubescent. Fl. May-Jun, fr. Jul.

- Field margins, hillsides. Hubei.

- 1a. Margin of middle lobe of lower corolla lip entire or undulate 53a. var. *vasta*
- 1b. Margin of middle lobe of lower corolla lip fringed-denticulate 53b. var. *fimbriata*

53a. *Salvia vasta* var. *vasta*

野丹参 ye dan shen

Salvia vasta var. *vasta* f. *purpurea* H. W. Li.

Margin of middle lobe of lower corolla lip entire or undulate.

- Field margins. Hubei.

53b. *Salvia vasta* var. *fimbriata* H. W. Li, Bull. Bot. Res. 3: 70. 1983.

齿唇丹参 chi chun dan shen

Margin of middle lobe of lower corolla lip fimbriate-denticulate.

- Hillsides. Hubei.

54. *Salvia prionitis* Hance, J. Bot. 8: 74. 1870.

红根草 hong gen cao

Salvia japonica Thunberg var. *prionitis* (Hance) Kudô.

Herbs annual. Stems erect, 20–43 cm, densely white hirsute, unbranched or few branched. Leaves mostly basal, simple or ternate compound; petiole 1.5–6 cm; leaf blades of

simple leaves oblong to ovate-lanceolate, 2.5–7.5 × 1.3–4.5 cm, adaxially hirsute, abaxially glabrous, hirsute on veins, base rounded to cordate, margin coarsely crenate; terminal leaflet ovate-elliptic, to 9 cm × 5 mm, lateral leaflets ovate. Verticillasters 6–14-flowered, widely spaced, in racemes or panicles; bracts lanceolate, to 2 mm. Pedicel 1–2 mm, curved downward, densely pubescent. Calyx campanulate, purplish, ca. 4 mm, glandular pilose, throat hirsute annulate; upper lip triangular, less than ca. 1 × 2 mm; lower lip ca. 1 × 3 mm, teeth triangular, apex acute. Corolla violet, slightly puberulent; tube imperfectly fine pilose annulate inside, cylindric, ca. 5.5 mm; upper lip oblong, ca. 4.5 × 2.1 mm; middle lobe of lower lip ca. 2 × to 6 mm, undulate; lateral lobes ovate, 1–1.5 mm wide. Filaments ca. 3 mm; connectives ca. 5 mm, upper arms ca. 3.5 mm, slightly curved, lower arms short, apex united. Style exerted, ca. 1.3 cm. Nutlets brownish, ellipsoid, ca. 1.3 × 0.7 mm. Fl. Jun-Aug.

- Hillsides, grassy places; 100–800 m. Anhui, Guangdong, Guangxi, Hunan, Jiangxi, Zhejiang.

Used medicinally.

55. *Salvia cavaleriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 422. 1910.

贵州鼠尾草 gui zhou shu wei cao

Herbs. Taproot robust, short. Stems 12–32 cm, slender, often violet, glabrous toward base. Basal and lower stem leaves simple to 2-pinnate; petiole 1–7 cm; terminal leaflet narrowly ovate to lanceolate, 2.5–7.5 × 1–3.2 cm, adaxially puberulent or glabrous, abaxially purple, glabrous, base cuneate to rounded, margin remotely obtuse serrate, apex obtuse to rounded; lateral leaflets 1–3-paired; upper stem leaves simple or ternate. Inflorescences slightly puberulent; verticillasters 2–6-flowered, widely spaced, in terminal racemes or panicles; bracts purplish, lanceolate, ca. 2 mm, subglabrous. Pedicel ca. 2 mm. Calyx tubular, ca. 4.5 mm, glabrous, 2-lipped to ca. 1/4 its length, apically fine strigose inside; upper lip entire, apex acute; lower lip longer than upper. Corolla blue-purple to purple-red or white, ca. 8 mm, puberulent; tube pilose annulate inside, ca. 5.5 mm, gradually dilated from base, ca. 2 mm wide at throat; lips subequal, lower to ca. 4 mm wide. Filaments ca. 2 mm; connectives ca. 4.5 mm, upper arms ca. 3 mm, lower arms ca. 0.5 mm. Nutlets black, narrowly ellipsoid, ca. 0.8 mm. Fl. Jul-Sep.

- Hillsides, streamsides, forests; 500–2700 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan.

- 1a. Leaves simple, cordate-ovate, or cordate-triangular, rarely in 3s; petiole longer than blade; corolla purple or purple-red 55c. var. *simplicifolia*
- 1b. Leaves 1- or 2-pinnate, occasionally simple; petiole shorter than to as long as blade; corolla blue-purple, dark purple, purple, or white.
 - 2a. Leaves basal and on stem, pinnate; lower stem leaves simple or ternate, remotely obtuse serrate; petiole glabrous; corolla blue-purple or purple 55a. var. *cavaleriei*
 - 2b. Leaves mostly basal, 1- or 2-pinnate, rarely simple, coarsely crenate or crenate-dentate; petiole spreading pilose; corolla dark purple or white 55b. var. *erythrophylla*

55a. *Salvia cavaleriei* var. *cavaleriei*

贵州鼠尾草 gui zhou shu wei cao

Salvia betonicoides H. Léveillé; *S. marchandii* H. Léveillé.

Basal and lower stem leaves 1-pinnately compound, upper stem leaves simple or ternate; petiole glabrous; blade adaxially puberulent, abaxially glabrous, margin remotely obtuse serrate. Corolla blue-purple or purple.

• Rocky hillsides, streamsides in forests; 500–1300 m. Guangdong, Guangxi, Guizhou, Sichuan.

55b. *Salvia cavaleriei* var. *erythrophylla* (Hemsley) E. Peter, Acta Horti Gothob. 10: 60. 1935.

紫背变种 zi bei bian zhong

Salvia japonica Thunberg var. *erythrophylla* Hemsley, J. Linn. Soc., Bot. 26: 284. 1890; *S. japonica* f. *erythrophylla* (Hemsley) Kudô.

Leaves mostly basal, 1- or 2-pinnately compound, occasionally simple; petiole shorter than blade, patent pilose; blade pilose, rarely subglabrous, margin remotely obtuse crenate or crenate-dentate, abaxially purple. Corolla dark purple or white.

• Grassy hills, forests; 700–2000 m. Guangxi, Hubei, Hunan, Shaanxi, Yunnan.

55c. *Salvia cavaleriei* var. *simplicifolia* E. Peter, Acta Horti Gothob. 10: 61. 1935.

血盆草 xue pen cao

Salvia delavayi H. Léveillé; *S. tsaiiana* E. Peter.

Leaves mostly basal, rarely ternate; petiole longer than blade, glabrous or patent pilose; blade 3.5–10.5 × 1.8–5.3 cm, glabrous or pilose, margin crenate, apex acute to obtuse, lateral leaflets small. Inflorescence finely appressed pilose, not glandular hairy. Corolla purple or purple-red.

• Hillsides, streamsides in forests; 500–2700 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan.

56. *Salvia nubicola* Wallich ex Sweet, Brit. Fl. Gard. 2: t. 140. 1826.

云生丹参 yun sheng dan shen

Plants perennial. Stems erect, 1–1.25 m. Petiole as long as to longer than blades, densely pubescent; leaf blade triangular-ovate, sparsely villous or glabrous, appressed hairy on veins, base hastate-sagittate. Inflorescences densely glandular pubescent; verticillasters 6-flowered, widely spaced, 10–12 in terminal racemes or panicles; bracts sessile, ovate to elliptic, shorter than calyx, reflexed, abaxially fine pubescent, glandular hairy, apex long acuminate; lower bracts smaller than stem leaves, 2–4 cm. Pedicel 5–6 mm. Calyx 1–1.2 cm, pubescent, long glandular hairy, minutely hispid inside, sparsely hairy at base; upper lip semicircular, shorter than lower, apex short 3-dentate; lower lip deeply 2-toothed. Corolla yellow with brown markings on lower lip, finely striate or spotted on limb, 3–4 cm; tube exserted, glandular hairy outside, finely hairy inside; upper lip falcate, glandular pubescent; middle lobe of lower lip broadly obovate, slightly shorter than lateral lobes, margin revolute, strongly dentate; lateral lobes transversely elliptic-oblong, revolute. Filaments shorter than connectives, upper arms 2–3 × as long as lower arms; upper anther cells to 1 cm, lower cells deformed,

semicircular, united. Nutlets brown, black reticulate, ellipsoid, ca. 3 mm, Fl. Jun-Aug (specimens not seen).

Xizang [Afghanistan, Bhutan, India, Pakistan; SW Asia, Europe].

Easily recognized by the hastate-sagittate leaf bases and yellow corollas.

57. *Salvia honania* L. Bailey, Gentes Herb. 1: 43. 1920.

河南鼠尾草 he nan shu wei cao

Herbs annual or biennial. Stems erect, 40–55 cm, densely glandular villous. Leaves simple or 3-foliolate; petiole 3–11 cm, sheathed at base; petiolules 1–4.3 cm, densely glandular villous; blades of simple leaves ovate, 5–7 × 4–5.5 cm, villous or pilose, ciliate, base cordate, margin coarsely serrate or crenate-serrate, apex acuminate to obtuse, terminal leaflet 5–10.5 × 4.5–8 cm. Inflorescences densely glandular villous; verticillasters 5–9-flowered, widely spaced, in terminal racemes or panicles; bracts lanceolate or spatulate, villous, glandular hairy. Pedicel 2–6 mm. Calyx tubular, 7–8 mm, glandular villous, throat white villous annulate; upper lip triangular, ca. 1.7 × 3.4 mm, margin entire or subentire, ciliate; lower lip larger than upper, teeth triangular. Corolla exserted, pubescent above middle; tube hairy annulate inside, 6–7 mm; upper lip oblong, ca. 4.7 mm; middle lobe of lower lip narrowed at base, apex enlarged, 2-lobulate, lobules fringed; lateral lobes ovate. Stamens exserted; filaments ca. 1 cm; connectives linear, ca. 1.4 cm, upper arms ca. 1 cm; lower anther cells undeveloped. Nutlets oblong-ellipsoid. Fl. May.

• Fields, wet open areas. Henan, Hubei.

58. *Salvia meiliensis* S. W. Su, Acta Bot. Yunnan. 6: 59. 1984.

美丽鼠尾草 mei li shu wei cao

Plants perennial. Stems erect, 30–50 cm, densely retrorse white villous, glandular hairy. Leaves 3–5-foliolate; petiole 4–13 cm, terminal petiolule (1–)2–4 cm, lateral petiolules 0.1–1(–2) cm, glandular pilose; terminal leaflet broadly ovate, (2.5–)6–11 × (2–)5–7 cm, white strigose, abaxially sometimes purple-green, base cordate to subcordate, margin irregularly crenulate, pilose, apex acute; lateral leaflets 1–2 (–4.5) × 0.8–1.5(–3) cm. Verticillasters 8- to many flowered, widely spaced, in racemes or panicles, glandular hairy. Pedicel 2–4 mm, pubescent. Calyx tubular, 6.5–7 mm, glandular pilose; upper lip obtusely triangular, ca. 1 × 3–3.5 mm; lower lip ca. 1.5 mm, teeth triangular. Corolla yellowish, 1.5–1.6 cm, apex pubescent outside; tube tubular, somewhat exserted, 6–7(–8) mm, ca. 1.5 mm wide at base, ca. 3.5 mm wide at throat, pilose annulate at middle; upper lip oblong lanceolate, 5–6(–7) × ca. 2 mm; lower lip spreading, 8–9 × 4 mm; middle lobe ca. 7.5 × 4–6 mm, base attenuate, gradually wider toward apex, strongly 2-lobulate, Y-shaped. Filaments ca. 2 mm; anthers ca. 2.5 mm, connectives ca. 1.6 cm, wider, upper arms ca. 1.1 cm, lower arms abortive. Nutlets dark brown, oblong, ca. 2 mm. Fl. May-Jun.

• Roadsides; 1000–1300 m. Anhui (Yuexi Xian).

59. *Salvia plectranthoides* Griffith, Not. Pl. Asiat. 4: 199. 1854.

长冠鼠尾草 chang guan shu wei cao

Salvia japonica Thunberg var. *gracillima* Diels; *S. japonica* var. *kaiscianensis* Pampanini; *S. japonica* var.

parvifoliola Hemsley; *S. pinnata* Pavolini; *S. tuberifera* H. Léveillé.

Plants annual or biennial. Stems 1 to few, erect or ascending, spreading pilose. Leaves ternate to 5-7-foliolate or 2-pinnate; petiole slightly shorter to longer than blade; leaflets ovate to lanceolate, 0.5-5 × to 5 cm, abaxially purplish, glandular, base broadly cuneate to rounded, margin crenate or crenate-dentate, apex acuminate to rounded. Inflorescences densely glandular pilose; verticillasters (2-)5-7-flowered, widely spaced, in elongated racemes or panicles; bracts lanceolate, to 2 mm. Pedicel 1-2 mm. Calyx campanulate-tubular, 5-8 mm in flower, 2-lipped to ca. 1/4 its length, yellowish glandular, veins glandular pubescent; upper lip semicircular, ca. 1.5 × 2.5 mm, margin entire; lower lip ca. 1.5 mm, to 3 mm wide, deeply 2-toothed; fruiting calyx 7-11 mm, glabrescent. Corolla red to purplish or purple-blue, rarely white, 1.1-2 cm, finely pilose; tube tubular, 2-3 × as long as calyx, slightly dilated at apex; upper lip straight, ca. 3 × 1.8 mm; lower lip dilated, somewhat longer than upper lip, middle lobe obcordate, lateral lobes subcircular. Filaments 2-3 mm; connectives suberect, 3-4 mm, upper arms longer than lower. Nutlets brownish, blackish brown on midvein, oblong, ca. 2.5 mm, adaxially ribbed, rounded. Fl. May-Aug.

Hillsides, streamsides in valleys, sparse forests; 800-2500 m. Guangxi, Guizhou, Hubei, Shaanxi, Sichuan, Yunnan [Bhutan, India (Sikkim)].

Used medicinally.

60. *Salvia brevicconnectivata* Sun, Fl. Yunnan. 1: 686. 1977.

短隔鼠尾草 duan ge shu wei cao

Herbs annual or perennial. Stems erect, ca. 35 cm, retrorse fine pilose. Basal leaves simple; petiole 7-9 cm; leaf blade ovate, 5-6 × 4-5 cm, glabrous, abaxially sparsely fine pilose on veins, base cordate, margin coarsely crenate, apex obtuse to rounded; stem leaves odd-pinnate, 10-15 × 5.5-7 cm; petiole 4-7 cm; leaflets 5-7, ovate to circular-ovate, 2-4 × 1-3 cm, base rounded or shallowly cordate, margin irregularly obtusely serrate, apex obtuse; terminal leaflet larger. Inflorescences densely pilose; verticillasters 2-6-flowered, widely spaced, in terminal racemes 8-15 cm; bracts lanceolate, ca. 1.5 mm. Pedicel ca. 3 mm. Calyx tubular, ca. 7 mm, pilose, glabrous near base inside, 2-lipped to ca. 1/4 its length; upper lip triangular, ca. 2 × 3 mm, margin entire, apex acute; lower lip slightly longer than upper, 2-cleft, teeth triangular. Corolla reddish, ca. 1.1 cm, pubescent, glabrous inside; tube to 8 mm, straight, ca. 1.5 mm wide at throat; upper lip oblong, ca. 3 × 2 mm, apex emarginate; lower lip ca. 3 × 4 mm, middle lobe obcordate, ca. 2 × 2 mm. Filaments ca. 1.3 mm; connectives ca. 0.3 mm, arms subequal. Nutlets green-yellow, narrowly ellipsoid, ca. 3 mm. Fl. and fr. Jan-Feb.

• Roadsides; 1800 m. Yunnan (Lunan Xian).

Distinguished in the original diagnosis from the previous species by the smaller corollas scarcely 2 × as long as calyx.

61. *Salvia nanchuanensis* Sun, Fl. Reipubl. Popularis Sin. 66: 582. 1977.

南川鼠尾草 nan chuan shu wei cao

Herbs annual or biennial. Stems 1 to few, erect, 20-65 cm, unbranched, densely spreading white lanate. Stem leaves,

1-4-pinnate; petiole 1.5-5.5 cm, petiolules 2-7 mm; leaflets ovate to lanceolate, 2-6.5 × 0.7-2.3 cm, adaxially glabrous, abaxially green-purple, villous on veins, margin crenate or serrate; terminal leaflet linear to ovate. Inflorescences glandular pilose; verticillasters 2-6-flowered, in terminal and axillary racemes 6-15 cm or panicles to 25 cm; bracts lanceolate, 1-3 mm, apex acuminate, ciliate. Pedicel ca. 3 mm. Calyx dark purple, tubular, 5-7 mm, glandular white pilose along veins, white hirsute on throat; upper lip triangular, ca. 1 × 4.5 mm; lower lip longer than adaxial, ca. 2 × 3 mm, teeth narrowly triangular; fruiting calyx 6-8 mm. Corolla purple-red, 0.9-3 cm, long tubular, pilose; tube to 2.5 cm, straight, ca. 2 mm wide at base, slightly dilated at throat; upper lip oblong, ca. 5 × 3 mm; lower lip ca. 5 × 7 mm, middle lobe broadly obcordate, lateral lobes semicircular. Filaments ca. 2 mm; connectives ca. 3.5 mm, upper arms slightly longer than abaxial. Nutlets brown, ellipsoid, ca. 2 mm. Fl. Jul-Aug.

• Riverbanks, rocky slopes, open areas; 1700-1800 m. Hubei, Sichuan.

Close to *Salvia plectranthoides*; separated from it in the original diagnosis by the hirsute annulus of the calyx tube and the spreading white lanate stems.

- 1a. Leaves 3- or 4-pinnate, terminal leaflets or lobules linear 61b. var. *pteridifolia*
1b. Leaves 1- (or 2)-pinnate, terminal leaflets ovate to lanceolate 61a. var. *nanchuanensis*

61a. *Salvia nanchuanensis* var. *nanchuanensis*

南川鼠尾草 nan chuan shu wei cao

S. nanchuanensis f. *intermedia* Sun.

Leaves 1- (or 2)-pinnately compound, terminal leaflets ovate to lanceolate.

• Rocky riverbanks, open areas; 1700-1800 m. Hubei, Sichuan.

61b. *Salvia nanchuanensis* var. *pteridifolia* Sun, Fl. Reipubl. Popularis Sin. 66: 583. 1977.

蕨叶变种 jue ye bian zhong

Leaves 3- or 4-pinnately compound, terminal leaflets or lobules linear.

• Wet rocky slopes. Sichuan.

62. *Salvia grandifolia* W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 123. 1916.

大叶鼠尾草 da ye shu wei cao

Plants perennial. Stems erect, ca. 1.5 m, robust, densely glandular hispid, much branched. Petiole 7 cm to obsolete, densely rusty tomentose-villous; leaf blade obovate, to 35 × 25 cm, papery, sparsely villous, base rounded to broadly cuneate, margin remotely deep undulate-lobulate; lobes rounded, ca. 4 mm wide, apex rounded. Inflorescences densely glandular pilose; verticillasters 2-flowered, widely spaced, forming much-branched terminal panicles; bracts ovate, acuminate, base rounded, to ca. 5 mm. Pedicel 1-5 mm. Calyx campanulate, 1.3-1.7 cm, glandular pubescent, sparsely red-brown glandular, tube 8-10 mm; upper lip shallowly 3-toothed, middle tooth smaller than lateral; lower lip slightly longer than upper, deeply 2-toothed, teeth triangular. Corolla purple-red except yellowish at base, ca. 2.4(-3) cm; tube straight, nearly exerted, gradually dilated

upward, apex glandular pilose, without hairy annulus inside; upper lip oblong, ca. 5×4 mm, slightly falcate, densely glandular pilose, lower lip as long as upper, to 1 cm wide; middle lobe obovate, ca. 4×5 mm; lateral lobes ovate, ca. 3 mm wide. Filaments ca. 4 mm; connectives nearly straight, ca. 1 cm, lower arms shorter than upper. Nutlets brown, ovoid, ca. 4 mm. Fl. and fr. Oct.

- Gorges; 2000–3000 m. Sichuan, Yunnan.

63. *Salvia deserta* Schangin, Bot. Gart. Dorpat., Suppl. 2, 6. 1824.

新疆鼠尾草 xin jiang shu wei cao

Plants perennial. Stems erect, to 70 cm, pilose, puberulent. Petiole 0–4 cm; leaf blade ovate to lanceolate-ovate, $4-9 \times 1.5-5$ cm, adaxially bullate, scabrous, abaxially pubescent, base cordate, margin irregularly crenate-serrate, apex acute to acuminate. Inflorescences densely puberulent; verticillasters 4–6-flowered, in elongated terminal racemes or panicles; bracts broadly ovate, purple-red, 4–6 mm, base rounded, margin entire, apex caudate-acuminate to acuminate. Pedicel ca. 1.5 mm. Calyx ovoid-campanulate, 5–6 mm, sparsely yellow-brown glandular, finely pilose on veins, 2-lipped to ca. 1/3 its length; upper lip semicircular, ca. 1.5×4 mm, apex 3-denticulate; middle tooth smaller, slightly reflexed; lower lip longer than upper, ca. 3×4 mm, deeply 2-toothed, teeth narrow triangular. Corolla blue-purple to purple, 9–10 mm, finely pilose, yellow-brown glandular; tube ca. 8 mm, ca. 2 mm wide at base, ca. 3 mm wide at throat, straight; upper lip elliptic, ca. 5×3.5 mm; lower lip subcircular, ca. 5×6.5 mm, margin undulate; lateral lobes elliptic, ca. 2 mm wide. Filaments ca. 2 mm; connectives ca. 6.5 mm, upper arms ca. 4.5 mm, lower arms ca. 2 mm. Nutlets black, obovoid, ca. 1.5 mm. Fl. and fr. Jun-Oct.

Waste places, sandy grasslands, streamsides in forests; 300–1800 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia].

A very close relative of the Eurasian *Salvia nemerosa* Linnaeus; the purple-red bracts are distinctive.

64. *Salvia plebeia* R. Brown, Prodr. 501. 1810.

荔枝草 li zhi cao

Lumnitzera fastigiata Roth Sprengel; *Ocimum fastigiatum* Roth; *O. virgatum* Thunberg; *Salvia brachiata* Roxburgh; *S. minutiflora* Bunge; *S. plebeia* var. *latifolia* E. Peter.

Herbs annual or biennial. Stems erect, 15–90 cm, robust, much branched, retrorse gray pilose. Petiole 4–15 mm; leaf blade elliptic-ovate to elliptic-lanceolate, $2-6 \times 0.8-2.5$ cm, adaxially sparsely minutely hispid, abaxially finely pilose, sparsely yellow-brown glandular, base rounded to cuneate, margin crenate, dentate, or serrate, apex obtuse to acute. Inflorescences densely pilose; verticillasters 6-flowered, numerous, in racemes or panicles 10–25 cm; bracts lanceolate. Pedicel ca. 1 mm. Calyx campanulate, ca. 2.7 mm, pilose, sparsely yellow-brown glandular, 2-lipped to 1/3 its length; upper lip 3-denticulate; lower lip deeply 2-toothed, teeth triangular. Corolla reddish, purplish, purple, blue-purple, to blue, rarely white, ca. 4.5 mm; tube glabrous, hairy annulate inside; upper lip oblong, ca. 1.8×1 mm, densely puberulent; lower lip ca. 1.7×1 mm, middle lobe broadly obovate. Stamens slightly exerted; filaments ca. 1.5 mm;

connectives ca. 1.5 mm, arcuate, arms subequal. Nutlets obovoid, ca. 0.4 mm in diam. Fl. Apr-May, fr. Jun-Jul.

Hillsides, streamsides, wet fields; 0–2800 m. In every province except Gansu, Qinghai, Xinjiang, Xizang [Afghanistan, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Russia, Thailand, Vietnam; Australia].

Used as a folk medicine. Easily recognized by the very small flowers.

65. *Salvia splendens* Ker Gawler, Bot. Reg. 8: t. 687. 1822.

一串红 yi chuan hong

Herbs suffruticose, to 90 cm tall. Petiole 3–4.5 cm, glabrous; leaf blade ovate to triangular-ovate, $2.5-7 \times 2-4.5$ cm, glabrous, abaxially glandular, base truncate or \pm rounded, margin serrate, apex acuminate. Verticillasters 2–6-flowered, in racemes to 20 cm; bracts ovate, red, enveloping flowers in bud, apex caudate-acuminate. Pedicel 4–7 mm, red glandular villous. Calyx red, campanulate, ca. 1.6 cm in flower, dilated to 2 cm after anthesis, red glandular, veins villous, 2-lipped to ca. 1/3 its length; upper lip triangular-ovate, $5-6 \times 10$ mm, apex mucronate; lower lip slightly longer than upper, deeply 2-toothed, teeth triangular. Corolla scarlet, 4–4.2 cm, pubescent; tube slightly dilated at throat; upper lip straight, somewhat concave, oblong, $8-9 \times$ ca. 4 mm; lower lip shorter than upper. Filaments ca. 5 mm; connectives ca. 1.3 cm. Nutlets dark brown, ellipsoid, ca. 3.5 mm, apex irregularly pleated, margin (or midvein) narrowly winged. Fl. Mar-Oct.

Cultivated in China [South America].

The corolla is purple or even white in different varieties.

66. *Salvia coccinea* Buc'hoz ex Etlinger, De Salvia 23. 1777.

朱唇 zhu chun

Herbs annual or biennial. Stems erect, to 70 cm, spreading hirsute, retrorse gray pilose. Petiole 0.5–2 cm; leaf blade ovate to triangular-ovate, $2-5 \times 1.5-4$ cm, abaxially gray minutely tomentose, base cordate to subtruncate, margin serrate or obtusely serrate, apex acute. Inflorescences densely, retrorse fine white pilose; verticillasters 4- to many flowered, widely spaced, in terminal racemes; bracts ovate, longer than pedicels, margin ciliate. Pedicel 2–3 mm. Calyx tubular-campanulate, 7–9 mm, finely pilose, puberulent, intermixed with yellowish glands; upper lip ovate, ca. 2.5×3 mm, ciliolate, apex mucronate; lower lip nearly as long as upper, deeply 2-toothed. Corolla scarlet or deep red, 2–2.3 cm, pubescent; tube ca. 1.6 cm; upper lip shorter than lower; lower lip ca. 7×8.5 mm. Stamens exerted; filaments ca. 4 mm; connectives ca. 1.5 mm, slender. Nutlets yellow-brown with blackish spots, obovoid, 1.5–2.5 mm. Fl. Apr-Jul.

Cultivated in China and naturalized in Yunnan [South America].

Used as an ornamental and medicinally.

67. *Salvia liguliloba* Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 10: 29. 1935.

舌瓣鼠尾草 she ban shu wei cao

Herbs annual. Stems purple-green, erect, 30–40(–70) cm, striate, finely pilose on angles. Petiole 2–3 cm; basal leaf blades oblong, $2-4.5 \times 1.2-3$ cm, abaxially purple, glabrous, veins pubescent, base cordate, margin crenulate-serrulate, apex obtuse; stem leaves ca. 3-paired, blade lanceolate, $3-7$ (–11) $\times 1-2.2$ (–4.2) cm. Inflorescences glandular villous;

verticillasters 2–12-flowered, widely spaced, in secund, terminal racemes; bracts linear-lanceolate, ca. 5 × 0.5 mm. Pedicel ca. 2.5 mm. Calyx campanulate, ca. 7 mm, villous; upper lip triangular, ca. 2 × 3 mm; lower lip nearly as long as upper, 2-cleft, teeth triangular. Corolla reddish, pilose especially on lips outside; tube conspicuously pilose annulate near base inside, ca. 1.8 cm, gradually dilated upward, to 6 mm wide at throat; upper lip straight, oblong, ca. 4 × 3 mm; lower lip ca. 4.5 × 8 mm, middle lobe ligulate, narrowly elliptic, margin entire, ca. 2 × 1.5 mm; lateral lobes larger than middle, triangular, ca. 2 × 4 mm. Filaments ca. 2 mm; connectives ca. 4.5 mm, upper arms ca. 2.5 mm. Nutlets brown, ellipsoid, ca. 2 × 0.8 mm. Fl. Jun.

- Hillside forests; 800 m. Anhui, Zhejiang.

68. *Salvia chienii* E. Peter, Acta Horti Gothob. 10: 62. 1935.

黄山鼠尾草 huang shan shu wei cao

Plants rhizomatous, perennial. Stems erect, 20–45 cm, glabrous or densely retrorse pilose. Leaves simple and compound; petiole 1.5–6 cm, petiolules 1–3 mm; leaflets 3, terminal largest, ovate to ovate-lanceolate, 4–14 × 1.2–4 cm, margin crenate or obtusely serrate, apex acute to acuminate; lateral leaflets 1–4 × 0.8–2.5 cm; simple leaves subsessile, on stem, ovate-lanceolate, 1.5–5.5 × 0.5–2.5 cm, similar to leaflets. Verticillasters 3–7-flowered, widely spaced, in terminal or axillary secund racemes or panicles; bracts lanceolate, ca. 5 mm. Calyx tubular, ca. 6 mm, purple-red, finely glandular pilose; tube ca. 4.5 mm, apex purple-red inside; upper lip broadly triangular, margin entire, 3-veined; teeth triangular, apex acute. Corolla 1–1.3 cm, purple, pubescent; tube obliquely hairy annulate near base, bearded in front at throat inside, ca. 9 mm, straight, gradually dilated to 3 mm wide at throat; upper lip oblong, ca. 2.5 × 2 mm; lower lip longer than upper, ca. 3 × 4 mm; middle lobe semicircular to oblong, apex emarginate; lateral lobes oblong. Filaments ca. 1 mm; connectives ca. 2.5 mm, upper arms ca. 2 mm. Nutlets yellow-brown, ca. 2 × 1 mm. Fl. Jul.

- Hillsides, streamsides; 700 m. Anhui, Jiangxi.

- 1a. Stems, blades, and petioles fine pilose; corolla ca. 1 cm, middle lobe of lower lip semicircular to oblong 68a. var. *chienii*
1b. Stems, blades, and petioles glabrous; corolla ca. 1.3 cm, middle lobe of lower lip oblong 68b. var. *wuyuania*

68a. *Salvia chienii* var. *chienii*

黄山鼠尾草 huang shan shu wei cao

Salvia anhweiensis Migo.

Stems, blades, and petioles finely pilose. Corolla ca. 1 cm, middle lobe of lower lip semicircular to oblong.

- Hillsides. Anhui.

68b. *Salvia chienii* var. *wuyuania* Sun, Fl. Reipubl. Popularis Sin. 66: 583. 1977.

婺源变种 wu yuan bian zhong

Stems, blades, and petioles glabrous. Corolla ca. 1.3 cm, middle lobe of lower lip oblong.

- Streamsides; 700 m. Jiangxi.

69. *Salvia baimaensis* S. W. Su & Z. A. Shen, Acta Bot. Yunnan. 6: 57. 1984.

白马鼠尾草 bai ma shu wei cao

Plants perennial. Stems erect, few, 40–60 cm, densely retrorse pubescent and pilose. Leaves mostly simple, rarely lower stem leaves ternate; petiole of basal leaves 2–8 cm, petioles of lower stem leaves (0.5–)1–4.5 cm, sessile in upper ones; leaf blades of basal leaves ovate to oblong-ovate, 3–9.5 × 1.5–7 cm, abaxially glandular pubescent, margin irregularly crenulate; stem leaves (1-) or 2- or 3-paired, blade obovate to elliptic-obovate, (2.5–)4–13 × 2–8 cm. Verticillasters 6-flowered, widely spaced, in racemes or panicles to 30 cm; rachis densely retrorse white pubescent; bracts lanceolate, 3–10(–20) × 1–1.5(–2) mm. Pedicel 2–3 mm, densely pubescent. Calyx green, tubular, 6–7 mm, sparsely pubescent on veins, yellowish glandular; upper lip semicircular-triangular, 0.5–1 mm, 3-denticulate; lower lip 1.5–2 mm, teeth triangular. Corolla white, reddish adaxially on middle lobe of lower lip, ca. 1.1 cm, pubescent or glandular pubescent; tube obliquely pilose annulate inside, ca. 8 mm, straight, 1.5–2 mm wide at base; upper lip ca. 2 mm; middle lobe of lower lip ca. 2 × 3.5–4 mm, obcordate; lateral lobes subcircular, ca. 1 mm. Stamens somewhat exerted; filaments ca. 0.7 mm; connectives slightly curved, ca. 3.5 mm, upper arms ca. 3 mm, lower arms very short. Nutlets unknown. Fl. May-Jun.

- Hillsides; 600–1400 m. Anhui (Jinzhai Xian).

70. *Salvia substolonifera* E. Peter, Acta Horti Gothob. 9: 138. 1934.

佛光草 fo guang cao

Plants annual. Stems ascending or trailing at base, 10–40 cm, pubescent or puberulent. Basal leaves mostly simple, stem leaves 3-lobed or ternate; petiole 0.6–6 cm, petiolules 1–4 mm; leaf or leaflet blades ovate, 1–3 × 0.8–2 cm, subglabrous or minutely hirsute on veins, margin crenate; terminal leaflet largest. Inflorescences densely hirtellous, glandular pilose; verticillasters 2–8-flowered, lower widely spaced, upper crowded, in axillary or terminal racemes or panicles 7–15 cm; bracts oblong ovate, 3–5 mm. Pedicel ca. 2 mm. Calyx campanulate, 3–4 mm in flower, to 7 mm in fruit, puberulent, glandular, subglabrous inside; upper lip trapeziform, somewhat longer than abaxial, teeth ovate-triangular. Corolla reddish or purplish, 5–7 mm, sparsely puberulent; tube with or without hairy annulus inside, slightly exerted, 3–4 mm, ca. 1 mm wide at base, dilated to ca. 2 mm wide at throat; upper lip suboblong or obovate, straight. Filaments ca. 1 mm; connectives less than 1 mm, arcuate; arms equal. Nutlets brownish, ovoid, 1.5 × 0.7 mm, apex rounded, adaxially ribbed. Fl. Mar-May.

- Streamsides, rocky crevices, forests; 0–900 m. Fujian, Gui-zhou, Hunan, Sichuan, Zhejiang.

Used medicinally.

71. *Salvia scapiformis* Hance, J. Bot. 23: 368. 1885.

地埂鼠尾草 di geng shu wei cao

Plants herbaceous. Stems slender, 20–26 cm, sparsely appressed puberulent or subglabrous. Leaves basal or subbasal, rarely on stem, mostly simple, sometimes 2- or 3-foliate; petiole 2.5–9 cm; leaf blade cordate-ovate, 2–

4.3 × 1.3–3.6 cm, abaxially violet, glabrous, pubescent on veins, base cordate, margin undulate-crenate; terminal leaflets larger than lateral. Inflorescences puberulent; verticillasters 6–10-flowered, widely spaced, in terminal racemes or panicles 10–20 cm; bracts ovate-lanceolate, 2–5 mm. Pedicel ca. 1.5 mm. Calyx green, tubular, ca. 4.5 mm, abaxially tinged red when dry, subglabrous, sparsely yellowish glandular; upper lip semicircular-triangular, margin entire, apex mucronate; lower lip shallowly 2-toothed, teeth triangular. Corolla purple or white, ca. 7 mm, pubescent; tube finely pilose annulate inside, slightly exserted, ca. 0.8 mm wide, slightly dilated at throat; upper lip straight, lower lip longer. Stamens exserted; filaments ca. 1 mm; connectives 2–4 mm, upper arms ca. 1.5 mm, lower arms ca. 0.9 mm, without apical anther cells, separate. Nutlets brown, narrowly ovoid, ca. 1.3 mm, apex acute. Fl. Apr–May.

Hilltops, valleys, streamsides, waste areas, forests; 100–1200 m. Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Taiwan, Zhejiang [Philippines].

- 1a. Calyx 6–7 mm, campanulate, membranous, yellowish when dry; verticillasters crowded; leaves on stem 71b. var. *carphocalyx*
1b. Calyx ca. 4.5 mm, tubular, papery, green, abaxially tinged red when dry; verticillasters widely spaced; at least some leaves basal or subbasal.
2a. Petioles sparsely spreading hirsute 71c. var. *hirsuta*
2b. Petioles glabrous or sparsely puberulent 71a. var. *scapiformis*

71a. *Salvia scapiformis* var. *scapiformis*

地埂鼠尾草 di geng shu wei cao

Leaves mostly basal or subbasal, rarely on stem or basal and on stem; petiole glabrous or sparsely puberulent. Verticillasters remote. Calyx green, ca. 4.5 mm, tubular, papery, dorsally tinged red when dry.

Hilltops, valleys, forests. Fujian, Guangdong, Taiwan [Philippines].

71b. *Salvia scapiformis* var. *carphocalyx* E. Peter, Acta Horti Gothob. 10: 63. 1935.

钟萼变种 zhong e bian zhong

Leaves tufted toward stem base or inserted on procumbent stem. Verticillasters congested. Calyx 6–7 mm, campanulate, membranous, yellowish when dry.

• Streamsides in forests; 600–700 m. Guangdong, Hunan, Jiangxi.

71c. *Salvia scapiformis* var. *hirsuta* E. Peter, Acta Horti Gothob. 10: 63. 1935.

硬毛变种 ying mao bian zhong

Basal leaves numerous, stem leaves 2–4, simple or 3–5-foliolate; petiole sparsely patent hirsute; leaf blade cordate or ovate-lanceolate, apex rounded to subacute, subglabrous.

• Hills, waste areas near villages, sparse forests; 100–1200 m. Fujian, Guangdong, Guangxi, Guizhou, Zhejiang.

72. *Salvia japonica* Thunberg, Syst. Veg., ed. 14, 72. 1784.

鼠尾草 shu wei cao

Plants annual. Stems erect, 40–60 cm, sparsely villous along angles or subglabrous. Leaves 1–3-pinnate; petiole 7–9 cm; leaf blade 6–13 × 5–9 cm; upper stem leaves 1-pinnate, short petiolate; terminal leaflet lanceolate or rhombic, to 10 × 3.5 cm, pilose or glabrous, base long cuneate, margin obtusely serrate; lateral leaflets sessile, ovate-lanceolate, 1.5–5 × 0.8–2.5 cm, base obliquely rounded. Verticillasters 2–6-flowered, in terminal racemes or panicles; rachis densely glandular pilose or pilose; bracts and bracteoles lanceolate, 2–5 × 0.5–1 mm, glabrous, margin entire. Pedicel 1–1.5 mm, pubescent. Calyx tubular, 4–6 mm, sparsely glandular pilose, white hirsute annulate on throat inside, 2-lipped to ca. 1/3 its length; upper lip triangular or nearly semicircular, ca. 2 × 3 mm; teeth narrowly triangular, apex long acuminate. Corolla reddish, purplish, bluish, to white, ca. 1.2 cm, densely villous; tube obliquely pilose annulate inside, ca. 9 mm, exserted, ca. 2 mm wide at base, to 3.5 mm wide at throat; upper lip elliptic to ovate, ca. 2.5 × 2 mm; lower lip ca. 3 × 4 mm, margin crenulate. Stamens exserted; filaments ca. 1 mm; connectives ca. 6 mm, straight or slightly curved. Nutlets brown, ellipsoid, ca. 1.7 × 0.5 mm. Fl. Jun–Sep.

• Hillsides, grasslands, wet areas, riverbanks, thickets, forests; 200–1200 m. Anhui, Fujian, Guangdong, Guangxi, Hubei, Jiangsu, Jiangxi, Sichuan, Taiwan, Zhejiang.

- 1a. Lower stem leaves 2- or 3-pinnately compound, leaflets numerous, variable; middle lobe of lower corolla lip 2-lobulate, lobules divaricate, conspicuously dentate 72b. var. *multifoliolata*
1b. Lower stem leaves 1- or 2-pinnately compound, leaflets few; middle lobe of lower corolla lip obcordate, apex emarginate, margin crenulate 72a. var. *japonica*

72a. *Salvia japonica* var. *japonica*

鼠尾草 shu wei cao

Salvia chinensis Benth. f. *alatopinnata* Matsumura & Kudô; *S. fortunei* Benth.; *S. japonica* f. *alatopinnata* (Matsumura & Kudô) Kudô; *S. japonica* var. *fortunei* (Benth.) Kudô; *S. japonica* var. *lanuginosa* (Franchet) E. Peter.; *S. japonica* var. *ternata* Franchet.

Lower stem leaves 1- or 2-pinnately compound, leaflets few. Middle lobe of lower corolla lip obcordate, margin crenulate, apex emarginate.

• Hillsides, shady grasslands, wet areas, forests; 200–1100 m. Anhui, Fujian, Guangdong, Guangxi, Hubei, Jiangsu, Jiangxi, Taiwan, Zhejiang.

72b. *Salvia japonica* var. *multifoliolata* E. Peter, Acta Horti Gothob. 10: 68. 1935.

多小叶变种 duo xiao ye bian zhong

Salvia szechuanica Yamazaki.

Lower stem leaves 2- or 3-pinnately compound, leaflets numerous, variable. Middle lobe of lower corolla lip 2-lobulate, lobules divaricate, conspicuously dentate.

• Grassy hillsides, riverbanks, thickets; 700–1200 m. Guangdong, Sichuan.

73. *Salvia chinensis* Benth., Labiat. Gen. Spec. 725. 1835.

华鼠尾草 hua shu wei cao

Salvia japonica Thunberg var. *chinensis* (Benth) E. Peter; *S. japonica* var. *integrifolia* Franchet & Savatier; *S. tashiroi* Hayata.

Plants annual. Stems erect or prostrate at base, 20–60 cm, pubescent or villous. Leaves simple or 3-foliolate toward stem base; petiole 0.1–7 cm; leaf blade of simple leaves ovate to ovate-elliptic, 1.3–7 × 0.8–4.5 cm, subglabrous except for pubescent veins, base cordate to rounded, margin crenate or obtusely serrate; terminal leaflet 2.5–7.5 cm, petiolule 0.5–1.7 cm. Inflorescences pubescent; verticillasters 6-flowered, lower widely spaced, upper crowded, in pubescent terminal racemes or panicles 5–24 cm; bracts lanceolate, 2–8 × 0.8–2.3 mm. Pedicel 1.5–2 mm. Calyx campanulate, 4.5–6 mm, purple, veins villous, throat densely hirsute annulate; tube 4–4.5 mm; upper lip ± semicircular, ca. 1.5 × 3 mm, apex 3-mucronate; lower lip longer than upper, ca. 2 × 3 mm; teeth narrowly triangular, apex acuminate. Corolla blue-purple or purple, ca. 1 cm, exserted, pubescent; tube obliquely pilose annulate inside, ca. 6.5 mm, to 3 mm wide at throat; upper lip oblong, ca. 3.5 × 3.3 mm, spreading; lower lip ca. 5 × 7 mm, middle lobe obcordate, curved downward, ca. 4 × 7 mm, margin crenulate, apex emarginate; lateral lobes semicircular, ca. 1.3 mm wide. Stamens nearly exserted; filaments ca. 1.8 mm; connectives ca. 4.5 mm, upper arms ca. 3.5 mm. Nutlets brown, ellipsoid-ovoid, ca. 1.5 × 0.8 mm. Fl. Aug–Oct.

• Forests, tufts of grass on hillsides or plains; 100–500 m. Anhui, Fujian, Guangdong, Guangxi, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Zhejiang.

Used medicinally.

74. *Salvia chunganensis* C. Y. Wu & Y. C. Huang, Fl. Reipubl. Popularis Sin. 66: 584. 1977.

崇安鼠尾草 chong an shu wei cao

Herbs annual. Stems erect, 32–44 cm, purple, glabrous, subterete toward base. Stem leaves 3–5-foliolate; petiole 2–9(–10) cm, adaxially spreading villous, abaxially glabrous, petiolule 2–15 mm; leaflets ovate, 1.2–4 × 0.7–3 cm, lateral leaflets ± oblique, adaxially minutely hispid or subglabrous, abaxially subglabrous or pilose along veins, glandular, margin serrate. Verticillasters 2–6-flowered, 1–2.5 cm apart, in racemes or panicles to 19 cm; bracts lanceolate, lower much longer than flowers, gradually shorter upward to almost as long as pedicels, abaxially conspicuously glandular. Pedicel 2–3 mm, glandular pilose. Calyx campanulate, 5–6 mm, glandular pilose, with 2 rows of hairs on middle of upper lip inside, tube ca. 4.5 mm; upper lip triangular, ca. 1.5 × 2.5 mm; lower lip slightly longer than upper, ca. 1.8 × 2.5 mm, shallowly 2-toothed; teeth triangular, apex spinescent; fruiting calyx slightly dilated. Corolla purplish blue or reddish white, 9–10 mm, glandular pilose; tube imperfectly pilose annulate inside, tubular, ca. 1 mm wide, gradually dilated to 2 mm wide at throat; upper lip nearly straight, oblong, ca. 3 × 2.2 mm; lower lip slightly longer than upper lip, lobes circular, subequal. Stamens exserted; filaments ca. 1.5 mm; connectives ca. 4 mm, upper arms ca. 3 mm. Nutlets brown, ellipsoid, ca. 1.8 mm, adaxially ribbed. Fl. and fr. Aug.

• Tufts of grass. Fujian (Chong'an Xian).

Related in the original description to *Salvia scapiformis*.

75. *Salvia adoxoides* C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 584. 1977.

五福花鼠尾草 wu fu hua shu wei cao

Plants perennial, rhizomatous. Stems ca. 11 cm, red, glandular pilose, sparsely so to glabrescent basally. Leaves mostly basal, 3–7-foliolate, finely minutely hirsute; stem leaves 1-paired, much reduced; petiole slender, 1–2.5 cm, petiolule 1–3 mm; leaflets subcircular to ovate, less than 9 × 8 mm, abaxially sparsely yellowish glandular, subglabrous or finely minutely hirsute, veins conspicuously elevated abaxially. Inflorescences densely glandular pilose; verticillasters 2-flowered, widely spaced; racemes to 9 cm, pedunculate; bracts narrowly ovate to lanceolate, densely glandular pilose. Pedicel 1–2 mm. Calyx campanulate, ca. 6.5 mm, veins glandular pilose; tube ca. 4 mm, throat hirsute annulate; upper lip nearly semicircular, ca. 1.5 × 4 mm, apex 3-mucronate; lower lip ca. 2.5 × 3 mm, teeth 2, lanceolate, apex acuminate. Corolla white, ca. 9 mm, subglabrous; tube imperfectly pilose annulate inside, nearly included, ca. 6 mm, slightly constricted at hairy annulus; upper lip straight, subcircular, ca. 3 × 3 mm; lower lip almost as long as upper, to 4 mm wide; middle lobe obcordate, 2-lobulate. Upper staminal arms ca. 3 × as long as lower; lower arms sterile, separate; staminodes short clavate. Nutlets obovoid, ca. 2 × 1 mm, apex rounded, adaxially ribbed, blackish brown. Fl. Mar, fr. Apr.

• Hillside fields; 200 m. Guangxi (Tian'e Xian).

Apparently a very close ally of *Salvia japonica* but very dwarf.

76. *Salvia filicifolia* Merrill, Lingnan Sci. J. 13: 47. 1934.

蕨叶鼠尾草 jue ye shu wei cao

Salvia japonica Thunberg var. *filicifolia* (Merrill) Metcalf & E. Peter.

Plants perennial. Stems erect or slightly ascending. Leaves 3- or 4-pinnate; petiole 7–10 cm; leaf blade broadly ovate, ca. 7 × 7 cm; lobes numerous, narrowly elliptic to linear-lanceolate or oblanceolate, margin entire or few lobulate, 8–15 × 2–4 mm, abaxially glabrous. Verticillasters 6–10-flowered, in pedunculate racemes or panicles 10–23 cm; rachis gray puberulent, glandular pilose; bracts linear-lanceolate, 4–7 mm. Pedicel 1.5–2 mm, puberulent. Calyx tubular, ca. 7 mm, glandular strigose along veins outside; tube ca. 4 mm, sparsely villous annulate at throat inside; upper lip triangular or semicircular, ca. 2.5 × 3.5 mm, margin entire; lower lip ca. 2.8 × 3.5 mm, shallowly 2-toothed; teeth triangular, apex spinescent. Corolla yellow, densely pilose; tube imperfectly pilose annulate inside, ca. 8 mm, ca. 1.5 mm wide at base; upper lip oblong, ca. 2.2 × 1.8 mm; lower lip ca. 2.5 × 4 mm. Stamens exserted; filaments ca. 2 mm; connectives 6–8 mm, glabrous, upper arms ca. 5 mm, lower ca. 1.8 mm. Nutlets brown, ellipsoid, ca. 1.5 mm. Fl. May–Sep.

• Rocky and sandy areas. Guangdong, Hunan.

77. *Salvia appendiculata* E. Peter, Acta Horti Gothob. 10: 65. 1935.

附片鼠尾草 fu pian shu wei cao

Plants perennial. Stems erect, 17–55 cm, pubescent or subglabrous. Leaves basal; petiole longer than blade, rarely shorter; leaf blade ovate to elliptic, 3–9.5 × 2–6 cm, abaxially purple, glandular, finely pilose on veins, margin coarsely crenate. Inflorescence densely fine pilose; verticillasters 4–6-

flowered, widely spaced, in racemes or panicles 8.5–16 cm; bracts lanceolate, purplish. Pedicel 1–2 mm. Calyx purple-red, tubular, 5–7 mm, sparsely pubescent glandular, tube 4–6 mm; upper lip broadly triangular to subtruncate, apex entire or 3-denticulate; lower lip slightly longer than upper, teeth triangular. Corolla purple or dark red, 8–10 mm, pilose; tube pilose annulate inside; upper lip oblong, ca. 2.5 × 2 mm, slightly falcate; lower lip ca. 4 × 6 mm, lateral lobes circular, ca. 1 mm wide. Filaments ca. 1 mm; connectives slightly curved, ca. 6 mm, lower arms with a membranous subulate appendage at junction. Nutlets brown, oblong, ca. 2 mm. Fl. May.

- Open streamsides, thickets, forests. Guangdong.

Characterized by the subulate appendage at the junction of connective and filament.

78. *Salvia kiangsiensis* C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 584. 1977.

关公须 *guan gong xu*

Herbs annual. Stems ca. 45(–60) cm, puberulent. Leaves mostly basal; petiole 3–10 cm; leaf blade oblong-ovate to lanceolate, 4–13.5 × (1–)2–4(–5.5) cm, abaxially purple, glabrous or veins sparsely puberulent; stem leaves 2-paired, petiole to 1 cm. Inflorescence densely puberulent; verticillasters 2–6-flowered, widely spaced, in terminal or axillary racemes or panicles 7–14 cm; bracts lanceolate, shorter to longer than calyx; bracteoles 1–2 mm. Pedicel 1–2 mm. Calyx tubular-campanulate, 8–9 mm, purple, veins sparsely pilose, tube ca. 6 mm; upper lip semicircular, ca. 2 × 3 mm, apex obtuse; lower lip slightly longer than upper, ca. 3 × 3 mm, 2-cleft; teeth triangular, apex acuminate. Corolla purple, ca. 1.2 cm, pubescent; tube pilose annulate inside, tubular, ca. 9 mm; upper lip erect, ovate, ca. 2.5 × 2 mm; lower lip ca. 3.5 × 4.5 mm, middle lobe obcordate, lateral lobes circular. Stamens exerted; filaments ca. 1 mm; connectives ca. 5 mm, upper arms ca. 4 × as long as lower. Nutlets unknown. Fl. May.

- Valleys, forests. Fujian, Hunan, Jiangxi.

Used medicinally.

Closely allied to *Salvia scapiformis*.

79. *Salvia qimenensis* S. W. Su & J. Q. He, Acta Bot. Yunnan. 6: 55. 1984.

祁门鼠尾草 *qi men shu wei cao*

Herbs perennial or biennial. Stems erect, 40–60 cm, retrorse pilose. Leaves simple; petiole of basal leaves 2–6 cm, reduced upward to subsessile, densely pubescent; leaf blade oblong to ovate-lanceolate, abaxially purple, pubescent on veins, margin irregularly crenulate; stem leaves 2- or 3-paired, blade of upper leaves ovate-lanceolate to lanceolate, (8–)10–18 × 2–3.5(–5) cm, base subtruncate to shallowly cordate, sometimes hastate, apex long acuminate. Inflorescences densely glandular pilose; verticillasters 6-flowered, widely spaced, in racemes or panicles; bracts linear-lanceolate, 0.5–1.5(–2) × 2–3 cm, margin glandular pilose. Pedicel 2–4 mm. Calyx tubular, upper lip triangular, 1–2 × ca. 3 mm, apex 3-mucronate; lower lip almost as long as upper lip, teeth triangular, apex acute. Corolla purple to white, ca. 1.5 cm, glandular pilose except at base, tube pilose annulate inside, 1.1–1.3 cm, straight, 1.5–2 mm wide at base, gradually dilated

to apex, ca. 3 mm wide at throat; upper lip ca. 2 mm; lower lip slightly longer than upper, middle lobe 1.5–2.5 mm, oblong to triangular, lateral lobes triangular-ovate. Stamens slightly exerted; filaments ca. 1 mm; connectives slightly curved, ca. 3 mm, upper arms ca. 2 mm. Style slightly exerted, retrorse pubescent. Nutlets gray-brown, ellipsoid, ca. 2 × 1 mm. Fl. May–Jun.

- Hillsides. Anhui (Qimen Xian).

80. *Salvia hayatae* Makino ex Hayata, Icon. Pl. Formos. 8: 96. 1919.

阿里山鼠尾草 *a li shan shu wei cao*

Herbs annual. Stems 20–45 cm, retrorse puberulent. Leaves mostly basal, 1- or 2-pinnate; petiole 1–2.5 cm; terminal leaflet 0.8–2.5 × 0.7–2 cm, ± membranous, adaxially finely strigose, abaxially glabrous, pubescent along veins, base obliquely cuneate to shallowly cordate, margin irregularly lobulate to coarsely crenate, apex acute to obtuse; lateral leaflets subsessile, subcircular, much smaller. Inflorescences densely glandular pilose; verticillasters 2–5-flowered, lower ones widely spaced, upper crowded, in terminal racemes or panicles ca. 14 cm; bracts lanceolate, shorter than pedicels. Pedicel 2–3 mm. Calyx tubular, ca. 5 mm, to 6–6.5 mm in fruit, puberulent on veins or subglabrous, glabrous inside, tube ca. 3.3 mm, upper lip broadly subtriangular; lower lip 2-cleft, teeth narrowly triangular, apex acuminate. Corolla ca. 6.5 mm, slightly exerted, sparsely pubescent; tube pilose annulate inside, ca. 4.5 mm, ca. 1 mm wide at base, slightly constricted at hairy annulus, gradually dilated above hairy annulus, to 1.5 mm wide at throat; upper lip straight, ca. 1 mm; lower lip elongated, ca. 2.5 × 3.5 mm, lateral lobes ovate. Stamens nearly exerted; filaments ca. 1.5 mm; connectives ca. 3 mm, lower arms ca. 1/2 as long as upper arms. Style included. Nutlets brownish, oblong, ca. 1.5 × 0.5 mm. Fl. and fr. Apr–May.

- Foothills. Taiwan.

1a. Leaves 2-pinnately compound 80a. var. *hayatae*
1b. Leaves 1-pinnately compound 80b. var. *pinnata*

80a. *Salvia hayatae* var. *hayatae*

阿里山鼠尾草 *a li shan shu wei cao*

Salvia arisanensis Hayata; *S. scapiformis* Hance var. *arisanensis* (Hayata) Kudô; *S. scapiformis* var. *pinnata* Hayata f. *gracilis* Hayata; *S. scapiformis* var. *pinnata* f. *hirsuta* Hayata.

Leaves 2-pinnately compound.

- Foothills. Taiwan.

80b. *Salvia hayatae* var. *pinnata* (Hayata) C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 192. 1977.

羽叶变种 *yu ye bian zhong*

Salvia scapiformis Hance var. *pinnata* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 312. 1906; *S. keitaoensis* Hayata; *S. scapiformis* f. *keitaoensis* (Hayata) Kudô.

Leaves 1-pinnately compound.

- Taiwan.

81. *Salvia adiantifolia* E. Peter, Acta Horti Gothob. 10: 64. 1935.

铁线鼠尾草 tie xian shu wei cao

Plants perennial. Stems 1 to few, ascending or erect, 30–60 cm, slender, finely retrorse pilose or puberulent. Leaves mostly basal, 1–3-pinnate; petioles 3.5–6.5 cm; leaflets sessile or short petiolate, variable; terminal leaflet largest, flabellate to ovate, 0.5–4 cm, adaxially sparsely strigose, abaxially sparsely fine pilose on veins, base cuneate-attenuate to rounded, margin crenate-serrate or 1- or 2-lobulate at base, apex obtuse to short acuminate; stem leaves 1-paired, petiole ca. 1 cm. Inflorescences finely pilose; verticillasters 4–10-flowered, 0.8–2 cm apart, mostly in panicles; bracts lanceolate, margin entire, subglabrous, slightly shorter than pedicels. Pedicel 1–2 mm. Calyx campanulate, 4–5.5 mm, sparsely puberulent on veins, 2-lipped to ca. 1/4 its length; upper lip semicircular, apex mucronate; lower lip strongly 2-toothed, teeth triangular, apex spinescent. Corolla sky blue to white-purple, 7–8 mm, glandular pubescent; tube obliquely pilose annulate inside, throat white pilose, included, gradually dilated to 2 mm wide at throat; upper lip ca. 2 mm, reflexed or nearly straight; lower lip somewhat shorter than upper lip. Filaments ca. 1 mm; connectives ca. 4 mm, upper arms ca. 2 × as long as abaxial, fertile. Fl. Jun.

• Foothills, forests. Fujian, Guangdong, Guangxi, Hunan, Jiangxi.

82. *Salvia fragarioides* C. Y. Wu, Fl. Yunnan. 1: 689. 1977.

草莓状鼠尾草 cao mei zhuang shu wei cao

Plants perennial. Stems ascending to suberect, 20–30 cm, densely retrorse puberulent, apex leafless or with reduced leaves. Leaves basal or subbasal, 3-foliolate; petiole 4.5–9.5 cm, densely retrorse puberulent, petiolule of terminal leaflet 5–10 mm, petiolules of lateral leaflets 2–3 mm; terminal leaflets rhombic-ovate, 3–4 × 1.5–2 cm, strigose especially on veins, base cuneate, margin coarsely and sometimes double crenate-serrate, apex obtuse to acute; lateral leaflets ovate, 1.5–2.5 × 1–1.5 cm. Inflorescences densely pubescent; racemes terminal, 10–18 cm, pedunculate; verticillasters 4–6, 2- to many flowered, widely spaced; bracts and bracteoles linear, 1.5–2 mm. Pedicel 1.5–2.5 mm. Calyx tubular, 5–8 mm, glandular pilose along veins; upper lip triangular, margin entire, apex 3-mucronate; teeth of lower lip narrowly triangular, apex acuminate. Corolla sparsely puberulent. Filaments slightly shorter than connectives, upper arms ca. 2 × as long as lower, with united anther cells. Nutlets unknown. Fl. Oct.

• Rocky riverbanks; 800 m. Yunnan.

Apparently a close ally of *Salvia japonica* only differing in the exannulate calyx and corolla.

83. *Salvia weihaiensis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 585. 1977.

威海鼠尾草 wei hai shu wei cao

Herbs. Stems erect, ca. 25 cm, densely pilose. Petiole of basal leaves 2–2.5 cm; leaf blade simple, oblong, 6.5–7 × 3.2–3.7 cm, subglabrous, sparsely pilose on veins, base subtruncate, margin irregularly undulate-crenate, apex obtuse to rounded; stem leaves subsessile, broadly ovate, ca. 3 × 2.7 cm. Inflorescences densely pilose; verticillasters 2–8-flowered, in terminal racemes or panicles; bracts broadly ovate to subcircular, ca. 5 × 4 mm, margin ciliate, apex spinescent, ca. 1.5 mm. Pedicel 1–1.5 mm. Calyx tubular-campanulate, 5.5–6 mm, pilose; upper lip semicircular, ca. 2 × 3 mm, apex ± 3-mucronate; lower lip slightly longer than upper, ca. 3 mm; teeth 2, narrowly triangular, apex spinescent. Corolla included or slightly exerted, sparsely puberulent, glandular on limb, glabrous inside; tube gradually dilated, to ca. 2 mm wide at throat; upper lip ca. 2 mm. Filaments ca. 1 mm; connectives ca. 3.2 mm, upper arms ca. 2 mm, lower arms ca. 1.2 mm. Style subequally 2-cleft. Nutlets unknown. Fl. Jun.

• Seashores. Shandong (Weihai Shi).

Related to *Salvia japonica* but with simple oblong leaves and exannulate calyx and corolla.

84. *Salvia piasezkii* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg 11: 304. 1881.

秦岭鼠尾草 qin ling shu wei cao

Herbs erect, viscid-villous. Stems ca. 18 cm, spreading villous at base, apex glandular pilose. Leaves pinnate, with petiolulate incised-serrate leaflets; basal leaves 3-foliolate, terminal leaflet ca. 1.2 × 1.1 cm, base truncate to rounded, lateral leaflets ovate, ca. 6 × 5 mm, apex obtuse; mid stem leaves 5-foliolate, terminal leaflets subrhombic, ca. 1.8 × 1.2 cm, lateral leaflets ca. 1.5 × 0.6 cm. Verticillasters 6-flowered, widely spaced, in few-branched panicles; bracts lanceolate, slightly shorter than pedicels. Pedicel ca. 1/3 as long as calyx. Calyx tubular, ca. 5 mm in flower, subcampanulate, ca. 7 mm in fruit, densely glandular hairy, finely 10-veined; upper lip broadly triangular, margin entire, apex acute; lower lip longer than upper lip, teeth narrowly triangular, apex mucronate. Corolla purple, ca. 7 mm, slightly exerted; tube included, without hairy annulus inside; upper lip entire, short falcate; lower lip pilose, middle lobe ca. 2 × as long, ca. 1.5 × as wide as lateral lobes, circular, concave. Stamens included; filaments longer than arcuate connectives, lower arms ca. 1/3 as long as upper. Style exerted. Nutlets dark green, oblong-ellipsoid, less than 2 mm, adaxially ribbed, smooth, shiny (specimens not seen).

• Gansu, Shaanxi.

57. ROSMARINUS Linnaeus, Sp. Pl. 1: 23. 1753.

迷迭香属 mi die xiang shu

Shrubs evergreen. Leaves linear, margin entire, revolute. Floral and to stem leaves similar; bracts petiolate. Flowers subsessile, few, crowded in apical racemes on short branches. Calyx ovoid-campanulate, glabrous on throat inside, 11-veined, 2-lipped, upper lip entire or 3-denticulate, lower lip 2-toothed. Corolla blue-purple, bluish, or whitish, 2-lipped; tube exerted, glabrous inside, dilated at throat; upper lip erect, emarginate or 2-lobed; lower lip large, spreading, 3-lobed; middle lobe largest, concave, declined, margin dentate; lateral lobes oblong. Stamens 2, reaching upper corolla lip; filaments coherent with connectives, with a tooth reflexed below middle; anther cells 2, parallel, only 1 fertile, linear, inserted on top of connective;

staminodes absent. Style much longer than stamens, apex unequally 2-cleft, lobes subulate, posterior lobe shorter. Disc ringlike, equally 4-lobed. Nutlets ovoid-globose, smooth, each with an elaiosome.

About three (to five) species: Africa, SW Asia, Europe; one species cultivated in China.

Many recognize this as a monotypic genus.

1. Rosmarinus officinalis Linnaeus, Sp. Pl. 1: 23. 1753.

迷迭香 mi die xiang

Plants to 2 m tall. Bark dark gray, irregularly fissured, exfoliating, young branches densely white stellate-tomentulose. Leaves tufted on branches, sessile to short petiolate; leaf blade 1–2.5 cm × 1–2 mm, leathery, adaxially somewhat shiny, subglabrous, abaxially densely white stellate-tomentose, base attenuate, margin entire, revolute,

apex obtuse. Calyx ca. 4 mm, densely white stellate tomentose and glandular outside, upper lip subcircular, teeth of lower lip ovate-triangular. Corolla blue-purple, less than 1 cm, sparsely pubescent outside, tube slightly exerted, apex of upper lip 2-lobed, lobes ovate, middle lobe of lower lip constricted at base into claw, lateral lobes oblong. Fl. Nov.

Introduced in China ca. 220 A.D. [Africa, SW Asia, Europe].

An aromatic ornamental plant.

58. PEROVSKIA Karelin, Bull. Soc. Imp. Naturalistes Moscou 14: 15. 1841.

分药花属 fen yao hua shu

Subshrubs, glabrous or stellate, sparsely golden yellow glandular. Leaves entire or pinnately lobed. Verticillasters 2–4(–6)-flowered, in panicles. Flowers sessile to short pedicellate. Calyx tubular-campanulate, 8-veined, ± dilated in fruit, densely hairy or sometimes stellate, 2-lipped, upper lip ± entire to obscurely 3-denticulate, lower lip 2-toothed. Corolla purple, rose, or yellowish, rarely white, ca. 2 × as long as calyx, funnelliform, without or with imperfect hairy annulus inside; limb 2-lipped, spreading; upper lip 4-lobed, lobes unequal, middle 2 lobes smaller; lower lip elliptic-ovate, margin entire. Stamens 4, anterior 2 fertile, exerted, inserted on corolla throat, posterior 2 sterile, rudimentary; anther cells 2, linear, parallel, connectives small. Style exerted, apex 2-cleft; lobes wide, flat. Disc ringlike or fingerlike in front. Nutlets brown, obovoid, obtuse, glabrous.

About seven species: Asia, two species in China.

1a. Leaves ovate-oblong, 2-pinnatifid 1. *P. abrotanoides*

1b. Leaves linear-lanceolate to narrowly lanceolate, 1-pinnatifid 2. *P. atriplicifolia*

1. Perovskia abrotanoides Karelin, Bull. Soc. Imp. Naturalistes Moscou 14: 15. 1841.

分药花 fen yao hua

Plants perennial. Stems ca. 1 m tall, woody at base, ca. 5 mm in diam., densely simple or branched white pubescent, sparsely golden yellow glandular. Petiole 5–8 mm; leaf blade ovate-oblong, 4–7 × 2.5 cm, 2-pinnatifid; lobes oblong to oblong-linear, 2–4 × 0.5–1.4 mm, glabrous or sometimes sparsely pubescent, densely golden yellow glandular, apex obtuse. Verticillasters in lax panicles 27–40 cm; floral leaves 8–30 × 3–8 mm; bracts lanceolate-linear, 1–1.5 × 0.5 mm, pilose, apex acute. Pedicel ca. 0.5 mm, pubescent, spreading, pendulous after anthesis. Calyx ca. 4.5 mm, purple, base densely white or purple pilose, glandular, apex sparsely hairy or subglabrous, tube 4 × 1.5–2 mm; upper lip short, ± entire to 3-denticulate, ca. 1 × 2 mm; lower lip as long, margin densely ciliate. Corolla rose, 0.9–1.1 cm, sparsely pubescent, tube 5–6.5 × 2 mm; upper lip 2.5–3 × 6.5–7 mm, lobes ovate to subcircular, 1.5–2 × 2 mm; lower lip oblong-ovate, ca. 3.5 × 2 mm, margin entire, apex obtuse. Nutlets 1.8–2 × 1 mm. Fl. Jun-Jul.

Gravelly hillsides, dry riverbeds, riverbanks; 2000 m. Xizang [Afghanistan, Tajikistan, Turkmenistan; SW Asia].

2. Perovskia atriplicifolia Benth, Prodr. 12: 261. 1848.

滨藜叶分药花 bin li ye fen yao hua

Perovskia pamirica C. Y. Yang & B. Wang.

Stems ca. 50 cm, branched from base, densely stellate, yellow glandular. Petiole 4–6 mm; leaf blade linear-lanceolate, 4–5(–6) cm × 4–9 mm, base cuneate, 1-pinnatifid; lobes oblong to ovate, 2–4 × 1–1.5 mm, sparsely stellate, densely yellow glandular, apex obtuse. Verticillasters in lax racemes or panicles 10–15 cm; floral leaves linear, 0.8–1.7 cm × 0.8–3 mm; bracts violet, ovate to elliptic, ca. 0.7 × 0.4 mm, deciduous, membranous, margin white ciliate. Pedicel 1–1.5 mm, densely pubescent, spreading to pendulous. Calyx 5–6 × 1.5–2.5 mm, purple, base densely white or purple hirsute, yellowish glandular, margin ciliate, apex sparsely pubescent to subglabrous, tube 4–5 × 1.5–2 mm; upper lip ca. 1 × 2 mm, obscurely 3-denticulate; lower lip nearly as long as upper lip. Corolla blue, ca. 1 cm, glabrous, sparsely glandular, tube 5–6 × 2 mm; upper lip 3–3.5 × 4–4.5 mm, dark purple lineate; lobes elliptic to ovate, middle lobes ca. 1.5 × 1 mm, lateral lobes ca. 1 × 1.5 mm; lower lip oblong-elliptic, ca. 3 × 1 mm, margin entire, apex obtuse. Nutlets ca. 2 × 1 mm, obtuse. Fl. Jun-Jul, fr. Jul-Aug.

• Xinjiang, Xizang.

59. MONARDA Linnaeus, Sp. Pl. 1: 22. 1753.

美国薄荷属 mei guo bo he shu

Herbs erect, annual or perennial. Leaves petiolate, dentate. Verticillasters many flowered, crowded, into a terminal or widely spaced capitula along branches; floral leaves similar, smaller, brightly colored; bracteoles minute. Calyx tubular, elongated, straight to slightly curved, 15-veined, throat villous or hirsute; teeth 5, subequal. Corolla red, purple, white, gray, or yellow, spotted, 2-lipped, tube slightly dilated at throat; upper lip narrow, erect to arcuate, apex entire to emarginate; lower lip spreading, 3-lobed, middle lobe largest, emarginate. Anterior stamens fertile, inserted on apical part of corolla tube, exserted; posterior stamens rudimentary, minute, or absent; filaments edentate; anthers linear, versatile, cells 2, divaricate, apex confluent. Style apex 2-cleft, lobes subulate, subequal. Nutlets smooth.

About 6–12 species: North America, two species cultivated as ornamentals in China.

- 1a. Calyx throat densely white bearded; upper corolla lip slightly recurved inward; stem obtusely 4-angled 1. *M. fistulosa*
 1b. Calyx throat sparsely hirsute; upper corolla lip slightly recurved outward; stem acutely 4-angled 2. *M. didyma*

1. *Monarda fistulosa* Linnaeus, Sp. Pl. 1: 22. 1753.

美国薄荷 mei guo bo he

拟美国薄荷 ni mei guo bo he

Plants annual. Stems reddish or ± purple-red spotted, branched apically, densely retrorse white pubescent, nodes glabrous or villous. Petiole 2–15 mm; leaf blade lanceolate-ovate to ovate, ca. 8 cm × 3 mm, base rounded to subtruncate, margin unequally serrate, apex acuminate. Verticillasters in terminal capitula to 5 cm in diam.; floral leaves leaflike, reduced, densely pubescent, glandular, short petiolate or subsessile, margin entire; bracteoles linear, ca. 1 cm, curved upward, pilose, glandular. Pedicel ca. 1 mm, puberulent. Calyx tubular, narrow, 7–9 mm, pubescent, brown glandular outside, white bearded at throat inside; teeth subulate, equal, ca. 1 mm, apex spinescent. Corolla purple-red, 3–4 × as long as calyx, densely pubescent, glandular; upper lip slightly recurved inward, entire; lower lip ± patent. Nutlets obovoid, truncate. Fl. Jun-Jul.

Plants annual. Stems subglabrous, villous on nodes and at apex along angles, glabrescent. Petiole to 2.5 cm, nearly lacking apically, base slightly dilated; leaf blade ovate-lanceolate, to 10 × 4.5 cm, papery, adaxially villous or glabrescent, abaxially sparsely, impressed glandular, villous on veins, base rounded, margin unequally serrate, apex acuminate. Verticillasters in terminal capitula to 6 cm in diam.; bracts short petiolate, leaflike, margin entire, red, shorter than capitula; bracteoles linear-subulate, ca. 10 × 1.5 mm, long caudate, puberulent, red. Pedicel ca. 1 mm, puberulent. Calyx slightly curved, ca. 10 × 2.5 mm, purple-red when dry, veins pubescent, throat sparsely hirsute; teeth equal, subulate-triangular, ca. 1 mm, apex spinescent. Corolla purple-red, ca. 2.5 cm, puberulent; upper lip straight, slightly recurved outward, margin entire; lower lip spreading, with middle lobe narrower, emarginate. Fl. Jul.

Cultivated in China [North America].

Cultivated in China [North America].

2. *Monarda didyma* Linnaeus, Sp. Pl. 1: 22. 1753.

60. HETEROLAMIUM C. Y. Wu, Acta Phytotax. Sin. 10: 254. 1965.

异野芝麻属 yi ye zhi ma shu

Herbs erect. Leaves cordate, long petiolate. Verticillasters 2–6-flowered, pedunculate, in narrow, secund, terminal panicles; upper floral leaves bractlike, short petiolate to subsessile; bracts minute. Pedicel slender. Calyx tubular, 15-veined, pilose annulate at throat inside, limb 2-lipped; upper lip 3-toothed, middle tooth larger than lateral teeth, ovate-orbicular; lower lip with 2 narrow teeth. Corolla 2-lipped; tube exserted, without hairy annulus inside; upper lip straight, 2-lobed, lobes rounded; lower lip 3-lobed, middle lobe larger than lateral lobes, spreading, white bearded near middle outside. Stamens 4, posterior 2 much exserted between 2 lobes of upper corolla lip, anterior 2 included before pollination but much exserted after; anther cells 2, divaricate, apex confluent. Style exserted, as long as stamens, apex 2-cleft; lobes linear, slightly curved. Nutlets triquetrous, ovoid, shiny, glabrous, rounded.

Monotypic: endemic to China.

Many workers consider *Heterolamium* as a synonym of *Orthosiphon*.

1. *Heterolamium debile* (Hemsley) C. Y. Wu, Acta Phytotax. Sin. 10: 254. 1965.

异野芝麻属 yi ye zhi ma

Stems suberect, slender, unbranched, 15–40 cm, striate, densely puberulent, glabrescent. Petiole 1.5–5 cm, gradually reduced apically; leaf blade cordate to circular-cordate, sometimes ovate, lower stem leaf blades reniform, 2.5–5 cm wide, membranous, sparsely appressed white strigose, base cordate to subtruncate, margin coarsely crenate, apex obtuse to subacute. Verticillasters in lax inflorescences 4–10 cm; bracts ovate-oblong, ca. 5 × 2.5 mm, margin entire, glabrous; bracteoles linear, ca. 1 mm. Pedicel slender, 4–5 mm. Calyx ca. 4 × 2.5 mm, puberulent, lateral teeth of upper lip triangular, teeth of lower lip subulate-triangular; fruiting calyx

ca. 8 × 3 mm, scarious, glabrescent, conspicuously 15-veined, with spinescent-tipped teeth; middle tooth of upper lip reflexed, decurrent, shorter than 2 anterior teeth. Corolla white; tube narrow, exserted, slightly dilated at apex; lobes of upper lip semicircular, as long as lateral lobes of lower lip; middle lobe of lower lip circular, margin entire, slightly concave; lateral lobes ovate, obtuse. Nutlets obscurely rugulose. Fl. Jun, fr. Jul.

• Forests, hillsides, streamsides; 1500–2700 m. Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

- 1a. Leaves broadly cuneate at base, widely spaced serrate, adaxially sparsely puberulent; corolla red 1c. var. *tochauense*
 1b. Leaves cordate to subtruncate at base, crenate or crenulate, adaxially sparsely appressed white

strigose; corolla white or dark red to purple-blue.

- 2a. Leaves coarsely crenate, abaxially greenish; raceme-panicles lax; corolla white 1a. var. *debile*
2b. Leaves crenulate, abaxially purplish; raceme-panicles compact; corolla dark red to purple-blue 1b. var. *cardiophyllum*

1a. *Heterolamium debile* var. *debile*

异野芝麻属 yi ye zhi ma

Orthosiphon debilis Hemsley, J. Linn. Soc., Bot. 26: 267. 1890.

Leaf blade base cordate or sometimes subtruncate, margin coarsely crenate to crenulate, adaxially sparsely appressed white strigose, abaxially greenish. Raceme-panicles loose. Corolla white.

- Dense forests; 1700 m. Hubei, Shaanxi, Sichuan.

1b. *Heterolamium debile* var. *cardiophyllum* (Hemsley) C. Y. Wu, Acta Phytotax. Sin. 10: 255. 1965.

细齿变种 xi chi bian zhong

Plectranthus cardiophyllus Hemsley, J. Linn. Soc., Bot. 26: 269. 1890.

Leaf blade margin crenulate, abaxially purplish. Raceme-panicles compact. Corolla dark red to purple-blue.

- Grassy hillsides, streamsides, forest margins, forests, bamboo forests; 1500–2700 m. Hubei, Hunan, Sichuan, Yunnan.

1c. *Heterolamium debile* var. *tochauense* (Kudô) C. Y. Wu, Acta Phytotax. Sin. 10: 255. 1965.

尖齿变种 jian chi bian zhong

Teucrium tochauense Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 296. 1929.

Leaf blade base broadly cuneate, margin remotely serrate, adaxially sparsely puberulent. Corolla red.

- Forests. Sichuan.

61. ZIZIPHORA Linnaeus, Sp. Pl. 1: 21. 1753.

新塔花属 xin ta hua shu

Plants annual or perennial, herbaceous or subshrubby. Leaves short petiolate or sessile; leaf blade abaxially glandular. Verticillasters scattered in leaf axils or crowded in a terminal capitulum; floral leaves as large as stem leaves or reduced. Calyx narrowly cylindrical, straight to slightly curved, 13-veined, villous annulate at throat, obscurely 2-lipped, upper lip 3-toothed, lower lip 2-toothed; teeth subequal, close together, rarely divergent following anthesis. Corolla limb 2-lipped; upper lip straight, margin entire, apex emarginate; lower lip spreading, 3-lobed, middle lobe narrower than suborbicular lateral lobes, apex emarginate. Anterior stamens fertile, reaching upper corolla lip, posterior stamens rudimentary, short, or absent; anther cells linear, 2 or only 1 developed, the other reduced to an appendage or absent. Style apex unequally 2-cleft, posterior lobe short. Nutlets ovoid, smooth.

About 25–30 species: Africa, Asia, Europe; four species in China.

- 1a. Annual herbs; verticillasters mostly axillary, not crowded in a capitulum 4. *Z. tenuior*
1b. Perennial shrubs; verticillasters crowded in a terminal capitulum.
2a. Calyx with dense short hairs less than 1/2 as long as calyx width 3. *Z. bungeana*
2b. Calyx with dense long hairs nearly as long as to longer than calyx width.
3a. Capitulum mostly semiglobose to subglobose, less than 2 cm in diam.; pedicels ca. 1.5 mm; calyx dark purple, densely hairy 2. *Z. tomentosa*
3b. Capitulum mostly globose, 1.2–2.8 cm in diam.; pedicels short; calyx green or purplish, sparsely hairy 1. *Z. pamiroalaica*

1. *Ziziphora pamiroalaica* Juzepczuk ex Nevski, Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vyss. Rast. 4: 328. 1937.

新疆新塔花 nan jiang xin ta hua

Subshrubs aromatic. Roots robust, woody, twisted. Stems numerous from woody base, reddish, slender or robust, ascending or prostrate, flexuous, 7–30 cm, with short, sparse, retrorse, slightly rigid hairs. Petiole to 3 mm; leaf blade oblong-ovate to subcircular, 2–15 × 1.7–7 mm, folded, pubescent, conspicuously glandular, base attenuate to petiole, margin entire or 1- or 2-denticulate, apex obtuse to subacute. Capitula globose, 1.2–2.8 cm in diam., compact; floral leaves not longer than calyx, reflexed. Pedicel short. Calyx green or purplish, 4–6 mm, with long, dense, flaccid white hairs as long as to longer than calyx width. Corolla rose, tube slightly exerted, limb large. Stamens much exerted; anthers purple (specimens not seen).

Gravelly areas, valleys, gorges. Xinjiang [Tajikistan].

2. *Ziziphora tomentosa* Juzepczuk, Fl. URSS 21: 667. 1954.

天山新塔花 tian shan xin ta hua

Subshrubs. Roots robust, woody. Stems numerous, ascending or flexuous patent, rarely suberect, 15–30 cm, retrorse pubescent, base robust, woody. Leaves oblong-ovate to ovate, 8–15(–20) × 2–9 mm, sparsely pubescent or subglabrous, conspicuously glandular, base cuneate or attenuate to petioles, margin entire or conspicuously 1–4-serrate, apex obtuse to acute. Capitula semiglobose to subglobose, less than 2 cm in diam; floral leaves reduced, ciliate. Pedicel ca. 1.5 mm. Calyx dark purple, tubular, 5–7 mm, with spreading, long white hairs shorter than to as long as calyx width; teeth subequal, narrowly lanceolate. Corolla purplish or purple, ca. 9 mm, with rigid short hairs; tube slightly exerted, with long hairs inside. Fertile stamens 2, posterior stamens absent. Fl. Jul–Aug.

Grassy hillsides; 300–2100 m. Xinjiang [Kyrgyzstan].

3. *Ziziphora bungeana* Juzepczuk, Fl. URSS 21: 664. 1954.

新塔花 xin ta hua

Subshrubs aromatic. Roots woody. Stems numerous, obliquely ascending to suberect, 12–30 cm, base woody, branched, densely retrorse pubescent especially at apex. Petiole pubescent; leaves narrowly lanceolate to ovate-lanceolate, rarely ovate, 5–15 × 1.5–6 mm, subglabrous or pubescent, conspicuously glandular, base cuneate to attenuate, margin entire, apex acute to slightly obtuse. Verticillasters crowded in globose or semiglobose terminal capitula; floral leaves reduced, mostly ascending or horizontal. Pedicel 1–3 mm. Calyx tubular, 5(–7) mm, obscurely glandular; teeth subequal, acute. Corolla rose, ca. 8 mm, tube pubescent, lateral lobes circular. Fertile stamens 2, posterior stamens short or absent. Fl. Aug–Sep.

Gravelly hillsides, semidesert areas, sandy beaches; 700–1100 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan].

4. *Ziziphora tenuior* Linnaeus Sp. Pl. 1: 21. 1753.

小新塔花 xiao xin ta hua

Herbs annual. Stems slender, erect, 5–15(–25) cm, retrorse pubescent. Leaves linear-lanceolate to lanceolate, 0.7–1.5(–2.5) cm × 1–4 mm, glabrous or finely strigose, obscurely glandular, base attenuate to petioles, margin entire, ± ciliate, apex acuminate. Verticillasters 2–6-flowered, lax or compact, in false spikes 2–11(–15) cm; floral leaves much longer than flowers, rarely as long apically, margin ciliate. Pedicel 1.5–4 mm. Calyx subtubular, slightly curved downward, 5–7 mm, base saccate in fruit, spreading hirsute or hirtellous, teeth ovate-triangular. Corolla ca. 1 cm, tube slightly exserted. Fertile stamens 2, included; anthers with an ovate, downwardly directed appendage. Fl. Aug.

Hillsides, gravelly areas, meadows, semidesert areas. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

62. MELISSA Linnaeus, Sp. Pl. 2: 592. 1753.

蜜蜂花属 mi feng hua shu

Herbs perennial. Leaves petiolate, ovate, margin serrate. Verticillasters axillary; bracts leaflike, smaller than leaves; bracteoles minute. Calyx campanulate, pendulous after anthesis, 13-veined, ± hairy, 2-lipped, upper lip shallowly 3-toothed, lower lip strongly 2-toothed. Corolla white, yellow-white, yellow, or reddish, 2-lipped; tube included or slightly exserted, slightly dilated at throat; upper lip straight, apex emarginate or 2-lobed; lower lip spreading, 3-lobed, with middle lobe entire or emarginate, wider than lateral lobes. Stamens 4, anterior 2 longer, clinging to upper corolla lip, included or slightly exserted; filaments arcuate; anther cells 2, initially divergent at nearly a right angle, becoming divaricate. Style apex equally 2-cleft; lobes subulate, revolute. Nutlets ovoid, smooth.

About four species: Asia, Europe; three indigenous and one cultivated in China.

- 1a. Calyx with subequal lips 1. *M. axillaris*
 1b. Calyx with lower lip longer.
 2a. Calyx blue-purple, inside glabrous 2. *M. flava*
 2b. Calyx greenish, inside hairy at least on upper lip inside.
 3a. Corolla yellow-white; inside of calyx villous only on upper lip, upper lip 3-toothed, acute, lateral teeth close to middle tooth 3. *M. yunnanensis*
 3b. Corolla cream-white; inside of calyx apex villous, upper lip short 3-denticulate or ± undulate, teeth straight, evenly spaced 4. *M. officinalis*

1. *Melissa axillaris* (Benth) R. Bakhuizen, Fl. Jav. 2: 629. 1965.

蜜蜂花 mi feng hua

Geniosporum axillare Benth, Pl. Asiat. Rar. 2: 18. 1830; *Calaminatha cavalierii* H. Léveillé & Vaniot; *M. hirsuta* Blume; *M. parviflora* Benth; *M. parviflora* var. *purpurea* Hayata.

Stems ± erect, branched, 60–100 cm, pubescent. Petiole 0.2–2.5 cm; leaf blade ovate, 1.2–6 × 0.9–3 cm, herbaceous, purplish along midrib, sparsely pubescent to subglabrous, base subcordate to cuneate, margin serrate-crenate, apex acute or short acuminate to rounded. Verticillasters widely spaced; bracteoles sublinear, ciliate. Pedicel ca. 2 mm. Calyx 6–8 mm, horizontally projected, villous outside, glabrous inside, teeth of upper lip acute; lower lip almost as long as upper lip, teeth lanceolate. Corolla white or reddish, ca. 1 cm, pubescent, tube slightly exserted, upper lip emarginate, lower lip spreading. Anterior stamens included. Nutlets adaxially ribbed. Fl. and fr. Jun–Nov.

Hills, valleys; 600–2800 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, Cambodia, India (Sikkim), Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam].

Used medicinally for dysentery and snake bites; also used as an essence in hair oil.

2. *Melissa flava* Benth ex Wallich, Pl. Asiat. Rar. 1: 65. 1830.

黄蜜蜂花 huang mi feng hua

Stems ca. 2.5 m, pubescent at apex, glabrescent at base. Petiole 1–2.8 cm; leaf blade ovate, (2–)5–7 × 1–3.5 cm, membranous, pubescent, base rounded to obtuse, margin coarsely serrate to serrate-crenate, apex acute. Verticillasters 2–10-flowered, widely spaced; upper bracts reduced; bracteoles linear to obovate-lanceolate, 3–6 × 1–2.5 mm, ciliate. Pedicel 3–7 mm. Calyx blue-purple, broadly campanulate, ca. 9 mm in flower, veins villous, inside glabrous; upper lip reflexed, ca. 4 × 4 mm, lateral teeth ± villous on outer margin; middle tooth erect, broadly triangular, apex acute; lower lip slightly longer, ca. 3 mm wide, 2-toothed to more than 1/2 its length, with lanceolate acuminate teeth; fruiting calyx dilated, to 1.3 cm, scarious, conspicuously netted. Corolla yellowish, 1.1 cm, villous outside; tube pubescent, gradually dilated beyond middle; upper lip ca. 4 × 3 mm, 2-lobed; lower lip as long as upper, to

6 mm wide, lobes circular. Stamens included. Immature nutlets brown, ca. 1 mm, corrugate. Fl. Jul-Aug.

Hillside forests; 1800–2800 m. Xizang [Bhutan, India, Nepal].

3. *Melissa yunnanensis* C. Y. Wu & Y. C. Huang, *Acta Phytotax. Sin.* 10: 228. 1965.

云南蜜蜂花 yun nan mi feng hua

Stems erect, ca. 1 m, few branched, finely pubescent. Petiole 0.5–2 cm; leaf blade ovate to lanceolate-ovate, 2–5 × 0.8–3 cm, ± membranous, adaxially puberulent or subglabrous, abaxially pubescent, base obtuse to cordate, margin irregularly serrate, apex acute. Verticillasters 2–16-flowered, numerous, widely spaced; bracts leaflike; bracteoles sublinear, shorter than pedicels, ciliate. Pedicel ca. 3 mm. Calyx campanulate, dilated after anthesis, 8–12 mm, villous, lateral teeth of upper lip close to middle tooth, teeth of lower lip lanceolate. Corolla yellow-white, to 1.5 cm, pubescent; middle lobe of lower lip rounded, slightly overlapping circular lateral lobes. Stamens included. Nutlets oblong-ovoid. Fl. Jul-Aug. fr. Sep.

- Forests, forest margins; 2100–3200 m. Xizang, Yunnan.

4. *Melissa officinalis* Linnaeus, *Sp. Pl.* 2: 592. 1753.

香蜂花 xiang feng hua

Stems ± erect, pyramidally much branched, pubescent, base glabrescent. Petiole slender, 0.5–2(–4) cm; leaf blade ovate, 1–5(–6.5) × 0.8–4(–5) cm, ± membranous or herbaceous, adaxially villous, abaxially villous along veins, base rounded to subcordate rarely obtuse or acute, margin serrate-crenate to obtusely serrate, apex acute to obtuse. Verticillasters 2–14-flowered, short pedunculate; bracts leaflike, much smaller than leaves, villous, ciliate. Pedicel ca. 4 mm. Calyx campanulate, ca. 8 mm, villous outside, villous inside apically; upper lip short 3-denticulate or ± undulate, teeth with short erect apices; lower lip slightly longer than upper, teeth narrowly triangular, apex spinescent. Corolla creamy white, 1.2–1.3 cm, villous outside; upper lip emarginate; middle lobe of lower lip obliquely spreading, rounded. Fl. Jun-Aug.

Cultivated in China [Kyrgyzstan, Russia, Tajikistan, Turkmenistan; Africa, SW Asia, Europe].

Used for flavoring salads, soups, and liqueurs. Oil employed in perfumery; commonly known as balm tea; a home remedy sometimes used for headaches and toothaches.

63. MICROMERIA Bentham, *Edward's Bot. Reg.* 15: t. 1282. 1829, nom. cons.

姜味草属 jiang wei cao shu

Subshrubs or herbs. Leaves sessile to short petiolate, ± hairy, conspicuously impressed glandular, upper leaves bractlike. Verticillasters axillary, 1- to many flowered, in terminal spikes or panicles. Calyx tubular, 13(–15)-veined, straight or slightly curved, ± hairy, glandular, throat pilose, limb with 5 subequal straight teeth or somewhat 2-lipped. Corolla white, reddish, to purple, 2-lipped, hairy; tube straight, gradually dilated at throat; upper lip straight, margin entire, apex emarginate or 2-lobed; lower lip spreading, 3-lobed; lobes subequal or middle lobe larger, margin entire, undulate, or emarginate. Stamens 4, anterior 2 longer, ascending, free, apex arcuate, approximate, included or occasionally exerted; anther cells 2, parallel, divergent or divaricate, connectives transversely thicker. Style apex 2-cleft; lobes subulate, equal or anterior lobe elongated, involute, flat, posterior lobe short. Nutlets ovoid or triquetrous oblong, dry, smooth.

About 100 species: Africa, Asia, Europe; five species in China.

The generic limits between *Micromeria*, *Clinopodium*, *Calamintha*, and several related genera not found in China are controversial.

1a. Leaves more than 1 cm.

- 2a. Stems white floccose-puberulent; leaves entire, involute; verticillasters widely spaced; calyx conspicuously 15-veined; corolla purplish, ca. 1.4 cm, glabrous inside 4. *M. wardii*
- 2b. Stems densely glandular puberulent; leaves widely spaced, conspicuously crenulate; verticillasters pedunculate, 3–7 in narrow panicles; calyx 13-veined; corolla dark red, ca. 1 cm, pilose on middle of lower lip and apical part of tube inside 5. *M. euosma*

1b. Leaves less than 1 cm.

- 3a. Stems sparsely floccose-puberulent; calyx tubular-funnelform, 2.5–3 mm; bracteoles absent 2. *M. formosana*
- 3b. Stems densely puberulent or pubescent, white pilose; calyx tubular, more than 4 mm; bracteoles linear to linear-subulate, 1.5–2 mm.
 - 4a. Stems densely pilose, pubescent; calyx to 4 mm, 2-lipped; posterior teeth 3, narrowly triangular, ca. 1.5 mm, long acuminate; anterior teeth 2, subulate, ca. 2 mm, spinescent; corolla ca. 6 mm 1. *M. biflora*
 - 4b. Stems densely puberulent, white spreading pilose; calyx to 9 mm; teeth subequal, subulate, apiculate, ca. 2.5 mm; corolla ca. 1.8 cm 3. *M. barosma*

1. *Micromeria biflora* (Buchanan-Hamilton ex D. Don) Bentham, *Labiata. Gen. Spec.* 378. 1834.

姜味草 jiang wei cao

Thymus biflorus Buchanan-Hamilton ex D. Don, *Prodr. Fl. Nepal.* 112. 1825; *Satureia biflora* Briquet; *T. cavaleriei* H. Léveillé.

Subshrubs tufted, aromatic. Stems numerous, ascending, to 30 cm, subterete, slender, densely ± patent white pilose and pubescent, red-purple. Petiole 0.1–0.5 mm; leaf blade ovate,

4–5 × 2.5–3 mm, conspicuously golden yellow glandular, sparsely puberulent on midrib, base rounded to shallowly cordate, margin flat or recurved, entire, apex acute. Verticillasters 1- or 2(–5)-flowered, pedunculate; peduncle 1–2 mm; bracts and bracteoles subequal, linear-subulate, ca. 1.5 mm, ciliate. Pedicel 2–3 mm, secund, red. Calyx short tubular, 2-lipped, to 4 mm, veins puberulent, throat pilose, 13-veined, ciliate; posterior teeth narrowly triangular, ca. 1.5 mm, apex long acuminate; anterior teeth subulate, ca. 2 mm, apex spinescent. Corolla rose, ca. 6 mm, sparsely puberulent,

tube ca. 4 mm; upper lip elliptic, ca. 2 mm; lower lip ca. 2.5 mm, lobes subequal or middle larger. Anterior stamens nearly included. Ovary yellow-brown, glabrous. Nutlets brown, oblong, ca. 1 mm, glabrous. Fl. Jun-Jul, fr. Jul-Aug.

Hilly grasslands over limestone; 2000–2500 m. Guizhou, Yunnan [Afghanistan, Bhutan, India, Nepal].

Extremely variable and at the center of a species complex distributed in Africa and SW Asia.

Essential oil used for flavoring liqueurs. Decoction used for abdominal distension, dysentery, colds, and coughs.

2. *Micromeria formosana* Marquand, Hooker's Icon. Pl. 33: t. 3230. 1934.

台湾姜味草 tai wan jiang wei cao

Herbs perennial, mostly shiny golden glandular. Stems erect or ascending, ca. 12 cm, much branched, terete, red and purplish, sparsely floccose-puberulent. Petiole 2–3 mm; leaf blade ovate, ca. 7 × 5 mm, adaxially slightly scabrid, base subcuneate, apex slightly obtuse. Verticillasters few flowered, in upper axils; bracts leaflike; bracteoles absent. Pedicel less than 1 mm. Calyx tubular-funnelform, 2.5–3 × 1 mm, purplish, puberulent, throat white villous; teeth ovate-triangular, ca. 1 mm, apex subacute. Corolla gray-violet, 5–7 mm, pubescent; upper lip ovate, ca. 2.5 mm in diam.; lower lip lobes subcircular, ca. 1.5 mm in diam. Nutlets ellipsoid-oblong, less than 0.5 mm, smooth (specimens not seen).

- Taiwan.

A little known species described from a cultivated plant.

3. *Micromeria barosma* (W. Smith) Handel-Mazzetti, Symb. Sin. 7: 932. 1936.

小香薷 xiao xiang ru

Calamintha barosma W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 88. 1916; *Satureia barosma* (W. Smith) Kudô.

Subshrubs diffuse, tufted, aromatic. Stems numerous, radiately prostrate, slender, 20–40 cm, terete, base woody, persistent, purple-red, densely puberulent, white pilose, much-branched, upper branches longer. Petiole ca. 0.5 mm; leaf blade lanceolate to oblanceolate, 4–6 × 2–3 mm, subpapery, glabrous or finely pilose, conspicuously impressed glandular, base cuneate, decurrent, margin entire, involute, apex slightly obtuse. Verticillasters 1- or 2-flowered, 3–7 close together in terminal spikes; bracts similar to leaves, smaller, narrower; bracteoles linear, ca. 2 mm. Pedicel ca. 2 mm. Calyx ca. 9 mm, ± purplish, conspicuously 13-veined, veins and teeth puberulent, golden glandular between veins, throat pilose annulate; teeth subulate, apiculate, subequal, ca. 2.5 mm. Corolla rose to red-purple, ca. 1.8 cm, densely puberulent; tube slender, ca. 1.2 cm; upper lip oblong, ca. 6 × 3 mm; lower lip spreading, ca. 7 mm; middle lobe elongated, oblong; lateral lobes ovate. Ovary glabrous. Nutlets triquetrous, oblong, ca. 1.3 mm, black-brown with 2 white scars at base, glabrous. Fl. Jul-Aug, fr. Sep-Oct.

• Dry gravelly grasslands, rocky crevices of limestone mountains; 2300–3800 m. Yunnan.

Species 3–5 are closely related.

4. *Micromeria wardii* Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 216. 1929.

西藏姜味草 xi zang jiang wei cao

Subshrubs aromatic. Rhizomes transverse. Stems erect, to 50 cm, few branched, terete, purplish, finely striate, sparsely white floccose-puberulent, branches erect. Petiole ca. 1 mm; leaf blade ovate, 1–1.5 cm × 4–7 mm, densely impressed glandular, adaxially sparsely strigose, scabrid, base cuneate, margin entire, involute, apex obtuse. Verticillasters 2–6-flowered, widely spaced, in upper axils; bracteoles subulate. Pedicel subulate, 1–3 mm. Calyx 4–5 × 1–1.5 mm, purplish, veins puberulent, white pilose at throat, conspicuously 15-veined; teeth subequal, triangular, ca. 1 mm, apex subulate, spreading. Corolla purplish, ca. 1.4 cm, pubescent; tube slender, to 2 mm wide at throat; upper lip ovate, 2-lobed; lower lip slightly longer. Ovary glabrous. Nutlets subtriquetrous, ovoid-oblong, ca. 1.3 mm, glabrous.

- Grassy hillsides, thickets, pine forests; 2100–3700 m. Xizang.

5. *Micromeria euosma* (W. Smith) C. Y. Wu, Acta Phytotax. Sin. 10: 229. 1965.

清香姜味草 qing xiang jiang wei cao

Calamintha euosma W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 89. 1916; *Satureia euosma* (W. Smith) Kudô.

Subshrubs aromatic, diffuse, tufted. Stems numerous, prostrate-ascending, unbranched, slender, 15–30 cm, basally woody, terete, densely glandular puberulent, purple-red. Petiole 2–4 mm, narrowly winged at apex; leaf blade ovate to subcircular, bractlike toward stem apex, 1–2 × 0.5–1.3 cm, glabrous or midrib puberulent, impressed glandular, base cuneate to rounded, ± decurrent, margin remotely crenulate, apex rounded. Verticillasters (2–)6–10-flowered, 3–7 in narrow terminal panicles; peduncle 5–10 mm; bracts oblong, ca. 5 × 1.5 mm; bracteoles minute, linear. Pedicel 2.5–4 mm. Calyx ca. 5 mm, glandular puberulent, sparsely golden yellow glandular, veins and teeth pilose, throat white pilose, conspicuously 13-veined; teeth narrowly triangular, apex spinescent, subequal, ca. 1.5 mm. Corolla dark red, ca. 1 cm, sparsely puberulent, conspicuously pilose inside; tube ca. 6 mm, slightly exserted; upper lip slightly spreading, suboblong, ca. 1.5 mm, 2-lobed to ca. 1/2 its length; lower lip ca. 5 mm, margin undulate, middle lobe subobcordate, lateral lobes broadly ovate. Ovary glabrous. Nutlets brown, ca. 1 mm, glabrous. Fl. Jun-Aug, fr. Sep-Nov.

- Grassy hillsides, dry valleys in limestone mountains; 3300 m. Yunnan.

64. CLINPODIUM Linnaeus, Sp. Pl. 2: 587. 1753.

风轮菜属 feng lun cai shu

Herbs perennial. Leaves dentate, reduced upward, bractlike. Verticillasters ± headlike, in panicles; peduncle sometimes present; bracts linear to needlelike, to as long as calyx. Calyx tubular, 13-veined, sometimes constricted at middle, swollen on 1 side at base, straight or slightly curved, throat sparsely hairy, limb 2-lipped; upper lip 3-toothed, teeth ciliate, apex mucronate; lower lip longer, 2-toothed. Corolla purple-red, reddish, or white, 2-lipped; tube exerted, gradually dilated upward to throat, with 2 rows of hairs, puberulent; upper lip straight, apex emarginate; lower lip 3-lobed, lateral lobes entire; middle lobe larger, emarginate or entire. Stamens 4, anterior 2 longer than posterior 2, reaching upper corolla lip, included or slightly exerted, posterior stamens sometimes rudimentary; anther cells 2, divaricate, ± obliquely inserted on dilated connectives. Style apex unequally 2-cleft, anterior lobe lanceolate, posterior lobe indistinct; ovary glabrous. Nutlets ovoid or subglobose, less than 1 mm in diam., glabrous, areolae small, basal.

About 20 species: Asia, Europe; 11 species in China.

Closely allied to *Calamintha*; many species are poorly defined.

- 1a. Peduncles of verticillasters much branched, secund.
- 2a. Bracts needlelike, minute, indistinctly ribbed; calyx ca. 6 mm; corolla less than 1 cm 4. *C. chinense*
- 2b. Bracts linear, distinctly ribbed; calyx ca. 8 mm; corolla ca. 1.2 cm 5. *C. urticifolium*
- 1b. Verticillasters sessile or on few-branched peduncles, not secund.
- 3a. Plants with 1 or 2 stems, mostly erect.
- 4a. Plants branched, branches gradually shorter toward stem apex; corolla 1.5–2.0 cm 7. *C. discolor*
- 4b. Plants unbranched or irregularly branched; corolla less than 1 cm.
- 5a. Leaves glabrous to subglabrous except for densely puberulent veins adaxially; verticillasters in continuous panicles on stem and branch apices; calyx white ciliate on veins otherwise glandular outside 11. *C. omeiense*
- 5b. Leaves strigose; verticillasters globose, in capitate, ample panicles on stems and branches; calyx villous, glandular puberulent along veins outside 1. *C. polycephalum*
- 3b. Plants with numerous, diffuse or much-branched, mostly slender, ascending basal stems.
- 6a. Calyx less than 4 mm.
- 7a. Verticillasters with floral leaves; calyx tube cylindric, glabrous or veins sparsely hairy, teeth of upper lip not reflexed in fruit 10. *C. confine*
- 7b. Verticillasters without floral leaves; calyx tube unequal in diam., puberulent, veins minutely hispid, teeth of upper lip reflexed in fruit 9. *C. gracile*
- 6b. Calyx more than 4 mm.
- 8a. Corolla 1.5–2 cm, tube elongated, ca. 2 × or more as long as calyx 6. *C. megalanthum*
- 8b. Corolla less than 1 cm.
- 9a. Verticillasters more than 9-flowered, globose; bracts numerous, almost as long as calyx 2. *C. repens*
- 9b. Verticillasters 2–8-flowered, not globose; bracts few, shorter than calyx.
- 10a. Bracts much shorter than pedicels; pedicel 3–5 mm; leaves spatulate, 10–25 × 7–10 mm 3. *C. longipes*
- 10b. Bracts longer than pedicels; pedicel ca. 2 mm; leaves ovate, 7–12 × 5–8 mm 8. *C. laxiflorum*

1. *Clinopodium polycephalum* (Vaniot) C. Y. Wu & Hsuan ex P. S. Hsu, *Observ. Ad Florulam Hwangshanicam* 169. 1965.

灯笼草 deng long cao

Calamintha polycephala Vaniot, *Bull. Acad. Int. Geogr. Bot.* 14: 183. 1904; *Calamintha clinopodium* Benth var. *nepalensis* Dunn; *Calamintha clinopodium* var. *polycephala* (Vaniot) Dunn; *Calamintha clinopodium* var. *pratensis* Dunn; *Calamintha tsacapensis* H. Léveillé; *Clinopodium chinense* Kuntze subsp. *grandiflorum* H. Hara var. *parviflorum* (Kudô) H. Hara; *Satureia chinensis* Briquet var. *parviflora* Kudô.

Stems erect, 50–100 cm, base sometimes trailing, much branched, spreading glandular hairy. Petiole to 1 cm; leaf blade ovate, 2–5 × 1.5–3.2 cm, strigose, base broadly cuneate to rounded, margin remotely crenate-dentate, apex obtuse to acute; upper leaves bractlike. Verticillasters many flowered, globose, to 2 cm in diam. in flower, in capitate, ample panicles; bracts needlelike, 3–5 mm. Pedicel 2–5 mm. Calyx ca. 6 × 1 mm, villous, veins glandular puberulent, throat sparsely hispid; fruiting calyx swollen on 1 side at base, to 2 mm wide; upper teeth triangular, caudate; lower teeth awned. Corolla purple-red, ca. 8 mm, tube puberulent; upper lip straight, emarginate. Stamens included, posterior 2 with small anthers; anterior 2 exerted, with normal anthers. Nutlets brown, ovoid, ca. 1 mm, smooth. Fl. Jul–Aug, fr. Sep.

• Hillsides, forests, thickets; 0–3400 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Shaanxi, Shandong, Shanxi, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang.

Widespread and very variable. Some authors consider this and the following species as conspecific with the Eurasian *Clinopodium umbrosum* (M. Bieberstein) Koch.

Used medicinally.

2. *Clinopodium repens* (Buchanan-Hamilton ex D. Don) Benth, *Pl. Asiat. Rar.* 1: 66. 1830.

匍匐风轮菜 pu fu feng lun cai

Thymus repens Buchanan-Hamilton ex D. Don, *Prodr. Fl. Nepal.* 113. 1825; *Calamintha clinopodium* Benth var. *repens* (Buchanan-Hamilton ex D. Don) Dunn; *Calamintha repens* (Buchanan-Hamilton ex D. Don) Benth; *Clinopodium kudoii* (Hosokawa) Mori; *Melissa repens* (Buchanan-Hamilton ex D. Don) Benth; *Satureia chinensis* Briquet var. *parviflora* Kudô; *S. chinensis* Briquet var. *repens* (Buchanan-Hamilton ex D. Don) Kudô; *S. kudoii* Hosokawa; *S. umbrosa* var. *repens* (Buchanan-Hamilton ex D. Don) Briquet.

Stems trailing, ascending, ca. 35 cm, pilose, angles and upper part densely so. Petiole 5–14 mm; leaf blade ovate, 1–3.5 × 1–2.5 cm, sparsely minutely hispid, base broadly

cuneate to rounded, margin incurved-serrate, apex acute to obtuse. Verticillasters subglobose, 1.2–1.5 cm in diam., 1.5–1.8 cm in fruit, widely spaced; floral leaves longer than verticillasters; bracts needlelike, 3–5 mm. Calyx ca. 6 mm, white ciliate, glandular puberulent; upper teeth triangular, caudate; lower teeth awned. Corolla rose, ca. 7 mm, slightly longer than calyx, puberulent. Nutlets subglobose, ca. 0.8 mm in diam. Fl. Jun-Sep, fr. Oct-Dec.

Hillsides, grasslands, streamsides, forests; 0–3300 m. Fujian, Gansu, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Myanmar, Nepal, Philippines, Sri Lanka].

3. *Clinopodium longipes* C. Y. Wu & Hsuan ex H. W. Li, Acta Phytotax. Sin. 12: 217. 1974.

长梗风轮菜 chang geng feng lun cai

Stems ca. 20 cm, base trailing, tinged purple-red, retrorse pilose. Petiole 2–3 mm; leaf blade spatulate, 1–2.5 cm × 7–10 mm, papery, adaxially sparsely minutely hispid, abaxially sparsely spreading ciliate, base cuneate, margin 2–6-crenate-serrate, apex acute to obtuse. Verticillasters 2–8-flowered, ca. 1.5 cm in diam. after anthesis, in upper axils, slightly crowded; peduncle 1–2 mm; floral leaves gradually reduced, bractlike; bracts needlelike, 2–2.5 mm, shorter than pedicels, ribbed. Calyx tubular-campanulate after anthesis, ca. 5 × 2 mm, tinged purple-red, veins and throat sparsely white ciliate, base slightly swollen on 1 side; upper teeth reflexed, triangular, apex acuminate; lower teeth straight, awned. Corolla nearly included in bud, puberulent. Nutlets yellow-brown, subglobose, ca. 0.9 mm in diam. Fr. Nov.

- Streamsides. Sichuan (Hongya Xian).

4. *Clinopodium chinense* (Benth) Kuntze, Revis. Gen. Pl. 2: 515. 1891.

风轮菜 feng lun cai

Calamintha chinensis Benth, Prodr. 12: 233. 1848; *Calamintha clinopodium* Benth var. *chinensis* (Benth) Miquel; *Satureia chinensis* (Benth) Briquet.

Stems to 1 m, base trailing, finely striate, densely pubescent, glandular puberulent. Petiole 3–8 mm; leaf blade ovate, bractlike apex, 2–4 × 1.3–2.6 cm, papery, adaxially densely appressed minutely hispid, abaxially pilose, base rounded to broadly cuneate, margin crenate-serrate, apex acute to obtuse. Verticillasters many flowered, semiglobose, to 3 cm in diam., upper ones ca. 1.5 cm, widely spaced; bracts numerous, needlelike, 3–6 mm. Calyx narrowly tubular, tinged purple-red, ca. 6 mm, pilose, glandular puberulent, pilose inside on teeth, base slightly swollen on 1 side in fruit; upper teeth ± reflexed, narrowly triangular, apex acuminate; lower teeth straight, awned. Corolla purple-red, ca. 9 mm, puberulent; throat with 2 rows of hairs, ca. 2 mm wide; upper lip emarginate. Nutlets yellow-brown, obovoid, ca. 1.2 × 0.9 mm. Fl. May-Aug, fr. Aug-Oct.

Hillsides, streamsides, grassy places, thickets, forests; 0–1000 m. Anhui, Fujian, Guangdong, Guangxi, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Taiwan, Yunnan, Zhejiang [Japan].

5. *Clinopodium urticifolium* (Hance) C. Y. Wu & Hsuan ex H. W. Li, Acta Phytotax. Sin. 12: 219. 1974.

麻叶风轮菜 ma ye feng lun cai

Calamintha clinopodium Benth var. *urticifolia* Hance, Ann. Sci. Nat. Bot., sér. 5, 5: 235. 1866; *Calamintha chinensis* Benth var. *grandiflora* Maximowicz; *Calamintha coreana* H. Léveillé; *Calamintha urticifolia* (Hance) Handel-Mazzetti.

Herbs perennial. Rhizomes woody. Stems erect, 25–80 cm, finely striate, rigid, base semiwoody, purple-red, sparsely retrorse minutely hispid. Petioles 1–1.2 cm in lower stem leaves, 2–5 mm in upper ones; leaf blade ovate to ovate-oblong, 3–5.5 × 1.2–3 cm, papery, adaxially sparsely minutely hispid, abaxially sparsely pilose, base subtruncate to rounded, margin serrate, apex obtuse to acute. Verticillasters many flowered, semiglobose, lower to 3 cm in diam., upper ca. 2 cm, widely spaced; peduncle 3–5 mm, much branched; lower floral leaves longer than verticillasters, upper ones as long as verticillasters, bractlike; bracts linear, tinged purple-red, conspicuously ribbed, 2/3–3/4 as long as calyx, white ciliate. Pedicel 1.5–2.5 mm. Calyx narrowly tubular, ca. 8 mm, tinged purple-red, glandular puberulent, veins white ciliate, teeth sparsely pilose inside, base slightly swollen on 1 side in fruit; upper teeth reflexed, narrowly triangular, short awned; lower teeth straight, awned. Corolla purple-red, ca. 1.2 cm, puberulent, throat with 2 rows of hairs, tube ca. 1 mm wide at base, gradually dilated beyond basal 1/3 to ca. 3 mm wide at throat. Anterior stamens nearly included or slightly exerted. Nutlets obovoid, ca. 1 × 0.8 mm. Fl. Jun-Aug, fr. Aug-Oct.

Hilly grasslands, forests; 300–2200 m. Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan [Japan, Korea, Russia].

Doubtfully distinct and often reduced to synonymy of *Clinopodium chinense* var. *chinense*.

6. *Clinopodium megalanthum* (Diels) C. Y. Wu & Hsuan ex H. W. Li, Acta Phytotax. Sin. 12: 220. 1974.

寸金草 cun jin cao

Calamintha chinensis Benth var. *megalantha* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 233. 1912; *Calamintha clinopodium* Benth var. *megalantha* (Diels) Dunn; *Calamintha megalantha* (Diels) Handel-Mazzetti; *Clinopodium megalanthum* var. *intermedium* C. Y. Wu & Hsuan ex H. W. Li, var. *lancifolium* C. Y. Wu & Hsuan ex H. W. Li, var. *robustum* C. Y. Wu & Hsuan ex H. W. Li, var. *speciosum* C. Y. Wu & Hsuan ex H. W. Li; *Satureia chinensis* Briquet var. *megalantha* (Diels) Kudô.

Plants rhizomatous. Stems numerous, 10–60 cm, base trailing, tinged purple-red, densely spreading white hispid or pubescent to subglabrous, internodes much longer than leaves. Petiole 1–3(–5) mm; leaf blade triangular-ovate to lanceolate, 1.2–3.8(–5) × 0.7–1.7(–4) cm, adaxially white ciliate or minutely hispid, abaxially distinctly impressed glandular, sometimes subglabrous, base rounded to shallowly subcordate, margin crenate-serrate, apex obtuse to acute. Verticillasters many flowered, semiglobose, to 3.5 cm in diam. in flower, crowded apically; lower floral leaves slightly longer than calyx, upper ones reduced and bractlike; bracts needlelike, to 9 mm. Calyx ca. 9 mm in flower, glandular, white hispid or puberulent mainly along veins outside, throat white pilose, base slightly swollen on 1 side in fruit; upper teeth narrowly triangular, ± reflexed, apex short aristate; lower teeth triangular, as long as upper teeth, apex long aristate. Corolla rose to purple, 1.5–2 cm, puberulent, throat

with 2 rows of hairs; tube exerted, ca. 1.5 mm wide at base, throat to 5 mm. Nutlets obovoid, ca. 1 × 0.9 mm. Fl. Jul-Sep, fr. Aug-Nov.

• Hillsides, grasslands, thickets, forests; 1300–3200 m. Guizhou, Hubei, Sichuan, Yunnan.

Considered by some as *Clinopodium umbrosum* (M. Bieberstein) Koch var. *souliei* (H. Léveillé) McKean (cf. Notes Roy. Bot. Gard. Edinburgh 40: 161. 1982).

Used medicinally.

7. *Clinopodium discolor* (Diels) C. Y. Wu & Hsuan ex H. W. Li, Acta Phytotax. Sin. 12: 221. 1974.

异色风轮菜 yi se feng lun cai

Calamintha discolor Diels, Notes Roy. Bot. Gard. Edinburgh 5: 232. 1912; *Calamintha clinopodium* Benth var. *discolor* (Diels) Dunn; *Satureia chinensis* (Benth) Briquet var. *discolor* (Diels) Kudô.

Rhizomes slender, trailing. Stems 20–40 cm, finely striate, densely retrorse gray puberulent. Petiole 0.5–2 cm; leaf blade narrowly ovate, (1.5–)2–5 × (0.8–)1.5–3 cm, ± membranous, sparsely fine pilose, base cuneate-attenuate to rounded, margin 3–8-serrate or crenate-serrate, apex obtuse to acute. Verticillasters 6–12-flowered, to 4 cm in diam.; peduncle 4–8 mm; floral leaves longer than verticillasters; bracts linear-subulate, 5–7 mm, distinctly ribbed, white ciliate. Pedicel 2–5 mm. Calyx narrowly tubular, slightly curved, ca. 1 cm, glandular, white hispid along veins, throat sparsely hispid, sometimes tinged purple-red; teeth awned, upper 3 reflexed, triangular, lower 2 straight, subulate. Corolla rose with purple spots, 1.5–2 cm, puberulent; tube ca. 1.5 mm wide at base, to 5 mm wide at throat. Nutlets dark brown, globose-ovoid, ca. 1.2 mm in diam., smooth. Fl. Aug-Sep, fr. Sep-Oct.

• Forest margins, waste areas, forests; 1600–3000 m. Xizang, Yunnan.

8. *Clinopodium laxiflorum* (Hayata) C. Y. Wu & Hsuan ex H. W. Li, Acta Phytotax. Sin. 12: 222. 1974.

疏花风轮菜 shu hua feng lun cai

Calamintha laxiflora Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 228. 1911; *Satureia laxiflora* (Hayata) Matsumura & Kudô.

Rhizomes ± woody, slender. Stems numerous, ascending, ca. 20 cm, slender, twisted, densely retrorse white pubescent. Petiole 1–2 mm; leaf blade ovate, 7–12 × 5–8 mm, papery, subglabrous, abaxially sometimes red-purple, base rounded, margin shallowly serrate, apex obtuse to acute. Verticillasters 2–6-flowered, semiglobose, 1.2–1.5 cm in diam.; peduncle ca. 1 mm; floral leaves entire, apex bractlike; bracts needlelike, ca. 3 mm, ribbed, purple-red, white ciliate. Pedicel ca. 2 mm. Calyx tubular, ca. 6 mm, tinged purple-red, glandular pubescent, veins and teeth minutely hispid; upper teeth 3, subtriangular, short awned; lower teeth 2, subulate, awned. Corolla tube ca. 1.1 cm, slightly curved outward, to 3 mm wide at throat; upper lip ca. 2.5 mm, 2-lobed; lower lip spreading, ca. 5 mm; middle lobe broadly circular, ca. 3 mm. Nutlets ovoid, ca. 0.7 × 0.6 mm.

• Hillsides. Taiwan.

9. *Clinopodium gracile* (Benth) Matsumura, Index Pl. Jap. 2: 538. 1912.

细风轮菜 xi feng lun cai

Calamintha gracilis Benth, Prodr. 12: 232. 1848; *Calamintha radicans* Vaniot; *Satureia gracilis* (Benth) Briquet; *Satureia ussuriensis* Kudô.

Herbs slender, stoloniferous. Stems numerous, ascending, 8–30 cm, retrorse pubescent. Petiole 0.3–1.8 cm; blade of basal leaves circular-ovate, ca. 10 × 8–9 mm, base rounded, margin remotely crenate, apex obtuse; blade of lower and mid stem leaves ovate, 1.2–3.4 × 1–2.4 cm, papery, subglabrous, abaxially sparsely minutely hispid on veins, base rounded to cuneate, margin remotely dentate or crenate-serrate, apex obtuse; blade of upper stem leaves ovate-lanceolate, margin serrate, apex acute. Verticillasters few flowered, lax or crowded in short terminal raceme; floral leaves ovate-lanceolate, margin serrate, apex acute; bracts needlelike, much shorter than pedicels. Pedicel 1–3 mm. Calyx tubular, base rounded, ca. 3 mm in flower, ca. 5 mm and declinate in fruit, puberulent or subglabrous, minutely hispid on veins, throat sparsely fine pilose; teeth ciliate, lower 2 subulate, upper 3 triangular, reflexed in fruit. Corolla white to purple-red, ca. 4.5 mm, puberulent. Nutlets ovoid, smooth. Fl. Jun-Aug, fr. Aug-Oct.

Streamsides, open grasslands, forest margins, thickets; 0–2400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan, Laos, Malaysia, Myanmar, Thailand, Vietnam].

Used medicinally.

Close to *Clinopodium multicaule* (Maximowicz) Kuntze from Japan, but the latter has calyx glabrous inside, as long as bracts, 1/2 as long as corolla, and 3 × as long as pedicel.

10. *Clinopodium confine* (Hance) Kuntze, Revis. Gen. Pl. 2: 515. 1891.

邻近风轮菜 lin jin feng lun cai

Calamintha confinis Hance, J. Bot. 6: 331. 1868; *Calamintha argyi* H. Léveillé; *Clinopodium confine* (Hance) Kuntze var. *globosum* C. Y. Wu & Hsuan ex H. W. Li; *Satureia confine* (Benth) Kudô.

Herbs diffuse. Stems glabrous or sparsely puberulent. Leaves ovate to subcircular, 0.8–2.2(–3) × 0.5–1.7(–2.5) cm, papery, glabrous, base rounded to broadly cuneate, margin 5–7-crenate-serrate, apex obtuse. Verticillasters many flowered, globose or subglobose, 1–1.5(–1.8) cm in diam., widely spaced; floral leaves reduced; bracts minute. Pedicel 1–2 mm, puberulent. Calyx subcylindric, narrower at base, ca. 4 mm in flower, slightly dilated in fruit, glabrous or sparsely hairy along veins, throat finely pilose; teeth ciliate, upper 3 triangular, lower 2 narrowly triangular. Corolla rose to purple-red, slightly exerted, ca. 5 mm, puberulent, throat slightly hairy or subglabrous, tube ca. 1.2 mm wide at throat; lips ca. 0.6 mm, middle lobe of lower lip emarginate. Posterior stamens rudimentary. Nutlets ovoid, ca. 0.8 mm, smooth. Fl. Apr-Jun, fr. Jul-Aug.

Hillsides, grasslands, field margins; 0–500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang [Japan].

11. *Clinopodium omeiense* C. Y. Wu & Hsuan ex H. W. Li, Acta Phytotax. Sin. 12: 223. 1974.

峨嵋风轮菜 e mei feng lun cai

Plants rhizomatous, perennial. Stems erect, 16–50 cm, tinged purple-red, base sparsely glandular pubescent, apex densely glandular pubescent. Petiole 6–13 mm; leaf blade ovate, 2.3–4 × 2.2–2.5 cm, papery, glabrous or subglabrous, densely puberulent along veins adaxially, base rounded, margin deeply projected dentate, apex acute. Verticillasters 10–14-flowered, in continuous terminal panicles; peduncle 1–5 mm; floral leaves conspicuously reduced except for lowest,

to as long as calyx, bractlike; bracts needlelike, few, 2–3 mm, ciliate. Pedicel 0.5–3 mm. Calyx narrowly tubular, 5–6 mm, glandular, veins white ciliate; upper 3 teeth narrowly triangular, reflexed in fruit; lower 2 triangular-subulate, spreading, ca. 2/3 as long as calyx. Corolla white or purplish, 8–9 mm, puberulent, throat ca. 2 mm wide, upper lip ca. 1 mm. Nutlets yellow-brown, obovoid, ca. 0.8 × 0.6 mm.

- Forests; 1700 m. Sichuan (Emei Shan).

65. CALAMINTHA Miller, Gard. Dict., ed. 4. 1754.

新风轮属 xin feng lun shu

Herbs annual or perennial. Leaves petiolate, dentate. Cymes axillary, 2–12-flowered, short pedunculate; bracts lanceolate-subulate. Calyx tubular to tubular-campanulate, 13-veined, throat not constricted, sparsely hirsute inside, base not or only slightly saccate in fruit, limb 2-lipped; teeth of upper lip 3, reflexed; teeth of lower lip 2, longer than upper teeth, lanceolate. Corolla almost as long as calyx to much exerted, 2-lipped, tube gradually dilated; upper lip emarginate, straight; lower lip reflexed, 3-lobed, middle lobe longer than lateral lobes. Stamens 4, didynamous, all included or anterior 2 exerted; anther cells 2, ± parallel or divergent. Ovary glabrous. Style shorter than corolla, complanate or 2-cleft at apex. Nutlets ovoid, rounded.

About six or seven species: Africa, Asia, Europe; one species in China.

1. Calamintha debilis (Bunge) Bentham, Prodr. 12: 232. 1848.

新风轮 xin feng lun

Thymus debilis Bunge, Fl. Altaic. 2: 391. 1830; *Antonina debilis* (Bunge) Vvedensky; *Calamintha annua* Schrenk; *Melissa debilis* (Bunge) Bentham; *Satureia annua* (Schrenk) B. Fedtschenko; *S. debilis* (Bunge) Briquet.

Herbs perennial. Stems slender, ascending, 9–20 cm, base or nodes reddish, pubescent. Petiole 2–8 mm, shorter toward stem apex; leaf blade ovate to oblong-ovate, 1–2 × 0.4–1 cm, herbaceous, base attenuate, margin remotely denticulate, base entire, sparsely minutely hispid, apex acute, adaxially sparsely minutely hispid, abaxially pubescent, sparsely yellow glandular, veins minutely hispid. Cymes

dichotomous, 2–12-flowered, axillary; peduncle 2–3 mm; bracts acute, 0.5–1.5 mm. Pedicel slender, 1–5 mm. Calyx tubular-campanulate, pendulous, ca. 6 × 1.5 mm in flower, slightly dilated in fruit, conspicuously 13-veined, puberulent, yellow glandular, veins minutely hispid, throat sparsely hirsute, tube longer than limb, slightly saccate toward base, teeth of upper lip ovate, apex awned, reflexed, ca. 2 mm, teeth of lower lip apex subulate-aristate, slightly longer than upper lip. Corolla white, to as long as calyx, funnelform, gradually dilated; stamens included, posterior 2 infertile; anther cells divergent. Style apex complanate. Disc ringlike. Nutlets ca. 1.2 × 0.8 mm, brownish, smooth. Fl. Jun-Jul, fr. Jul-Aug.

Subalpine meadows, gravelly slopes, stony beaches, rocky cliffs, stony hillocks; 500–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan].

66. HYSSOPUS Linnaeus, Sp. Pl. 2: 569. 1753.

神香草属 shen xiang cao shu

Plants perennial herbs or subshrubs. Leaves mostly linear to oblong, margin entire, involute, or flat. Verticillasters 2- to many flowered, mostly secund, axillary, often in long terminal spikes, lower ones lax, upper crowded; floral leaves similar to stem leaves, reduced; bracts and bracteoles minute. Pedicel distinct. Calyx tubular to subcampanulate, brightly colored, conspicuously 15-veined, hairy, glandular, teeth 5, equal, sinuses with a thickening at junction of 2 side veins. Corolla blue, purple, or occasionally white, hairy outside, glandular, glabrous inside, tube nearly included or conspicuously exerted, limb 2-lipped; upper lip emarginate or 2-lobed, sometimes subentire; lower lip spreading, 3-lobed; middle lobe longer than lateral lobes, truncate to emarginate. Stamens 4, mostly exerted, anterior 2 longer; filaments glabrous; anthers ovoid, cells 2, divaricate. Style apex equally 2-cleft. Nutlets oblong to oblong-ovoid, hairy, glandular, or glabrous.

About 15 species: Africa, Asia, Europe; two native and one cultivated in China.

- 1a. Leaves, bracts, and calyx teeth cuspidate at apex 2. *H. cuspidatus*
 1b. Leaves, bracts, and calyx teeth not cuspidate.
 2a. Corolla ca. 1 cm, tube nearly included; calyx ca. 7.5 mm; nutlets glabrous; leaves 1–4 cm × 2–7 mm 1. *H. officinalis*
 2b. Corolla ca. 1.3 cm, tube conspicuously exerted; calyx ca. 6 mm; nutlets puberulent at apex; leaves 1–2 cm × 1–2 mm 3. *H. latilabiatum*

1. Hyssopus officinalis Linnaeus, Sp. Pl. 1: 569. 1753.

神香草 shen xiang cao

Subshrubs. Stems 20–50(–80) cm, much branched, striate, pubescent. Leaves sessile, linear to lanceolate, 1–4 cm × 2–7 mm, glabrous, glandular, scabrous and finely strigose along margin, base attenuate to cuneate, margin

slightly involute, apex obtuse. Verticillasters 3–7-flowered, axillary, secund, in spikes ca. 4 cm or sometimes in panicles to 10 cm; peduncle less than 1 mm; bracts and bracteoles linear-subulate, apex acute, longer than pedicels, 3–5 mm. Pedicel 0.5–1.5 mm. Calyx tubular, ca. 7.5 mm, veins puberulent, glandular between veins; teeth triangular-lanceolate, ca. 2.5 mm, apex short spinescent. Corolla bluish to purple, ca. 1 cm, puberulent; tube ca. 7 mm, nearly included; upper lip ovate, erect, ca. 2.5 mm, 2-lobed; lower lip spreading, middle lobe wider than ovate lateral lobes. Anterior stamens much exerted. Ovary glabrous. Fl. Jun.

Cultivated in China [Europe].

A polymorphic aromatic herb. Essential oil is used for flavoring liqueurs.

2. *Hyssopus cuspidatus* Borissova-Bekrjasheva, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 12: 256. 1950.

硬尖神香草 ying jian shen xiang cao

Hyssopus cuspidatus var. *albiflorus* C. Y. Wu & H. W. Li.

Subshrubs. Stems enlarged, 30–60 cm, base woody, brown, twisted, branching from base, bark exfoliating; branches numerous, glabrous to subglabrous, base purplish. Leaves sessile, linear, 1.5–4.5 cm × 2–4 mm, mostly longer than internodes, glabrous, base attenuate, margin finely strigose, ± incurved, apex cuspidate, ca. 2 mm, ± deciduous. Verticillasters 10-flowered, pedunculate, secund, in 3–8 cm spikes; peduncle 1–2 mm; bracts and bracteoles linear, 4–8 mm, longer than pedicels, apices 2–3 mm. Calyx tubular, ca. 1 cm, throat slightly dilated, sparsely yellow glandular, veins and teeth puberulent; teeth triangular-lanceolate, ca. 4 mm, apex cuspidate. Corolla purple to white, ca. 1.2 cm, puberulent, yellow glandular; tube slightly incurved,

gradually dilated upward; upper lip straight, ca. 3 mm, lobes acute; lower lip ca. 4 mm, middle lobe obcordate, apex emarginate, not wider than lateral lobes; lateral lobes broadly ovate, ca. 1.5 mm wide. Nutlets brown, triquetrous, oblong, ca. 2.5 × 0.7 mm, apex rounded, glandular, areolae basal, white.

Gravelly or stony, dry hillside grasslands; 1100–1800 m. Xinjiang [Kazakhstan, Mongolia, Russia].

3. *Hyssopus latilabiatus* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 229. 1965.

宽唇神香草 kuan chun shen xiang cao

Subshrubs. Stems glabrous, base woody, brown, twisted, branches numerous from base, wandlike, ca. 20 cm, bark exfoliating, internodes longer than leaves. Leaves sessile, linear, 1–2 cm × 1–2 mm, glabrous, impressed glandular, base cuneate, margin ± involute, apex obtuse. Verticillasters ± secund, pedunculate, in terminal spikes 5–8 cm, lower spikes 1–4-flowered, upper 6–8-flowered; peduncle ca. 2 cm; floral leaves similar, 3–10 × less than 1 mm; bracts and bracteoles linear-subulate, shorter than pedicels. Pedicel 2–4 mm. Calyx tubular-campanulate, tinged purple, ca. 6 mm, pubescent, glandular; teeth triangular, ca. 2 mm, apex acute. Corolla purple, ca. 1.3 cm, pubescent, sometimes glandular toward apex; upper lip straight, oblong, ca. 5 mm, lobes ovate; lower lip spreading, ca. 7 mm wide; middle lobe to 1 cm wide, much wider than lateral lobes, obcordate, abruptly constricted at base, 2-lobulate, undulate; lateral lobes ovate, ca. 2 mm wide. Ovary apex pubescent. Fl. Aug.

• Steppes. Xinjiang.

67. **ORIGANUM** Linnaeus, Sp. Pl. 2: 588. 1753.

牛至属 niu zhi shu

Subshrubs or perennial herbs, gynodioecious, aromatic. Leaves ovate to oblong-ovate, entire to remotely dentate. Spikes cylindrical to oblong, sometimes elongated in fruit, many flowered, overlapping with small bracts, in corymbose panicles; bracts and bracteoles green and purple-red, oblong-obovate to lanceolate. Calyx campanulate, throat villous annulate, ca. 13-veined; teeth 5, subtriangular, subequal, apex acute to obtuse. Corolla white or rose to purple, campanulate, tube exerted, limb 2-lipped; upper lip straight, emarginate; lower lip spreading, 3-lobed, middle lobe larger than lateral lobes. Stamens 4, shorter to slightly longer than upper lip in bisexual flowers, included in pistillate flowers; anthers ovoid, cells 2, separated by triangular cuneate connectives; filaments glabrous. Style exerted, apex unequally 2-cleft. Nutlets ovoid, slightly ribbed, dry, glabrous.

About 15–20 species: primarily in SW and C Asia, one in China.

1. *Origanum vulgare* Linnaeus, Sp. Pl. 2: 590. 1753.

牛至 niu zhi

Origanum creticum Loureiro; *O. normale* D. Don; *O. vulgare* var. *formosanum* Hayata.

Rhizomes oblique, ± woody. Stems erect or prostrate near base, 25–60 cm, purplish, retrorse pubescent or slightly floccose-pubescent, numerous, leafless near base, lower branches sterile. Petiole 2–7 mm; leaf blade ovate to oblong-ovate, 1–4 × 0.4–1.5 cm, glandular, adaxially shiny green tinged purple, sparsely villous, abaxially densely villous, base broadly cuneate to rounded, margin entire or remotely serrulate, apex obtuse to slightly obtuse. Spikes oblong, ± elongated in fruit; floral leaves mostly sessile, purplish; bracts green or purple, oblong-obovate to obovate or oblanceolate,

ca. 5 mm, margin entire, apex acute. Calyx ca. 3 mm, minutely hispid or subglabrous; teeth triangular, ca. 0.5 mm. Corolla purple-red to white, tubular-campanulate, 5–7 mm; tube ca. 5 mm, exerted in bisexual flowers, ca. 3 mm, included in pistillate flowers, sparsely pubescent; upper lip ovate, ca. 1.5 mm, apex 2-lobed; lower lip ca. 2 mm, lobes oblong-ovate. Nutlets brown, ca. 0.6 mm, apex rounded. Fl. Jul-Sep, fr. Oct-Dec.

Hills, grasslands, forests; 500–3600 m. Anhui, Fujian, Gansu, Guangdong, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Kazakhstan, Kyrgyzstan, Russia; Africa, Europe, introduced in North America].

A polymorphic species; used medicinally.

mm in flower, to 6 mm in fruit, with robust veins and glands, tube 2.5 mm, upper teeth triangular, ca. 1 mm, ciliate. Corolla rose, pilose, ca. 8 mm; tube narrowly funnelform, ca. 5 mm, upper lip apex emarginate, lower lip \pm elongated (specimens not seen).

- Heilongjiang.

3. *Thymus marschallianus* Willdenow, Sp. Pl. 3: 141. 1800.

异株百里香 yi zhu bai li xiang

Plants gynodioecious. Stems short, much branched; vegetative shoots arising mostly from apical parts, \pm shorter, less numerous than fertile branches, pubescent; fertile branchlets to 30 cm, suberect to obliquely ascending, with small branchlets when larger, spreading or retrorse villous where bearing flowers, \pm pubescent elsewhere, leaf axils sometimes bearing tufts of small leaves. Leaves oblong-elliptic to linear-oblong, 1–2.8 cm \times 1–6.5 mm, glabrous or sparsely puberulent, distinctly glandular abaxially, base attenuate, margin entire or indistinctly 1- or 2-serrulate, not or only slightly involute, apex acute to obtuse. Verticillasters in spikes on apical part of fertile branchlets. Bisexual flowers well developed; pistillate flowers reduced. Pedicel 2–4.5(–5) mm, densely pubescent. Calyx tubular-campanulate, 2.5–3.5(–4) mm, spreading pilose, glandular in fruit; teeth of upper lip triangular, acute, ciliate. Corolla red-purple, purple, or white, pubescent, ca. 5 mm, exerted, lower lip spreading; corolla of pistillate flowers to 4 mm, lower lip nearly straight. Nutlets black-brown, ovoid, ca. 1 mm. Fl. and fr. Aug.

Stony slopes, basins, streamsides. Xinjiang [Kazakhstan, Kyrgyzstan, Russia].

4. *Thymus amurensis* Klokov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 16: 299. 1954.

黑龙江百里香 hei long jiang bai li xiang

Stems slender, curved, branched at base, with ascending vegetative shoots at apex; fertile branches erect to ascending, 6–20 cm, internodes \pm elongated, \pm spreading densely villous. Basal leaves indistinctly petiolate, crowded, mostly ovate, 3–5 \times 1.3–1.5 mm, apex subobtuse; blade of mid stem leaves 0.5–1.5 cm \times 1.5–4.5 mm; petiole of upper leaves to 1/3 as long as blades; blade mostly oblong-elliptic, densely pubescent, with much longer hairs abaxially, glandular, margin serrate. Inflorescences capitate. Pedicel shorter than calyx, densely pubescent. Calyx narrowly campanulate, 3.8–5 mm, pubescent, apex dark purple; teeth of upper lip lanceolate, long ciliate. Corolla ca. 2 \times as long as calyx, rose-purple, \pm whitish when dry (specimens not seen).

Gravelly slopes. Heilongjiang [Russia].

5. *Thymus curtus* Klokov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 16: 302. 1954.

短毛百里香 duan mao bai li xiang

Stems prostrate; fertile branchlets divaricate, 5–11 cm, with short, spreading or slightly recurved hairs, dark purple; large branches with up to 4 fertile branchlets on basal half. Petiole of stem leaves shorter to subequal to blades; leaf blade \pm oblong-elliptic, rarely elliptic to ovate, margin entire, lower 1/3 or more ciliolate, densely short hairy, sparsely glandular; blade of stem leaves ovate toward stem base, 0.7–1.4

cm \times 1.5–6 mm. Inflorescences capitate, rather lax, of 1–3 widely spaced verticillasters. Pedicel 2–3 mm, pubescent. Calyx tubular-campanulate, 4.5–5 mm, dark purple, pubescent; upper lip glabrous, teeth lanceolate, ciliate. Corolla rose-purple, ca. 7 mm, tube slender. Fl. Jul-Aug.

Gravelly slopes. Heilongjiang [Russia].

Perhaps only a minor variant of *Thymus amurensis*.

6. *Thymus inaequalis* Klokov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 16: 303. 1954.

斜叶百里香 xie ye bai li xiang

Stems slender, arcuately curved; vegetative shoots arising from stem base or rhizome, slender, to 40 cm, ascending to prostrate, finely retrorse pilose; short branchlets sometimes with small axillary tufts of leaves, sometimes elongated, fertile. Leaves oblong to ovate, 3–12 \times 1–4 mm, glabrous, glandular, base attenuate, asymmetrical, margin 1–3-serrulate, lower 1/4–1/3 ciliate, apex acute to obtuse. Inflorescences capitate, loose, sometimes with undeveloped basal verticillasters; bracteoles subulate, to 4 mm, long ciliate. Pedicel 1–4 mm, densely pubescent. Calyx tubular-campanulate, 4–5 mm, base spreading pilose, apex glabrous or subglabrous; teeth of upper lip lanceolate to triangular, acute, ciliolate. Corolla purplish, to 8 mm, pubescent, glandular. Stamens exerted or posterior 2 included. Fl. Jul-Aug.

Dry hills, grasslands, gravelly sunny slopes; 300–800 m. Heilongjiang, Nei Mongol [Russia].

Doubtfully distinct from *Thymus amurensis*.

7. *Thymus proximus* Sergievskaja, Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ. Kujbyseva 10(6–7): 3. 1936.

拟百里香 ni bai li xiang

Stems trailing, slender, terete; fertile branches with a retrorse dense line of hairs from base of each leaf, 2–6 cm, sometimes with branchlets. Leaves elliptic, rarely ovate, 0.8–1.2 cm \times 3–5 mm, conspicuously glandular abaxially, base attenuate, margin entire or indistinctly serrulate, apex obtuse. Inflorescences capitate or slightly elongated, sometimes with undeveloped verticillasters below; floral leaves sessile, ovate or broadly ovate, margin sparsely ciliate at base. Pedicel 1–4 mm, densely retrorse pubescent. Calyx campanulate, 3.5–4.5 mm, base pilose, apex glabrous; teeth of upper lip triangular, ciliate. Corolla ca. 7 mm, pubescent. Stamens slightly exerted. Fl. Jul-Aug.

Wet valleys, sunny hills; 2000–2100 m. Xinjiang [Kazakhstan, Russia].

8. *Thymus mongolicus* (Ronniger) Ronniger, Acta Horti Gothob. 9: 99. 1934.

百里香 bai li xiang

Thymus serpyllum Linnaeus var. *mongolicus* Ronniger, Notizbl. Bot. Gart. Berlin-Dahlen 10: 890. 1930.

Stems numerous, trailing to ascending; vegetative shoots pubescent; fertile branches (1.5–)2–10 cm, densely retrorse pilose or slightly spreading pilose below inflorescences, sparsely fine pilose at base, 2–4-leaved. Petioles of lower stem leaves ca. 1/2 as long as blades; leaf blade ovate, 4–10 \times 2–4.5 mm, glabrous, \pm conspicuously glandular, base

cuneate to attenuate, margin entire or 1- or 2-serrulate, apex obtuse to subacute. Inflorescences capitate; floral leaves ciliate on lower 1/3 of margin; bractlets deciduous at base. Calyx tubular-campanulate to narrowly campanulate, 4–4.5 mm, base pilose, apex subglabrous; teeth of upper lip less than 1/3 as long as lip, triangular, ciliate or glabrous; lower lip as long as to longer than upper. Corolla purple-red, purple, or reddish, 6.5–8 mm, sparsely pubescent; tube elongated, 4–5 mm, slightly dilated upward. Nutlets subglobose to ovoid, compressed. Fl. Jul-Aug.

• Stony hills, slopes, grassy areas, valleys; 1100–3600 m. Gansu, Hebei, Nei Mongol, Qinghai, Shaanxi, Shanxi.

9. *Thymus altaicus* Klokov & Desjatova-Shostenko, Zhurn. Inst. Bot. Vseukrajins'k. Akad. Nauk. 10(18): 159. 1936.

阿尔泰百里香 a er tai bai li xiang

Thymus altaicus Sergievskaja.

Stems trailing to ascending; vegetative shoots ascending or trailing, pubescent; fertile branches ascending, mostly 4–8 cm, subglabrous, retrorse puberulent or pubescent below inflorescences, with 2–4 internodes. Leaves oblong-elliptic to ovate, rarely obovate, 5–10 × 1–3 mm, glabrous, base attenuate, margin entire, sparsely ciliate basally, apex obtuse to acute. Inflorescences capitate, sometimes with 1 or 2 undeveloped verticillasters; bractlets crowded at bases of branches, deciduous. Pedicel 1–4 mm, densely pubescent. Calyx campanulate, 3.5–4.5 mm, base pilose, apex glabrous; teeth of upper lip subtriangular to lanceolate, minutely hispid. Corolla red-purple, 5.5–6.5 mm, pubescent. Fl. Jul-Aug.

Stream-sides, grasslands, gravelly areas; 1100–1400 m. Xinjiang [Russia].

10. *Thymus nervulosus* Klokov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 16: 302. 1954.

显脉百里香 xian mai bai li xiang

Stems slender, tufted, ascending; vegetative shoots to 30 cm, slender, spreading, rarely trailing, retrorse pilose; fertile branches few, slender, more than 5 mm, ascending to erect, retrorse pilose on inflorescences, base finely pilose. Leaves short petiolate; petiole sparsely ciliate on basal 1/3; leaf blade of lower stem leaves broadly elliptic to ovate, 0.5–1.6 cm × 1.5–5 mm, glabrous, base cuneate to attenuate, margin entire or 1- or 2-serrulate, sparsely ciliate, apex obtuse to acute. Inflorescences capitate, sometimes with widely spaced undeveloped verticillasters. Calyx tubular-campanulate, 4–5 mm, mostly pilose, conspicuously veined; teeth of upper lip lanceolate, ciliate, apex acuminate. Corolla 6–8 mm, pubescent, exerted. Fl. Jul.

Steppes, hills. Heilongjiang [Russia].

Perhaps a variant of *Thymus amurensis*.

11. *Thymus quinquecostatus* Celakovsky, Oesterr. Bot. Z. 39: 263. 1889.

地椒 di jiao

Stems obliquely ascending to subhorizontally spreading; vegetative shoots ± fewer than fertile branches, sparsely retrorse pilose; fertile branches numerous, crowded, 3–15 cm, erect to ascending, densely retrorse pilose below inflorescences, base sparsely fine pilose, internodes to 15, usually shorter than leaves. Leaves oblong-elliptic or oblong-

lanceolate, rarely ovate to ovate-lanceolate, 0.7–1.3(–2) cm × 1.5–3(–8) mm, ± leathery, glabrous, densely glandular, base attenuate, margin entire, revolute, ciliate on lower half or only at base, apex obtuse to acute. Inflorescences capitate, sometimes oblong; floral leaves similar to stem leaves; bractlets usually deciduous. Pedicel to 4 mm. Calyx tubular-campanulate, 5–6 mm, base spreading pilose, apex glabrous; upper lip subequal to longer than lower lip, teeth lanceolate, to ca. 1/2 as long as lower lip, sometimes ciliate. Corolla 6.5–7 mm, tube shorter than calyx. Fl. Aug.

Gravelly areas, hills, riverbanks, rocky crevices, beaches, seashore dunes; 0–3500 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Japan, Korea, Russia].

- 1a. Leaves lanceolate to linear-lanceolate, generally less than 2 mm wide 11c. var. *asiaticus*
- 1b. Leaves oblong-elliptic to broadly ovate-lanceolate, more than 2 mm wide.
 - 2a. Inflorescence rachis densely retrorse pilose; leaves oblong-elliptic to oblong-lanceolate, (1.5–)2–3(–4.5) mm wide, lateral veins 2- (or 3)-paired 11a. var. *quinquecostatus*
 - 2b. Inflorescence rachis densely pilose; leaves broadly ovate-lanceolate, 4–5 mm wide, lateral veins 3- or 4-paired 11b. var. *przewalskii*

11a. *Thymus quinquecostatus* var. *quinquecostatus*

地椒 di jiao

Leaves oblong-elliptic to oblong-lanceolate, (1.5–)2–3(–4.5) mm wide, lateral veins 2- (or 3)-paired. Rachis of inflorescence densely retrorse pilose.

Hills, seashore dunes; 0–900 m. Hebei, Henan, Liaoning, Shandong, Shanxi [Japan, Korea].

11b. *Thymus quinquecostatus* var. *przewalskii* (V. Komarov) Ronniger, Acta Horti Gothob. 9: 100. 1934.

展毛变种 zhan mao bian zhong

Thymus serpyllum Linnaeus var. *przewalskii* V. Komarov, Trudy Imp. S. Peterburgsk. Bot. Sada 25: 379. 1907; *T. przewalskii* (V. Komarov) Nakai.

Leaves broadly ovate-lanceolate, 1–1.2 cm × 4–5 mm, lateral veins 3- or 4-paired. Rachis of inflorescence densely pilose, hairs shorter than diam. of rachis.

Gravelly areas, grassy hills, sandy riverbanks, sandy beaches, rocky crevices; 600–3500 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Korea, Russia].

Perhaps conspecific with *Thymus mandschuricus*.

11c. *Thymus quinquecostatus* var. *asiaticus* (Kitagawa) C. Y. Wu & Y. C. Huang, Fl. Reipubl. Popularis Sin. 66: 259. 1977.

亚洲变种 ya zhou bian zhong

Thymus serpyllum Linnaeus var. *asiaticus* Kitagawa, Rep. First Sci. Exped. Manch. IV. 4: 92. 1936; *T. asiaticus* (Kitagawa) Kitagawa.

Leaves lanceolate to linear-lanceolate, generally less than 2 mm wide.

• Dry hills; 600 m. Nei Mongol.

globose, ca. 1.8 cm in diam.; peduncle 0–3 mm. Pedicel slender, 2.5 mm. Calyx tubular-campanulate, ca. 2.5 mm, puberulent, glandular, obscurely 10-veined; teeth narrowly triangular-subulate, apex acuminate, ca. 1 mm. Corolla purplish or white, ca. 4 mm, puberulent; upper lobe largest, 2-lobulate; other lobes subequal, oblong, obtuse. Stamens ca. 5 mm. Nutlets yellow-brown, small pitted. Fl. Jul-Sep, fr. Oct.

Wet areas; 0–3500 m. In all provinces [Cambodia, Japan, Korea, Laos, Malaysia, Myanmar, Russia, Thailand, Vietnam; North America].

Source of mint oil. Used in cigarettes, pharmaceuticals, and oral preparations.

2. *Mentha sachalinensis* (Briquet ex Miyabe & Miyake) Kudô, J. Coll. Sci. Imp. Univ. Tokyo 43(10): 47. 1921.

东北薄荷 dong bei bo he

Mentha arvensis Linnaeus subsp. *haplocalyx* Briquet var. *sachalinensis* Briquet ex Miyabe & Miyake, Fl. Saghalin 361. 1916; *M. arvensis* var. *piperascens* Holmes; *M. sachalinensis* (Briquet) Kudô var. *arguta* Kitagawa.

Plants rhizomatous, perennial. Stems erect, 50–100 cm, striate, densely retrorse pubescent along angles, little branched. Petiole 0.5–1.5 cm; leaf blade elliptic-lanceolate, (2.5–)4–9 × 1–3.5 cm, glandular, ciliate, puberulent on veins, base attenuate, margin shallow serrate, apex acute. Verticillasters axillary, many flowered, globose, to 1.5 cm in diam., short pedunculate; floral leaves subsessile, sublanceolate; bracteoles linear to linear-lanceolate, 3–4 mm, ciliate. Pedicel ca. 2 mm, glabrous. Calyx campanulate, ca. 1.5 mm, densely pilose, yellow glandular, mouth and teeth pilose inside; teeth narrowly triangular, ca. 1.5 mm, apex acute. Corolla purplish or purplish red, ca. 4 mm, pilose; lobes ovate-oblong, upper emarginate. Anterior stamens slightly longer, ca. 5 mm. Nutlets yellow-brown, oblong, glabrous, ribbed. Fl. Jul-Aug, fr. Sep.

Wet grasslands near rivers, lakes; 200–1100 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Russia].

3. *Mentha dahurica* Fischer ex Bentham, Labiat. Gen. Spec. 181. 1836.

兴安薄荷 xing an bo he

Plants rhizomatous, perennial. Stems erect, 30–60 cm, rarely branched, base leafless, retrorse puberulent, sometimes purplish. Petiole 7–10 mm; leaf blade ovate to oblong, ca. 3 × 1.3 cm, glabrous or sparsely puberulent, abaxially glandular on veins, base broadly cuneate to rounded, margin shallow crenate-serrate to subentire, apex acute to obtuse. Verticillasters 5–13-flowered, generally 2, in terminal capitate inflorescences longer than floral leaves; peduncle 2–10 mm, puberulent; bracteoles linear, curved upward. Pedicel 1–3 mm. Calyx tubular-campanulate, ca. 2.5 mm, veins conspicuous, puberulent; teeth broadly triangular, ca. 0.5 mm, apex acute; fruiting calyx broadly campanulate. Corolla reddish or rose purplish, ca. 5 mm, glabrous, throat puberulent, gradually dilated from base; lobes circular, ca. 1 mm, obtuse, upper lobe conspicuously 2-lobulate. Anterior stamens equal to slightly longer than corolla. Ovary brown, glabrous. Fl. Jul-Aug.

Meadows; 600 m. Heilongjiang, Jilin, Nei Mongol [Japan, Russia]

4. *Mentha longifolia* (Linnaeus) Hudson, Fl. Angl. 221. 1762.

欧薄荷 ou bo he

Mentha spicata Linnaeus var. *longifolia* Linnaeus, Sp. Pl. 2: 576. 1753; *M. sylvestris* Linnaeus, 1763.

Plants rhizomatous, perennial. Stems erect, to 1 m, much branched, whitish, striate, retrorse short tomentose-villous. Leaf blade ovate to oblong-lanceolate, to 6 × 1.5 cm, appressed tomentose-villous, subglabrescent, base rounded to shallow cordate, margin coarsely irregular serrate-dentate, apex acute. Verticillasters in cylindrical terminal spikes 3–8 cm, lower ones somewhat lax; floral leaves linear-subulate, mostly shorter than verticillasters. Pedicel to 2 mm. Calyx campanulate, ca. 2 mm, tomentose-villous, obscurely 5-veined; teeth linear-subulate, ca. 1 mm, close together in fruit. Corolla purplish, ca. 4 mm, sparsely puberulent; tube ca. 2 mm, gradually dilated upward; lobes oblong, obtuse; upper lobe oblong-ovate, emarginate. Ovary glabrous. Fl. Jul-Sep.

Nanjing Shi, Shanghai Shi, and other cities [Russia; SW Asia, Europe].

Cultivated in China. A polymorphic aromatic herb used medicinally.

Mentha asiatica, *M. vagans*, and the Himalayan *M. royleana* Benthall all are very closely related to and perhaps doubtfully distinct from *M. longifolia*. Further work is needed to fully assess their correct status.

5. *Mentha asiatica* Borissova-Bekrjasheva, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 16: 280. 1954.

假薄荷 jia bo he

Herbs rhizomatous, perennial. Stems erect, (30–)50–120(–150) cm, few branched, densely minutely tomentose. Petiole 0.1–0.5 mm; leaf blade oblong or elliptic to oblong-lanceolate, 3–8 × 1–2.5 cm, sometimes folded and curved downward, sometimes glaucous, appressed crisped minutely tomentose, glandular, base rounded to broadly cuneate, margin remotely unequal dentate, apex acute. Verticillasters in terminal cylindrical spikes 3–8 × 1–1.4 cm; bracts linear to subulate, 5–7 mm; bracteoles subulate, nearly as long as calyx. Pedicel ca. 1 mm. Calyx ± purple-red, campanulate to funnellform, 1.5–2 mm, appressed pubescent, obscurely veined; teeth linear, close together in fruit. Corolla purple-red, 4–5 mm, pilose, tube gradually dilated, lobes ca. 1 mm; upper lobe oblong-ovate, ca. 2 × 1.5 mm, apex emarginate. Nutlets brown, ca. 1 mm, apex pilose, pitted. Fl. Jul-Aug, fr. Aug-Oct.

Riverbanks, landfills, waste areas, wet valleys; 0–3100 m. Sichuan, Xinjiang, Xizang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

6. *Mentha vagans* Borissova-Bekrjasheva, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 16: 282. 1954.

灰薄荷 hui bo he

Plants rhizomatous, perennial. Stems erect, 40–80 cm, densely tomentose, glabrescent, purple-red, base with exfoliating bark; branches many, long, divaricate. Petiole ca. 1 mm; leaf blade elliptic to oblong, 1–2.5 cm × 5–13 mm, generally shorter than internodes, sometimes curved-conduplicate, densely gray tomentose, base rounded to shallow cordate, margin serrate-dentate, apex acute to subobtuse. Verticillasters in cylindrical spikes 2–2.5 cm × ca. 8 mm, lower spikes ± separated; bracts filiform. Pedicel ca.

1 mm. Calyx campanulate, to 2 mm, crisped pilose, obscurely 5-veined; teeth lanceolate, ca. 0.5 mm, apex spinescent, close together in fruit. Corolla 3–3.5 mm, lobes ovate, subequal, pilose; upper lobe longer, oblong-ovate, ca. 1.5 mm, emarginate. Nutlets ovoid, ca. 0.6 × 0.5 mm, brown, sparsely hairy, pitted. Fl. Jul-Aug.

Riverbanks. Xinjiang [Tajikistan, Turkmenistan; SW Asia].

7. *Mentha ×piperita* Linnaeus, Sp. Pl. 2: 576. 1753.

辣薄荷 la bo he

Stems erect-ascending, 30–100 cm tall, branched, purple-red, glabrous or angles sparsely minutely hispid. Petiole 1–2 mm, purple; leaf blade lanceolate to ovate-lanceolate, 2.5–3 × 0.8–2 cm, glabrous or abaxially minutely hispid on veins, densely glandular, base rounded to shallow cordate, margin unequally acute serrate, apex acute. Verticillasters in cylindrical terminal spikes, interrupted at base; bracts linear-lanceolate, slightly longer than calyx, ciliate. Pedicel ca. 1 mm. Calyx tubular, tinged purple, puberulent or subglabrous, glandular outside; teeth 5, linear-subulate, ca. 1 mm, ciliate. Corolla white, tinged red on lobes, ca. 4 mm, tube nearly as long as calyx; lobes subequal, upper emarginate. Nutlets brown, obovoid, ca. 0.7 mm, apex glandular. Fl. Jul, fr. Aug.

Beijing Shi, Nanjing Shi, and other cities [India, Japan, Kyrgyzstan, Russia, Turkmenistan; SW Asia, Europe, North America].

Cultivated in China. Source of peppermint oil, an essential oil used for flavoring confectionery, candies, liqueur, and chewing gum. The dried plant is used medicinally as a carminative, nervine, and stimulant, while menthol is used in nasal sprays.

A hybrid: *Mentha aquatica* Linnaeus × *M. spicata* Linnaeus.

8. *Mentha citrata* Ehrhart, Beitr. Naturk. 7: 150. 1792.

柠檬留兰香 ning meng liu lan xiang

Mentha ×piperita Linnaeus var. *citrata* (Ehrhart) Briquet.

Herbs perennial, bearing leafy stolons, glabrous or subglabrous throughout. Petiole of middle stem leaves ca. 2 mm; leaf blade broadly ovate to elliptic, 2–4 × 1.5–3 cm, base rounded to shallow cordate, margin remotely serrate, apex obtuse; upper leaves reduced, sometimes sublanceolate, apex acute. Verticillasters in terminal spikes 2.5–4 cm; bracts linear-lanceolate, shorter than verticillasters. Pedicel ca. 1 mm. Calyx tubular, ca. 1.5 mm, glandular; teeth linear-subulate, ca. 0.5 mm. Corolla purplish, ca. 4 mm, tube ca. 2.5 mm. Fl. Jul-Aug.

Beijing Shi, Hangzhou Shi, Nanjing Shi, and other cities [Europe].

Cultivated in China.

Perhaps best regarded as a cultivar of *Mentha ×piperita*.

9. *Mentha spicata* Linnaeus Sp. Pl. 2: 576. 1753.

留兰香 liu lan xiang

Mentha spicata var. *viridis* Linnaeus; *M. viridis* (Linnaeus) Linnaeus.

Herbs stoloniferous. Stems erect, 40–130 cm, glabrous or subglabrous, striate. Leaves sessile or subsessile, ovate-oblong to oblong-lanceolate, 3–7 × 1–2 cm, base broadly cuneate to rounded, margin irregularly serrate, apex acute. Verticillasters in cylindrical terminal spikes 4–10 cm, spikes

interrupted at base; bracteoles linear, 5–8 mm. Pedicel ca. 2 mm. Calyx campanulate, ca. 2 mm, glandular, obscurely 5-veined; teeth triangular-lanceolate, ca. 1 mm. Corolla purplish, ca. 4 mm, glabrous, tube ca. 2 mm; lobes subequal, apex emarginate. Ovary brown, glabrous. Fl. Jul-Sep.

Guangdong, Guangxi, Guizhou, Hebei, Hubei, Jiangsu, Sichuan, Xizang, Yunnan, Zhejiang [Russia, Turkmenistan; Africa, SW Asia; Europe].

Cultivated in China. Source of spearmint oil, an essential oil used for flavoring candies, toothpaste, chewing gum. Dried tops and leaves are used medicinally as a stimulant, carminative, and nervine. It contains carvone.

10. *Mentha crispata* Schrader ex Willdenow, Enum. Pl. 608. 1809.

皱叶留兰香 zhou ye liu lan xiang

Herbs rhizomatous. Stems erect, 30–60 cm, purplish, glabrous. Leaves sessile or subsessile, ovate to ovate-lanceolate, 2–3 × 1.2–2 cm, papery, base rounded to shallow cordate, margin serrate, apex acute. Verticillasters in terminal spikes 2.5–3 × ca. 1 cm, continuous or ± interrupted at base; bracts linear-lanceolate, slightly longer than calyx. Pedicel ca. 1 mm. Calyx campanulate, ca. 1.5 mm, subglabrous, glandular, obscurely 5-veined; teeth triangular-lanceolate, ca. 0.1 mm, ciliate. Corolla purplish, ca. 3.5 mm, glabrous, tube ca. 2 mm; lobes subequal, apex emarginate. Ovary brown, glabrous. Nutlets brown, triquetrous, ovoid, ca. 0.7 mm, sparsely glandular.

Beijing Shi, Hangzhou Shi, Kunming Shi, Nanjing Shi, Shanghai Shi [Russia; Europe].

Cultivated in China. Source of German spearmint oil. Young shoots and leaves edible.

A form/cultivar of *M. spicata* Linnaeus.

11. *Mentha suaveolens* Ehrhart, Beitr. Naturk. 7: 149. 1792.

圆叶薄荷 yuan ye bo he

Herbs perennial, rhizomatous, stoloniferous. Stems erect, 30–80 cm, striate, crisped villous, pyramidally branched. Leaves usually sessile, circular to oblong-ovate, 2–4.5 × 1.5–3 cm, villous, base cordate, margin crenate or crenate-serrate, apex obtuse. Verticillasters in terminal, dense cylindrical spikes 2–4 × ca. 0.6 cm, lower 1 or 2 ± widely spaced; bracts lanceolate, ca. 3 mm, crisped. Pedicel ca. 1 mm, glabrous. Calyx broadly campanulate, ca. 2.5 mm, pubescent, subglobose, dilated in fruit, not constricted at throat, obscurely veined; teeth lanceolate-subulate, ca. 1 mm. Corolla white, purplish, bluish or purple, ca. 2.5 mm, glabrous, tube ca. 1.5 mm; lobes subequal, upper emarginate. Ovary glabrous. Nutlets unknown.

Beijing Shi, Kunming Shi, Nanjing Shi, Shanghai Shi, Yunnan (Lijiang Xian) [Europe].

Cultivated in China.

Most widely known as *Mentha rotundifolia* (Linnaeus) Hudson, but the holotype of that species has been shown to be a different plant of hybrid origin.

12. *Mentha pulegium* Linnaeus, Sp. Pl. 2: 577. 1753.

唇萼薄荷 chun e bo he

Pulegium vulgare Miller.

Herbs. Stolons with scalelike leaves. Stems ascending, rarely erect or trailing, 15–30(–50) cm, hirtellous, striate, tinged red-purple, much branched, internodes generally longer than leaves. Leaf blade ovate-orbicular to ovate, 0.8–1.3 cm × 5–7 mm, herbaceous, puberulent, base rounded, margin entire or sometimes remotely crenate, apex obtuse. Verticillasters 10–30-flowered, globose, 1–1.5 cm in diam., few, widely spaced; floral leaves sessile, recurved, shorter than verticillasters. Pedicel 2–3 mm. Calyx tubular, 2-lipped, 2.5–3 mm, hirtellous, glandular, throat bearded, ± conspicuously 10-veined, tube ca. 1.5 mm; upper lip

3-toothed, teeth lanceolate-triangular, ca. 1 mm; lower lip 2-toothed, teeth subulate, ca. 1.5 mm. Corolla rose, purple or rarely white, ca. 4.5 mm, puberulent; tube ca. 3 mm, abruptly saccate at apex; lobes oblong, ca. 1.5 mm, entire, upper lanceolate. Ovary glabrous. Fl. Sep.

Beijing Shi, Nanjing Shi, and other cities [Russia, Tajikistan, Turkmenistan; SW Asia, Europe].

Cultivated in China. Source of oil of pennyroyal. Employed in the manufacture of soaps and synthetic menthol. Used medicinally for flatulent colic, stomach ailments, and as a diaphoretic.

70. LYCOPUS Linnaeus, Sp. Pl. 1: 21. 1753.

地笋属 di sun shu

Herbs perennial, usually with enlarged rhizomes. Leaves dentate or pinnatifid. Verticillasters sessile, many flowered, subtended by minute bracteoles; floral leaves similar to stem leaves, gradually reduced upward; outer bracteoles equal to longer than calyx. Flowers sessile. Calyx campanulate, ± regular, glabrous inside; teeth 4 or 5, equal or 1 larger. Corolla campanulate, 2-lipped, throat intricately villous; upper lip entire or emarginate; lower lip 3-lobed, middle lobe larger than lateral lobes. Anterior stamens fertile, slightly exerted, straight, posterior 2 rudimentary or filiform, apex clavate or capitate; filaments glabrous; anther cells 2, parallel, becoming divergent. Style exerted, apex 2-cleft; lobes flattened, acute, equal or posterior smaller. Nutlets brown, dorsiventrally flattened, ± adaxially ribbed, glabrous or adaxially glandular, base cuneate, margin thickened, apex truncate.

About 10 species: E Hemisphere, North America; four species in China.

- 1a. Calyx teeth apex acute; nutlets longer than calyx 1. *L. parviflorus*
 1b. Calyx teeth apex spinescent; nutlets shorter than calyx.
 2a. Leaves shorter to slightly longer than internodes, remotely undulate-dentate above base 4. *L. cavaleriei*
 2b. Leaves much longer than internodes, not undulate-dentate.
 3a. Stem leaves coarsely dentate-serrate or lower ones ± pinnatifid, middle leaves remotely serrate, upper leaves entire 2. *L. lucidus*
 3b. Lower and middle stem leaves pinnatifid on margin basally, coarsely dentate on margin apically, upper leaves mostly coarse dentate 3. *L. europaeus*

1. *Lycopus parviflorus* Maximowicz, Prim. Fl. Amur. 216. 1859.

小花地笋 xiao hua di sun

Lycopus virginicus Linnaeus var. *parviflorus* (Maximowicz) Makino.

Rhizomes fusiform, producing filiform stolons with scalelike leaves. Stems erect, 25–40 cm, usually unbranched, densely fine puberulent. Leaves short petiolate, oblong-elliptic, mid stem leaves largest, others 3–5.5 × 1.2–2.5 cm, subglabrous or veins sparsely fine puberulent, sparsely yellowish glandular, base cuneate-attenuate, margin ± 4–6-serrate or entire. Verticillasters 7–10-flowered, not distinctly globose, subtended by 2 or 3 bracteoles; bracteoles linear-lanceolate, ca. 1 mm, ciliate. Calyx ca. 2 mm, pubescent; teeth 5, ovate, ca. 0.8 mm, apex acute, ciliolate, 1 tooth slightly smaller. Corolla white, ca. 2 mm, pubescent, tube ca. 1 mm; limb obscurely 2-lipped, upper lip straight, lower lip spreading. Stamens slightly longer than corolla. Nutlets unknown. Fl. Jul.

• Wet grasslands; 600 m. Heilongjiang, Jilin.

2. *Lycopus lucidus* Turczaninow ex Benth, Prodr. 12: 178. 1848.

地笋 di sun

Herbs perennial. Rhizomes swollen at apex, sometimes with enlarged stolons bearing scalelike leaves. Stems erect, 20–70 cm, usually unbranched, nodes ± tinged purple-red. Leaves subsessile or short petiolate, linear to oblong-lanceolate, ± arcuate, 4–8 × 1.2–2.5 cm, glabrous to minutely hispid-hirsute, abaxially impressed glandular, base attenuate, margin ± pinnatifid to ± entire, apex acuminate. Verticillasters globose, 1.2–1.5 cm in diam.; bracteoles ovate to lanceolate, ciliolate, spinescent, outermost to 5 mm and 3-veined, inner ones 2–3 mm and 1-veined. Calyx ca. 3 mm, glabrous, glandular; teeth 5, lanceolate-triangular, ca. 2 mm, apex spinescent, ciliolate. Corolla white, ca. 5 mm, glandular, throat white pubescent, tube ca. 3 mm; limb indistinctly 2-lipped, upper lip subcircular; lower lip 3-lobed, middle lobe larger. Nutlets obovoid, 4-sided, ca. 1.6 × 1.2 mm, abaxially flattened, glandular, base subattenuate. Fl. Jun-Sep, fr. Aug–Nov.

Marshy areas, grasslands, streamsides; 300–2600 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Russia].

- 1a. Stems slender, 20–50 cm tall; lower leaves elliptic to lanceolate, ± pinnatifid; middle leaves serrate; upper leaves linear-lanceolate, ± entire 2c. var. *maackianus*
 1b. Stems robust, 60–70 cm tall; leaves oblong-lanceolate, coarsely dentate-serrate.

- 2a. Stems glabrous or sparsely hirtellous on nodes; leaves glabrous 2a. var. *lucidus*
 2b. Stems hirtellous along angles, densely hirsute on nodes; leaves densely minutely hispid-hirsute adaxially and on veins abaxially, margin ciliate 2b. var. *hirtus*

2a. *Lycopus lucidus* var. *lucidus*

地笋 di sun

Stems robust, 60–70 cm tall, glabrous or sparsely hirtellous on nodes. Leaf blade oblong-lanceolate, glabrous, margin coarsely dentate-serrate.

Marshy areas, streamsides; 300–2600 m. Guizhou, Hebei, Heilongjiang, Jilin, Liaoning, Shanxi, Sichuan, Yunnan [Japan, Russia].

Rhizomes are prepared as a boiled vegetable and are also salted. Used medicinally.

2b. *Lycopus lucidus* var. *hirtus* Regel, Mém. Acad. Imp. Sci. Saint Pétersbourg 4: 115. 1861.

硬毛变种 ying mao bian zhong

Lycopus formosanus (Hayata) Sasaki; *L. lucidus* var. *formosanus* Hayata.

Stems hirtellous along angles, densely hirsute on nodes. Leaf blade lanceolate, dark green, densely minutely hispid-hirsute adaxially and mainly on veins abaxially, base attenuate, margin serrate, ciliate, apex attenuate.

Marshy areas; 300–2400 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Russia].

2c. *Lycopus lucidus* var. *maackianus* Maximowicz ex Herder, Bull. Soc. Imp. Naturalistes Moscou 61(1): 131. 1885.

异叶变种 yi ye bian zhong

Lycopus angustus Makino; *L. maackianus* (Maximowicz ex Herder) V. Komarov; *L. sinuatus* Regel.

Stems slender, 20–50 cm tall. Lower stem leaves elliptic to lanceolate, margin ± pinnatifid; mid leaves serrate; upper leaves linear-lanceolate, margin ± entire.

- Wet grasslands. Heilongjiang.

3. *Lycopus europaeus* Linnaeus, Sp. Pl. 1: 21. 1753.

欧地笋 ou di sun

Rhizomes transverse, producing long stolons enlarged at apex, with scalelike leaves. Stems erect, 15–80 cm, unbranched or apically branched. Petiole 0–5 mm; leaf blade oblong-elliptic to lanceolate-elliptic, 3–9 × 1–4 cm or more, base attenuate, apex acuminate; lower and mid stem leaves coarsely dentate, subglabrous or sparsely pubescent, glandular. Verticillasters globose, 8–10 mm in diam.; floral leaves sessile; outer bracteoles to 4 mm, inner ones ca. 3 mm, linear-subulate, spinescent. Calyx ca. 3 mm, puberulent, ± conspicuously 10–15-veined; teeth 4 or 5, ca. 2 mm, erect, linear-lanceolate, apex spinescent. Corolla white, red spotted on lower lip, nearly included, ca. 3 mm, puberulent; tube ca. 2.5 mm, intricately white villous inside; limb obscurely 2-lipped, ca. 0.5 mm; upper lip circular, emarginate, lobes subequal. Anterior stamens exerted,

posterior 2 lacking or reduced to staminodes. Nutlets 4-sided, ca. 1.5 × 1 mm, adaxially slightly swollen, glandular at middle, base slightly attenuate, apex rounded; areolae basal, white. Fl. Jun–Aug, fr. Aug–Sep.

Field margins, streamsides, grasslands; 700–1000 m. Hebei, Shaanxi, Xinjiang [Japan, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe, introduced in North America].

- 1a. Leaves 1–3 cm wide; calyx teeth longer than tube; staminodes generally lacking or filiform; nutlets shorter than calyx 3a. var. *europaeus*
 1b. Leaves more than 4 cm wide; calyx teeth generally as long as tube; staminodes capitellate; nutlets as long as calyx 3b. var. *exaltatus*

3a. *Lycopus europaeus* var. *europaeus*

欧地笋 ou di sun

Leaves 1–3 cm wide. Calyx teeth longer than tube. Staminodes usually lacking or filiform. Nutlets shorter than calyx.

Field margins, streamsides, wet grasslands; 700–1000 m. Hebei, Shaanxi, Xinjiang [Japan, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe, introduced in North America].

3b. *Lycopus europaeus* var. *exaltatus* (Linnaeus f.) J. D. Hooker, Fl. Brit. India 4: 648. 1885.

深裂变种 shen lie bian zhong

Lycopus exaltatus Linnaeus f., Suppl. Pl. 87. 1781 (1782); *L. pinnatifidus* Pallas.

Leaves more than 4 cm wide. Calyx teeth usually as long as tube. Staminodes capitellate. Nutlets as long as calyx.

Wet grasslands. Xinjiang [Kazakhstan, Kyrgyzstan, Russia; Europe].

Perhaps better treated as a distinct species.

4. *Lycopus cavaleriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 423. 1910.

小叶地笋 xiao ye di sun

Lycopus coreanus H. Léveillé; *L. coreanus* var. *cavaleriei* (H. Léveillé) C. Y. Wu & H. W. Li; *L. europaeus* Linnaeus var. *sinensis* H. Léveillé; *L. maackianus* (Maximowicz ex Herder) V. Komarov var. *ramosissimus* Makino; *L. ramosissimus* (Makino) Makino.

Rhizomes transverse, producing long underground stolons enlarged at apex, with scalelike leaves. Stems erect, 15–60 cm, puberulent to glabrous, nodes ± pubescent. Leaves sessile, oblong-obovate to ovate, 1.5–3 × 0.6–1.5 cm, subglabrous, glandular, base cuneate to cuneate-attenuate, margin undulate-dentate or irregularly crenate-dentate, apex acute. Verticillasters globose, 5–7 mm in diam.; bracteoles linear-subulate, ribbed, 1.5–2.5 mm, spinescent. Calyx 2.5–3 mm, puberulent, obscurely 10–15 veined; teeth 4 or 5, ca. 1 mm, triangular-lanceolate, apex spinescent. Corolla white, slightly exerted, 3–3.5 mm, limb glandular, intricately white ciliate inside; limb obscurely 2-lipped, lips ca. 1 mm, subequal; upper lip circular, emarginate, lower lobes subequal. Anterior stamens as long as corolla, posterior 2 lacking or reduced to filiform staminodes. Nutlets obovoid,

4-angled, adaxially slightly swollen, glandular; areolae basal, white. Fl. Jul-Aug, fr. Aug-Sep.

Hills, streamsides, field margins; 900–1700 m. Anhui, Guizhou, Jiangxi, Jilin, Sichuan, Yunnan, Zhejiang [Japan, Korea].

71. *PERILLA* Linnaeus, Gen. Pl., ed. 6, 578. 1764.

紫苏属 *zi su shu*

Herbs aromatic, annual. Leaves dentate. Verticillasters 2-flowered, in terminal and axillary secund racemes; bracts broadly ovate to subcircular. Flowers pedicellate. Calyx campanulate, 10-veined, straight in flower, enlarged, spreading or pendulous, swollen on 1 side in fruit, throat pilose annulate, limb 2-lipped, upper lip 3-toothed, with middle tooth smallest, lower lip 2-toothed, teeth lanceolate. Corolla white to purple-red, campanulate, throat oblique; limb nearly 2-lipped, upper lip emarginate; lower lip 3-lobed, lateral lobes smaller than middle, similar to upper lip. Stamens 4, subequal or anterior 2 longer, erect, separate; anther cells 2, parallel, becoming divergent or divaricate. Style included, apex 2-cleft; lobes subequal, subulate. Nutlets subglobose, netted.

Monotypic: Asia.

1. *Perilla frutescens* (Linnaeus) Britton, Mem. Torrey Bot. Club 5: 277. 1894.

紫苏 *zi su*

Herbs erect. Stems 0.3–2 m tall, green or purple, finely pilose or densely villous. Petiole 3–5 cm; leaf blade broadly ovate to circular, 4.5–13 × 2.8–10 cm, green, purplish, or purple-black, pilose or adaxially pilose, abaxially appressed villous, base rounded to broadly cuneate, margin narrowly to coarsely serrate, apex short acuminate or mucronate. Verticillasters 1.5–15 cm, densely villous; bracts ca. 4 × 4 mm, short acuminate, red-brown glandular. Pedicel ca. 1.5 mm, densely villous. Calyx ca. 3 mm, erect, base villous, yellow glandular, lower lip longer than upper lip; fruiting calyx 4–11 mm, base villous or pilose, glandular. Corolla 3–4 mm, slightly puberulent, tube 2–2.5 mm. Nutlets gray-brown or tawny, 1–1.5 mm in diam. Fl. Aug-Nov, fr. Aug-Dec.

Waste areas, cultivated in gardens. Fujian, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Jiangsu, Jiangxi, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, Cambodia, India, Indonesia (Java), Japan, Korea, Laos, Vietnam].

- 1a. Leaves strongly narrow serrate, purple
..... 1c. var. *crispa*
1b. Leaves coarsely serrate, sometimes green at least adaxially.
2a. Fruiting calyx to 1.1 cm, base villous; stem densely villous; leaves broadly ovate to circular, 7–13 × 4.5–10 cm, adaxially pilose, abaxially appressed villous; nutlets gray-brown, ca. 1.5 mm in diam. 1a. var. *frutescens*
2b. Fruiting calyx 4–5.5 mm, base pilose; stem finely pilose; leaves ovate, 4.5–7.5 × 2.8–5 cm, pilose; nutlets tawny, 1–1.5 mm in diam.
..... 1b. var. *purpurascens*

1a. *Perilla frutescens* var. *frutescens*

紫苏 *zi su*

Ocimum frutescens Linnaeus, Sp. Pl. 2: 597. 1753; *Melissa cretica* Loureiro; *Melissa maxima* Arduino; *Mentha perilloides* Lamarck; *Perilla avium* Dunn; *P. ocymoides* Linnaeus; *P. urticaefolia* Salisbury.

Stems densely villous. Leaves broadly ovate to orbicular, 7–13 × 4.5–10 cm, green or purple, adaxially pilose, abaxially appressed villous, margin coarsely serrate. Fruiting calyx to 1.1 cm, base villous, glandular. Nutlets gray-brown, ca. 1.5 mm in diam.

Widely cultivated in China [Bhutan, Cambodia, India, Indonesia (Java), Japan, Korea, Laos, Vietnam].

Seeds are a source of perilla oil, a drying oil resembling linseed oil, which is used in waterproofing paper, manufacturing cheaper lacquer vanishes, printing ink, and painting. Leaves are used for flavoring dishes in India and China.

1b. *Perilla frutescens* var. *purpurascens* (Hayata) H. W. Li, Acta Bot. Yunnan. 13: 350. 1991.

野生紫苏 *ye sheng zi su*

Perilla ocymoides Linnaeus var. *purpurascens* Hayata, Icon. Pl. Formos. 8: 103. 1919; *Ocimum acutum* Thunberg; *P. albiflora* Odashima; *P. frutescens* var. *acuta* (Thunberg) Kudô; *P. schimadae* Kudô.

Stems finely pilose. Leaves ovate, 4.5–7.5 × 2.8–5 cm, pilose. Fruiting calyx, 4–5.5 mm, base pilose, glandular. Nutlets tawny, 1–1.5 mm in diam.

Waste areas, cultivated in gardens. Fujian, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Jiangsu, Jiangxi, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Japan].

1c. *Perilla frutescens* var. *crispa* (Benth) Deane ex Bailey, Manual Cult. Plants, Ed. 1: 646. 1924.

回回苏 *hui hui su*

Perilla ocymoides Linnaeus var. *crispa* Benth, Prodr. 12: 164. 1848; *Dentidia nankinensis* Loureiro; *D. purpurascens* Persoon; *D. purpurea* Poir; *Mentha reticulosa* Hance; *Ocimum crispum* Thunberg; *Perilla arguta* Benth; *Perilla frutescens* var. *arguta* (Benth) Handel-Mazzetti; *Perilla frutescens* var. *crispa* (Thunberg) Handel-Mazzetti (1939); *Perilla frutescens* var. *nankinensis* (Loureiro) Britton; *Perilla frutescens* var. *crispa* Deane; *Perilla nankinensis* (Loureiro) Decaisne; *Plectranthus nankinensis* (Loureiro) Sprengel.

Leaves narrowly serrate, purple.

Widely cultivated in China [Japan].

Leaves and flower clusters used as a condiment or salted and eaten. Leaves give a purplish red tint to salted fruits of *Prunus mume*. Cotyledons of seedlings also used as a condiment.

The nomenclature of this taxon is complex and depends on the interpretation of Bailey (1924). The oldest epithet at the specific rank is *Ocimum crispum* Thunberg (1784). The oldest epithet at the varietal rank is *Perilla ocymoides* var. *crispa* Benth (1848) which is based on different material. This epithet should have been taken up by Britton (1894) who cited Benth's taxon under his *Perilla*

frutescens var. *nankinensis* based on *Dentidia nankinensis* Loureiro (1790), thus making that name illegitimate. Bailey ascribes the name taken up to Deane who gives a description and cites "var. *nankinensis* Bailey." It seems best to accept this as a reference to var. *nankinensis* Britton and thus indirectly to Benth. If this is not done, then Deane's name must be accepted as new and ascribed directly to him.

72. MOSLA (Benth) Buchanan-Hamilton ex Maximowicz, Bull. Acad.

Imp. Sci. Saint Pétersbourg, sér. 3, 20: 456. 1875.

石芥苳屬 shi qi zhu shu

Hedeoma Persoon sect. *Mosla* Benth, Labiat. Gen. Spec. 366. 1834.

Herbs aromatic, annual. Leaves petiolate, dentate, abaxially conspicuously impressed glandular. Verticillasters 2-flowered, in terminal racemes; bracts small or lower ones leaflike. Flowers pedicellate. Calyx campanulate, 10-veined, throat hairy, limb subequally 5-toothed or 2-lipped; upper lip 3-toothed, teeth acute to obtuse; lower lip 2-toothed, teeth lanceolate; fruiting calyx dilated, with base swollen on 1 side. Corolla white or rose to purple-red, tube glabrous or hairy annulate inside; limb nearly 2-lipped, upper lip emarginate; lower lip 3-lobed, margin crenate; lateral lobes smaller than middle lobe, emarginate. Stamens 4, posterior 2 fertile, anterior 2 reduced, with indistinct anther cells; anther cells 2, divaricate. Style apex subequally to equally 2-cleft. Nutlets subglobose to globose, sparsely netted or pitted with small depressions; areolae basal, dotlike.

About 22 species: Cambodia, China, India, Indonesia, Japan, Korea, Laos, Malaysia, Philippines, Vietnam; 12 species in China.

- 1a. Bracts ovate-lanceolate to circular-obovate; calyx subequally 5-toothed; nutlets pitted with small depressions.
 - 2a. Bracts ovate-lanceolate, 4–6(–9) mm.
 - 3a. Racemes dense, occupying a large part of each stem or branch; leaves few 4. *M. longispica*
 - 3b. Racemes lax, occupying a small part of each stem or branch; leaves many 5. *M. pauciflora*
 - 2b. Bracts broadly ovate, subcircular, to circular-obovate, 1.5–7 mm.
 - 4a. Bracts 1.5–2.5 mm, loosely arranged 3. *M. soochowensis*
 - 4b. Bracts 4–7 × 3–5 mm, overlapping.
 - 5a. Leaves lanceolate, 5–13 mm; corolla ca. 10 mm 2. *M. hangchowensis*
 - 5b. Leaves linear-oblong to linear-lanceolate, 2–4(–7) mm; corolla ca. 5 mm 1. *M. chinensis*
- 1b. Bracts ovate-lanceolate, lanceolate, to needlelike, generally shorter than flowers; calyx 2-lipped; nutlets sparsely netted rarely pitted with small depressions.
 - 6a. Upper calyx teeth acute.
 - 7a. Stem retrorse fine puberulent, glabrescent; leaves coarsely 3–5-serrate 7. *M. grosseserrata*
 - 7b. Stem densely pubescent; leaves serrate 6. *M. scabra*
 - 6b. Upper calyx teeth obtuse.
 - 8a. Plants leafless; stem retrorse gray pubescent; each branch with a many-flowered raceme; bracts ovate-lanceolate, 2.5–3.5 mm, 1.5–2 × as long as pedicels 8. *M. exfoliata*
 - 8b. Plants many leaved.
 - 9a. Corolla ca. 2.5 mm; plants sparsely villous, puberulent; leaves ovate to ovate-lanceolate 9. *M. cavaleriei*
 - 9b. Corolla 4–10 mm or more; plants not sparsely villous.
 - 10a. Leaves remotely serrate; bracts needlelike to linear-lanceolate 10. *M. dianthera*
 - 10b. Leaves crenate to crenate-serrate; bracts ovate to lanceolate.
 - 11a. Bracts much longer than pedicels; calyx ca. 2.7 mm; corolla slightly longer than calyx 11. *M. longibracteata*
 - 11b. Bracts as long as pedicels; calyx less than 2 mm; corolla ca. 3 × as long as calyx 12. *M. formosana*

1. *Mosla chinensis* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg 11: 805. 1883.

石香薷 shi xiang ru

Calamintha clipeata Vaniot; *Mosla fordii* Maximowicz; *Orthodon chinensis* (Maximowicz) Kudô; *O. fordii* (Maximowicz) Handel-Mazzetti.

Herbs erect. Stems 9–40 cm tall, much branched from base or unbranched, white pilose. Petiole 3–5 mm, sparsely pubescent; leaf blade linear-oblong to linear-lanceolate, 1.3–2.8(–3.3) cm × 2–4(–7) mm, sparsely pubescent, impressed brown glandular, adaxially olive green, abaxially

greenish, base attenuate to cuneate, margin remotely shallow serrate, apex acuminate to acute. Racemes terminal, capitate, 1–3 cm; bracts overlapping, rarely lax, circular-obovate, 4–7 × 3.5 mm, pilose, abaxially impressed glandular, ciliate, palmately 5-veined from base, margin entire, apex caudate. Pedicel sparsely pubescent. Calyx ca. 3 × 1.6 mm, white lanate, glandular, white lanate beyond throat inside, glabrous below throat; teeth 5, subulate, ca. 2/3 as long as calyx. Corolla purple-red, reddish, to white, ca. 5 mm, slightly longer than bracts, puberulent outside, sparsely puberulent on tube below lower lip inside, otherwise glabrous. Stamens included. Pistil included. Nutlets gray-brown, globose, ca.

1.2 mm in diam., glabrous, pitted with small depressions. Fl. Jun-Sep, fr. Jul-Nov.

Grassy slopes, forests; 0–1400 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Zhejiang [Vietnam].

Used medicinally.

2. *Mosla hangchowensis* Matsuda, Bot. Mag. (Tokyo) 26: 344. 1912.

杭州石荠苎 hang zhou shi qi zhu

Stem 50–60 cm tall, much branched, pubescent, brown glandular sometimes intermixed with spreading pilose hairs. Petiole 5–14 mm; leaf blade lanceolate, 1.5–4.2 cm × 5–13 mm, papery, glandular, adaxially olive green, abaxially gray, pubescent, impressed brown glandular, base broadly cuneate, margin remotely serrate, apex acute. Racemes 1–4 cm, usually many flowered; bracts broadly ovate to subcircular, 5–6 × 4–5 mm, green or purple, margin ciliate, apex acute to caudate. Pedicel pubescent. Calyx ca. 3.5 × 2.5 mm, pilose, teeth long subulate to lanceolate, ca. 3/4 as long as calyx. Corolla purple, ca. 3 × as long as calyx, pubescent; middle lobe of lower lip reflexed, circular, pubescent; lateral lobes erect, ovate. Posterior stamens inserted on base of upper lip, slightly exerted, anterior stamens inserted on base of lower lip; filaments shorter than anthers; anthers linear, cells divergent, ca. 2 mm, connectives distinct. Style exerted. Nutlets brownish, globose, ca. 2.1 mm in diam., pitted with small depressions. Fl. and fr. Jun-Sep.

• Roadsides. Zhejiang.

- 1a. Verticillasters ± approximate; bracts overlapping; calyx teeth lanceolate, posterior tooth longer 2a. var. *hangchowensis*
1b. Verticillasters widely spaced; bracts not overlapping; calyx teeth long subulate, subequal 2b. var. *cheteana*

2a. *Mosla hangchowensis* var. *hangchowensis*

杭州石荠苎 hang zhou shi qi zhu

Orthodon hangchowensis (Matsuda) C. Y. Wu.

Verticillasters ± approximate; bracts overlapping. Calyx teeth lanceolate, posterior tooth longer.

• Zhejiang.

2b. *Mosla hangchowensis* var. *cheteana* (Sun ex C. H. Hu) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 12: 230. 1974.

建德变种 jian de bian zhong

Orthodon hangchowensis (Matsuda) C. Y. Wu var. *cheteana* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 46. 1966.

Verticillasters widely spaced; bracts not overlapping. Calyx teeth long subulate, subequal.

• Roadsides. Zhejiang.

3. *Mosla soochowensis* Matsuda, Bot. Mag. (Tokyo) 26: 134. 1912.

苏州荠苎 su zhou qi zhu

Orthodon soochowensis (Matsuda) C. Y. Wu.

Stems 12–50 cm tall, much branched, sparsely pubescent. Petiole 2–7 mm, sparsely puberulent; leaf blade linear-lanceolate to lanceolate, 1.2–2.2(–3.5) cm × 2–4(–10) mm, adaxially puberulent, sparsely glandular, abaxially sparsely impressed glandular, sparsely minutely hispid on veins, base attenuate-cuneate, margin serrulate, apex acuminate. Racemes 2–5 cm, lax; bracts subcircular-ovate, 1.5–2.5 mm, caudate. Pedicel 1–3 mm, elongated in fruit, puberulent. Calyx ca. 3 × 2.1 mm, pilose, yellow glandular, throat pilose; upper teeth lanceolate, ca. 1.5 mm; lower teeth narrowly lanceolate, 2–2.2 mm; fruiting calyx dilated, base saccate in front. Corolla purple, 6–7 mm, puberulent outside, pubescent on lower lip inside and apical part of tube just below lower lip; upper lip erect. Posterior stamens slightly exerted, anterior 2 included. Style exerted. Nutlets brown, globose, ca. 1 mm in diam., netted. Fl. Jul-Oct, fr. Sep-Nov.

• Grassy slopes. Anhui, Jiangsu, Jiangxi, Zhejiang.

4. *Mosla longispica* (C. Y. Wu) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 12: 230. 1974.

长穗荠苎 chang sui qi zhu

Orthodon longispicus C. Y. Wu, Acta Phytotax. Sin. 10: 231. 1965.

Taproots cylindrical. Stems erect, ca. 40 cm tall, much branched from base; branches nearly as long as stem, with numerous fertile branchlets; branches and stem brown-red, sparsely tawny or white floccose-pubescent, few leaved. Petiole 1–4(–15) mm; leaf blade linear, 0.7–1.5 cm × 2.5–6 mm, papery, densely fine tawny pilose, sometimes subglabrous, glandular, densely so abaxially, base attenuate, margin few serrate, apex obtuse to acute. Racemes numerous, 1.5–10 cm; bracts ovate-lanceolate, 4–4.5 × 1.7–2 mm, apex abruptly acuminate. Pedicel 1–1.5 mm after anthesis, densely villous. Calyx ca. 2.5 × 2 mm, densely grayish yellow villous especially on veins, bearded apex just below middle lobe of lower lip inside; tube ca. 2 mm, gradually dilated upward; upper lip erect, emarginate; lower lip 3-lobed, middle lobe crenate. Nutlets gray, 1 at maturity, globose, ca. 1.2 mm in diam., pitted with small depressions. Fl. and fr. Nov.

• Roadsides; 1100 m. Jiangxi.

5. *Mosla pauciflora* (C. Y. Wu) C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 12: 230. 1974.

少花荠苎 shao hua qi zhu

Orthodon pauciflorus C. Y. Wu, Acta Phytotax. Sin. 10: 231. 1965.

Herbs erect. Stems (15–)20–70 cm, much branched; branches slender, elongated, retrorse white pubescent, nodes purplish. Petiole 0.5–1.5 cm; leaf blade lanceolate to narrowly lanceolate, 1.5–4 cm × 6–12 mm, papery, adaxially sparsely pubescent, ± conspicuously impressed brown glandular with age, abaxially sparsely impressed brown glandular, sparsely pubescent on veins, base attenuate, margin sparingly serrate, apex acute. Racemes 1.2–10 cm, subcapitate on branches; bracts ovate-lanceolate, 5–6(–10) × 2–4.5 mm, apex acuminate, much longer than pedicels. Pedicel ca. 1 mm, to 2 mm in fruit, pilose. Calyx ca. 3 × 2 mm, to 7 × 4 mm in fruit, white pilose, limb nearly 2-lipped, posterior teeth shorter, narrowly lanceolate, base saccate. Corolla purple, ca. 4 mm, puberulent, bearded just below middle lobe of lower lip

inside; tube ca. 3 mm, gradually dilated at apex; upper lip erect, flat; middle lobe of lower lip crenate. Nutlets dark brown, globose, ca. 1.5 mm in diam., pitted with small depressions. Fl. Sep-Oct, fr. Oct.

• Forest margins, streamsides; 1000–1300 m. Guizhou, Hubei, Sichuan.

6. *Mosla scabra* (Thunberg) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 12: 230. 1974.

石荠苎 shi qi zhu

Ocimum scabrum Thunberg, Trans. Linn. Soc. London 2: 338. 1794; *Mosla lanceolata* (Benth) Maximowicz; *M. punctata* (Thunberg) Maximowicz; *Ocimum punctatum* Thunberg; *Ocimum punctulatum* J. Gmelin; *Orthodon lanceolatus* (Benth) Kudô; *Orthodon punctatum* (Thunberg) Kudô; *Orthodon punctulatum* (J. Gmelin) Ohwi; *Orthodon scaber* (Thunberg) Handel-Mazzetti; *Perilla lanceolata* Benth.

Stems 20–100 cm tall, much branched, densely pubescent. Petiole 0.3–1.6(–2) cm; leaf blade ovate to ovate-lanceolate, 1.5–3.5 × 0.9–1.7 cm, papery, abaxially gray, subglabrous or sparsely pubescent, densely impressed glandular, base rounded to broadly cuneate, margin serrate, apex acute to obtuse. Racemes 2.5–15 cm; bracts ovate, 2.7–3.5 mm, densely fine white pilose. Calyx ca. 2.5 × 2 mm, pilose outside, limb 2-lipped; upper lip teeth ovate-lanceolate, apex acuminate, middle tooth smaller; lower lip teeth linear, apex acute; fruiting calyx to 4 × 3 mm, distinctly veined. Corolla reddish, 4–5 mm, puberulent, hairy annulate near base inside, tube gradually dilated at apex, upper lip straight, middle lobe of lower lip crenate. Nutlets yellow-brown; globose, ca. 1 mm in diam., pitted with small depressions. Fl. May–Nov, fr. Sep–Nov.

Hills, thickets; 0–1100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shaanxi, Sichuan, Taiwan, Zhejiang [Japan, Vietnam].

Used medicinally.

7. *Mosla grosseserrata* Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg, sér. 3, 20: 458. 1875.

荠苎 qi zhu

Orthodon grosseserrata (Maximowicz) Kudô.

Herbs annual. Stems 10–60(–70) cm, erect, finely retrorse puberulent, glabrescent, shiny green, branches spreading. Leaves ovate, base attenuate, margin 3–5-dentate, sometimes with 1 or 2 small teeth, apex acute. Racemes short; bracts very small, ca. 2.5 mm, lanceolate, longer than pedicels. Calyx 2–3 mm, pubescent, glabrescent in fruit, shiny glandular; teeth of upper lip acute, middle tooth shorter; lower teeth narrower, apex acuminate. Corolla 3.5–4 mm; upper lip ca. 2 × as long as lower lip, rounded. Stamines with distinct anther cells. Nutlets shorter than calyx tube, subglobose, base slightly acute, loosely netted, of 1 color (specimens not seen: description based on Volkova, Fl. U.S.S.R. 21: 633. 1954).

Anhui, Jiangsu, Jilin, Liaoning [Japan].

8. *Mosla exfoliata* (C. Y. Wu) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 12: 231. 1974.

无叶荠苎 wu ye qi zhu

Orthodon exfoliatus C. Y. Wu, Acta Phytotax. Sin. 10: 232. 1965.

Herbs erect. Stems 20–35 cm tall, purple-red, 4-angled, 4-sulcate, branched, retrorse gray pubescent, leafless. Racemes numerous, 1–10 cm; bracts ovate-lanceolate, 2.5–3.5 cm × 1–1.5 mm, 1.5–2 × as long as pedicels, gray pubescent, base attenuate, margin entire, ciliate, apex acute to acuminate. Calyx ca. 3.5 × 2.5 mm, to 5 × 4 mm in fruit, tube villous, otherwise pilose, limb 2-lipped, upper teeth triangular, middle tooth slightly shorter. Corolla purple, slightly exerted beyond calyx, puberulent outside. Nutlets unknown.

• Open hills. Sichuan.

9. *Mosla cavaleriei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 247. 1911.

小花荠苎 xiao hua qi zhu

Orthodon cavaleriei (H. Léveillé) Kudô.

Stems 25–100 cm tall, sparsely villous, puberulent, branched. Petiole 1–2 cm; leaf blade ovate to ovate-lanceolate, 2–5 × 1–2.5 cm, papery, pilose, abaxially sparsely impressed glandular, base rounded to broadly cuneate, margin serrulate, apex acute. Racemes 2.5–4.5 cm in flower, to 8 cm in fruit, finely pilose; bracts minute, ovate-lanceolate, to slightly longer than pedicels. Pedicel ca. 1 mm. Calyx ca. 1.2 × 1.2 mm, dilated in fruit, pilose outside; upper teeth minute, triangular; lower teeth slightly longer. Corolla purple or reddish, ca. 2.5 mm, pubescent outside, lower lip slightly longer than upper lip. Nutlets gray-brown, globose, ca. 1.5 mm in diam., loosely netted, glabrous. Fl. Sep–Nov, fr. Oct–Dec.

Sparse forests, hilly grasslands; 700–1600 m. Guangdong, Guangxi, Guizhou, Hubei, Jiangxi, Sichuan, Yunnan, Zhejiang [Vietnam].

Used medicinally.

10. *Mosla dianthera* (Buchanan-Hamilton ex Roxburgh) Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg, sér. 3, 20: 457. 1875.

小鱼仙草 xiao yu xian cao

Lycopus dianthera Buchanan-Hamilton ex Roxburgh, Fl. Ind. 1: 144. 1820; *Cunila nepalensis* D. Don; *Hedeoma nepalensis* (D. Don) Benth; *Melissa nepalensis* (D. Don) Benth; *Mosla ocimoides* Buchanan-Hamilton ex Benth; *Mosla remotiflora* Sun; *Orthodon diantherus* (Buchanan-Hamilton ex Roxburgh) Handel-Mazzetti; *O. punctatum* (Thunberg) Kudô var. *tetrantherus* Handel-Mazzetti.

Stems to 1 m, subglabrous, much branched. Petiole 0.3–1.8 cm, adaxially puberulent; leaf blade ovate-lanceolate to rhombic-lanceolate, 1.2–3.5 × 0.5–1.8 cm, papery, adaxially glabrous or subglabrous, abaxially gray, glabrous, sparsely impressed glandular, base attenuate, margin remotely acute serrate, apex acuminate to acute. Racemes numerous, 3–15 cm; bracts needlelike to linear-lanceolate, subglabrous, base broadly cuneate, apex acuminate, to 1 mm, rarely to 4 mm in fruit; rachis subglabrous. Pedicel ca. 1 mm, to 4 mm in fruit, finely puberulent. Calyx ca. 2 × 2–2.6 mm, dilated to ca. 3.5 × 4 mm in fruit, veins minutely hispid; upper lip reflexed, teeth ovate-triangular, middle tooth shorter than lateral; lower lip erect, teeth to slightly longer than upper lip. Corolla purplish, 4–5 mm, puberulent, inside obscurely hairy annulate or without hairy annulus. Nutlets gray-brown, subglobose, 1–1.6 mm in diam., loosely netted. Fl. and fr. May–Nov.

Hills, near water; 200–2300 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India (Sikkim), Japan, Malaysia, Myanmar, Nepal, Pakistan, Vietnam].

Used medicinally.

11. *Mosla longibracteata* (C. Y. Wu & Hsuan) C. Y. Wu & H. W. Li, Acta Phytotax, Sin. 12: 232. 1974.

长苞芥苳 chang bao qi zhu

Orthodon longibracteatus C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 232. 1965.

Stems 30–50 cm, retrorse minutely hispid on angles and nodes, much branched. Petiole 6–12 mm, minutely hispid; leaf blade obovate to rhombic, 1.6–3.3 × 0.9–1.6 cm, papery, olive green, glabrous, abaxially sparsely glandular, base attenuate, decurrent, margin crenate or crenate-serrate on upper half, apex obtuse. Racemes 6–11 cm; bracts ovate-lanceolate to lanceolate, 4–6.5 × 0.8–3 mm, much longer than pedicels, lower bracts sometimes leaflike. Calyx ca. 2.7 × 2.2 mm, dilated to 6 × 5 mm in fruit, puberulent, retrorse minutely hispid on veins, sparsely glandular; posterior teeth obtuse triangular, middle tooth minute; anterior teeth lanceolate, slightly longer. Corolla reddish or whitish, slightly longer than calyx, without hairy annulus inside. Nutlets yellow-brown, subglobose, ca. 1.5 mm in diam., loosely netted. Fl. Sep–Oct, fr. Nov.

• Foothills, riverbanks; 500 m. Guangxi, Zhejiang.

12. *Mosla formosana* Maximowicz, Bull. Acad. Imp. Sci. Saint Pétersbourg, sér. 3, 20: 459. 1875.

台湾芥苳 tai wan qi zhu

Mosla lysimachiiflora Hayata; *Orthodon formosanus* (Maximowicz) Kudô; *O. lysimachiiflorus* (Hayata) Masamune.

Stems erect, branched, subglabrous. Petiole 3–12 mm, adaxially slightly scaly puberulent; leaf blade ovate to ovate-lanceolate, 1.5–3 × 0.7–1.5 cm, subglabrous, abaxially sparsely impressed glandular, base broadly cuneate, margin crenate-serrate, apex obtuse to acute. Racemes 3–9 cm, finely puberulent; bracts lanceolate, 1.5–2.5 mm, subglabrous, apex acute. Pedicel 1.5–2.5 mm. Calyx ca. 2 × 2 mm, dilated to ca. 5 × 3 mm in fruit, sparsely fine glandular hairy, veins finely pilose; upper teeth triangular, obtuse, middle tooth shorter. Corolla ca. 5 mm, puberulent, without hairy annulus inside, upper lip straight. Style exerted. Nutlets yellow-brown, ovoid, ca. 1 mm, loosely netted, areolae indistinct. Fl. and fr. Oct.

Taiwan [Philippines].

73. LEUCOSCEPTRUM Smith, Exot. Bot. 2: 113. 1805.

米团花属 mi tuan hua shu

Shrubs to small trees, bark smooth, stellate-tomentose. Leaves petiolate. Verticillasters in dense, terminal cylindrical spikes; bracts subreniform, densely overlapping; bracteoles minute, linear. Pedicel short. Calyx campanulate, densely tomentose, slightly curved, 15-veined; teeth 5(–7), equal, triangular. Corolla white or reddish to purple-red, tubular, with a hairy annulus inside; limb 2-lipped, upper lip emarginate; lower lip 3-lobed, middle lobe larger. Stamens 4, anterior 2 longer, inserted at middle of corolla tube; filaments slender, densely puberulent at base, involute in bud, much exerted in flower; anthers 1-locellate, reniform, transversely dehiscent, basifixed. Ovary 4-lobed, tuberculate. Style slender, apex subequally 2-cleft, lobes subulate. Disc subannular, equally shallow 4-lobed. Nutlets triquetrous, oblong, apex truncate, areolae basal.

Monotypic: Bhutan, China, India, Laos, Myanmar, Nepal, Vietnam.

While *Leucosceptrum stellipilum* (Miquel) Kitamura & Murata var. *formosanum* (Ohwi) Kitamura & Murata (Acta Phytotax. Geobot. 20: 171. 1962) was recently cited by T. C. Huang & W. T. Cheng (Fl. Taiwan 4: 481. 1978), H. W. Li believes this taxon to be a *Comanthosphace* which he maintains as distinct from *Leucosceptrum*.

1. *Leucosceptrum canum* Smith, Exot. Bot. 2: 113. 1805.

米团花 mi tuan hua

Clerodendron leucosceptrum D. Don; *Comanthosphace nepalensis* Kitamura & Murata; *Teucrium macrostachyum* Wallich ex Benth.

Plants 1.5–7 m tall, bark gray-yellow or brown, exfoliating; branches densely gray or yellowish tomentose when young, brownish, puberulent or subglabrous with age. Petiole 1.5–3(–4.5) cm, densely yellowish tomentose; leaf blade elliptic-lanceolate, 10–23 × 5–9 cm, papery, densely gray or yellowish tomentose-stellate/floccose when young,

adaxially glabrescent or puberulent on midrib, base cuneate, margin serrate or sometimes crenate, apex acuminate. Spikes 10–13 cm, dense, cylindric, densely stellate-tomentose; verticillasters 6- to many flowered; bracts acute, margin entire or irregularly crenate, deciduous in fruit. Pedicel ca. 1 mm. Calyx 6–8 mm, densely yellowish stellate-tomentose, tuberculate, glabrous inside, teeth to 1.5 mm. Corolla 8–9 mm, stellate-tomentose outside. Nutlets smooth abaxially,

with sparse ± transparent tubercles adaxially. Fl. Nov–Mar, fr. Mar–May.

Dry open waste areas, forest margins, valley streamsides, second growth forests, thickets; 1000–2600 m. Sichuan, Xizang, Yunnan [Bhutan, India, Laos, Myanmar, Nepal, Vietnam].

A honey plant.

74. ELSHOLTZIA Willdenow, Bot. Mag. (Römer & Usteri) 4(11): 3. 1790.

香薷属 xiang ru shu

Herbs, subshrubs, or shrubs. Verticillasters in continuous or interrupted spikes or capitula; spikes cylindric or secund, often compact, sometimes in panicles; bracts ovate or flabellate to minute, narrower than calyx. Calyx campanulate or cylindric, throat glabrous; teeth 5, subequal or anterior 2 longer. Corolla white, yellowish, or purplish, 2-lipped, hairy and glandular outside, hairy annulate or glabrous inside; tube to slightly longer than calyx, straight or slightly curved, funnelform; upper lip straight, margin entire or emarginate; lower lip spreading, 3-lobed, lateral lobes entire; middle lobe largest, margin entire, apex erose or emarginate. Stamens 4, usually exerted, anterior 2 longer, rarely undeveloped, free; filaments glabrous; anther cells 2, divergent or divaricate, apex confluent. Ovary glabrous. Style usually exerted beyond stamens, apex deeply to shallowly 2-cleft; lobes subulate, sublinear or clavate, usually equal. Nutlets ovoid to oblong, glabrous or sparsely hairy, tuberculate or smooth.

About 40 species: Europe, Japan, Korea, North America; 33 species in China.

- 1a. Bracts lanceolate, subulate or linear.
 - 2a. Abaxial surface of leaves white tomentose, sometimes yellowish tomentose when dry, different in color from adaxial surface.
 - 3a. Leaves long petiolate, elliptic to rhombic-ovate, adaxially finely corrugate, obtusely serrate; verticillasters pedunculate, loosely capitate on basal part of spikes; corolla white, sometimes purple or yellowish 1. *E. rugulosa*
 - 3b. Leaves subsessile or short petiolate, lanceolate or oblanceolate, adaxially not finely corrugate, serrulate above base; verticillasters sessile, capitate; corolla white to green-yellow 2. *E. myosurus*
 - 2b. Abaxial surface of leaves glabrous or hairy, of same color as adaxial surface.
 - 4a. Abaxial surface of leaves glabrous or puberulent on veins.
 - 5a. Lower verticillasters widely spaced; flowers pendulous when open; calyx glabrous outside 11. *E. penduliflora*
 - 5b. Verticillasters continuous; flowers not pendulous when open; calyx tomentose outside.
 - 6a. Spikes ± secund; corolla ca. 9 mm, rose-purple; leaves lanceolate to oblong-lanceolate 7. *E. stauntonii*
 - 6b. Spikes cylindric; corolla ca. 4 mm, white; leaves rhombic-lanceolate 4. *E. glabra*
 - 4b. Abaxial surfaces of leaves variously hairy.
 - 7a. Shrubs or subshrubs; corolla white or yellow.
 - 8a. Inflorescences capitate; leaves elliptic-oblong to oblong, 0.8–2 cm × 2–5 mm, densely floccose-pubescent, shallowly crenate above base 9. *E. capituligera*
 - 8b. Inflorescences spicate; leaves larger than 2 cm × 5 mm, coarsely dentate.
 - 9a. Spikes ± secund, loose; bracts subulate to lanceolate-subulate 14. *E. blanda*
 - 9b. Spikes cylindric, compact; bracts lanceolate.
 - 10a. Leaves lanceolate to elliptic-lanceolate, coarsely serrate, apex acuminate 3. *E. fruticosa*
 - 10b. Leaves ovate to oblong, crenate to crenate-serrate, apex acute.
 - 11a. Bracts conspicuous; calyx densely lanate-pilose outside; leaves subsessile 5. *E. eriocalyx*
 - 11b. Bracts inconspicuous; calyx yellowish white tomentose outside; leaves petiolate 6. *E. ochroleuca*
 - 7b. Herbs; corolla mostly purple-red, rarely white.
 - 12a. Inflorescences capitate, loose; annual diffuse herbs 12. *E. cephalantha*
 - 12b. Inflorescences spicate, compact; erect herbs (except *E. pilosa*).
 - 13a. Inflorescences terminal, axillary; corolla white 8. *E. winitiana*
 - 13b. Inflorescences inserted on stem and branch apices; corolla rose-purple or purple.
 - 14a. Plants pilose-hispid; bracts densely, rigid, spreading white ciliate 13. *E. pilosa*
 - 14b. Plants pubescent; bracts pubescent or pilose.
 - 15a. Spikes 5(–8) mm in diam. in flower; leaves rhombic-ovate, incised-serrate above base, adaxially sparsely pubescent 15. *E. stachyodes*
 - 15b. Spikes 8–10 mm in diam. in flower; leaves ovate to oblong, serrate to crenate, adaxially puberulent or villous.
 - 16a. Plants with strong citral fragrance; calyx apex conspicuously curved forward after anthesis, densely lanate-villous; cultivated species, rarely naturalized 16. *E. communis*
 - 16b. Plants without citral fragrance; calyx apex straight curved forward, densely pubescent; native species 17. *E. cyprianii*
- 1b. Bracts flabellate, subcircular, or ± broadly ovate.
 - 17a. Leaves broadly ovate to subcircular, 8–15 cm 10. *E. flava*

- 17b. Leaves not broadly ovate or subcircular, 0.5–12 cm.
- 18a. Bracts united into a cup at each node, densely overlapping.
- 19a. Spikes cylindrical, not secund 20. *E. strobilifera*
- 19b. Spikes secund.
- 20a. Corolla white to yellowish; bract with numerous, irregular subulate teeth (entire or 1- or 2-toothed in var. *holostegia*) 23. *E. luteola*
- 20b. Corolla rose-purple; bracts 1-mucronate.
- 21a. Stems straight, unbranched or few branched on upper part, with slender, basal stolons; leaves heteromorphic 21. *E. heterophylla*
- 21b. Stems prostrate, ascending, base branched, sometimes with numerous short stolons; leaves not heteromorphic 22. *E. bodinieri*
- 18b. Bracts free.
- 22a. Spikes cylindrical.
- 23a. Spikes interrupted at base at anthesis.
- 24a. Corolla yellow; calyx densely yellow moniliform villous, cylindrical 18. *E. eriostachya*
- 24b. Corolla purplish; calyx densely purple moniliform villous, subglobose 19. *E. densa*
- 23b. Spikes not interrupted at base.
- 25a. Abaxial leaf surface densely puberulent, ± pilose on veins 27. *E. oldhamii*
- 25b. Abaxial leaf surface finely pilose or puberulent.
- 26a. Plants prostrate, producing adventitious roots on basal part of stem; leaves ovate to ovate-lanceolate; bracts pilose outside 25. *E. kachinensis*
- 26b. Plants erect, without adventitious roots on lower part of stem; leaves lanceolate to linear-lanceolate; bracts glabrous outside 28. *E. saxatilis*
- 22b. Spikes secund.
- 27a. Leaves 1–1.5 cm, linear to linear-lanceolate 26. *E. pygmaea*
- 27b. Leaves more than 1.5 cm, oblong or ovate to lanceolate.
- 28a. Leaf blade base rounded to shallowly cordate, auriculate-dentate; corolla rose red, 2–3 mm 24. *E. hunanensis*
- 28b. Leaf blade base attenuate, cuneate, decurrent, rarely rounded; corolla purple to rose-purple, 4.5–8 mm.
- 29a. Bracts usually discolored, glabrous or subglabrous, margin ciliate.
- 30a. Calyx teeth unequal, anterior 2 longer; leaves ovate to elliptic-lanceolate; corolla ca. 4.5 mm 33. *E. ciliata*
- 30b. Calyx teeth subequal; leaves ovate-triangular to oblong-lanceolate; corolla 6–7 mm 29. *E. splendens*
- 29b. Bracts usually purplish at least on veins, long pilose.
- 31a. Calyx teeth ± equal; petiole 8–25 mm; plants 50–100 cm 30. *E. argyi*
- 31b. Calyx teeth unequal, anterior 2 longer; petiole 2–8 mm; plants rarely to 50 cm.
- 32a. Petiole white floccose; leaf blade lanceolate, base attenuate, margin serrate, apex acuminate; corolla ca. 6 mm 31. *E. souliei*
- 32b. Petiole pubescent; leaf blade ovate, base rounded to broadly cuneate, margin crenate, apex obtuse; corolla ca. 8 mm 32. *E. feddei*

1. *Elsholtzia rugulosa* Hemsley, J. Linn. Soc., Bot. 26: 278. 1890.

野拔子 ye ba zi

Aphanochilus rugulosus (Hemsley) Kudô; *Elsholtzia labordei* Vaniot; *E. mairei* H. Léveillé; *Plectranthus labordei* (Vaniot) Diels.

Herbs to subshrubs. Stems 30–150 cm tall, much branched, branches densely white puberulent. Petiole 0.5–2.5 cm; leaf blade elliptic to rhombic-ovate, 2–7.5 × 1–3.5 cm, papery, adaxially hispid, rugulose, abaxially gray tomentose, base rounded to broadly cuneate, margin obtusely serrate with entire base, apex acute to slightly obtuse; lateral veins 4–6 paired, prominent abaxially. Spikes terminal 3–12 cm or more, mostly white tomentose; verticillasters pedunculate, dense at spike apex, lax at base; peduncle 1.2–2.5 cm; upper bracts lanceolate to subulate, 1–3 mm, margin entire. Pedicel less than 1 mm. Calyx campanulate, ca. 1.5 × 1 mm, white hispid; teeth equal or posterior 2 longer, ca. 0.7 mm. Corolla white, sometimes purple or yellowish, ca. 4 mm, villous

outside, obliquely hairy annulate inside, tube ca. 3 mm, ca. 1.5 mm wide at throat; upper lip less than 1 mm, apex emarginate; middle lobe of lower lip circular, ca. 1 × 1 mm, margin erose; lateral lobes semicircular. Anterior stamens exerted; filaments slightly hairy. Nutlets yellowish, oblong, slightly flattened, ca. 1 mm, smooth. Fl. and fr. Oct-Dec.

• Hilly grasslands, waste areas, forests, thickets; 1300–2800 m. Guangxi, Guizhou, Sichuan, Yunnan.

Used medicinally.

2. *Elsholtzia myosurus* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 160. 1913.

鼠尾香薷 shu wei xiang ru

Aphanochilus fruticosa (D. Don) Kudô var. *tomentella* (Rehder) Kudô; *A. myosurus* (Dunn) Kudô; *Elsholtzia fruticosa* (D. Don) Rehder var. *tomentella* Rehder.

Shrubs aromatic, 0.8–1.5 m tall. Branches densely stellate-puberulent. Petiole short or obsolete; leaf blade lanceolate to oblanceolate, 4.5–10 × 1–2.5 cm, adaxially

puberulent, glandular hairy, lanate, abaxially gray, stellate-tomentose, base cuneate, margin serrulate except for entire base, apex acute to acuminate; lateral veins 6- or 7-paired, conspicuously elevated abaxially. Spikes 4–13 cm, pedunculate, base interrupted; verticillasters many flowered; bracts subulate to linear, to 1 mm. Pedicel ca. 0.5 mm. Calyx campanulate, ca. 2 mm, ca. 1 mm wide at mouth, densely stellate-tomentose; teeth triangular-subulate, subequal, posterior 2 usually longer, ca. 0.5 mm; fruiting calyx tubular, to 3.5 × 1.5 mm. Corolla white to greenish yellow, ca. 5 mm; tube ca. 0.7 mm wide at base, widening to 1.5 mm wide at throat; upper lip ca. 0.6 mm, apex emarginate; middle lobe of lower lip circular, margin irregularly incised, ca. 1.5 × 1.5 mm; lateral lobes semicircular. Anterior stamens exerted; filaments filiform, glabrous. Stigma lobes unequal. Nutlets yellow, oblong, ca. 1.5 mm, smooth. Fl. Sep-Oct, fr. Nov.

- Hills, waste areas, valleys; 2600–3000 m. Sichuan, Yunnan.

3. *Elsholtzia fruticosa* (D. Don) Rehder, Pl. Wilson. 3: 381. 1917.

鸡骨柴 ji gu chai

Shrubs erect, 0.8–2 m tall, much branched. Stems and branches yellow- or purple-brown, white floccose-pilose, glabrescent, bark exfoliating. Petiole short to obsolete; leaf blade elliptic-lanceolate to oblong, 6–13 × 2–3.5 cm, densely yellow glandular, adaxially strigose, abaxially curved pubescent or glabrous except for sparsely puberulent veins, base narrowly cuneate, margin coarsely serrate except for entire base, apex acuminate; lateral veins 6–8 paired, prominent abaxially. Spikes cylindrical, 6–20 × to 1.3 cm in flower, base ± interrupted, mostly densely pubescent; verticillasters short pedunculate, many flowered; bracts mostly lanceolate to subulate, shorter than verticillasters. Pedicel 0.5–2 mm. Calyx campanulate, ca. 1.5 mm, gray pubescent; teeth triangular-subulate, ca. 0.5 mm, subequal; fruiting calyx tubular, ca. 3 × 1 mm, conspicuously veined. Corolla white to yellowish, ca. 5 mm, floccose outside, golden glandular, hairy annulate inside; tube ca. 4 mm, ca. 1 mm wide at base, to 2 mm wide at throat; upper lip erect, ca. 0.5 mm, apex emarginate; middle lobe of lower lip circular, ca. 1 mm; lateral lobes semicircular. Nutlets brown, oblong, ca. 1.5 × 0.5 mm, adaxially ribbed, apex obtuse. Fl. Jul-Sep, fr. Oct-Nov.

Grasslands, hills, mountains, valleys; 1200–3800 m. Gansu, Guangxi, Guizhou, Hubei, Sichuan, Xizang, Yunnan [Bhutan, India (Sikkim), Nepal].

- 1a. Leaves lanceolate to elliptic-lanceolate, abaxially curved pubescent 3a. var. *fruticosa*
 1b. Leaves oblong, abaxially glabrous except for sparsely puberulent veins 3b. var. *glabrifolia*

3a. *Elsholtzia fruticosa* var. *fruticosa*

鸡骨柴 ji gu chai

Perilla fruticosa D. Don, Prodr. Fl. Nepal. 115. 1825; *Aphanochilus fruticosus* (D. Don) Kudô; *A. polystachys* Benth; *Buddleia plectranthoidea* H. Léveillé; *Colebrookea oppositifolia* Loddiges; *Elsholtzia dielsii* H. Léveillé; *E. fruticosa* (D. Don) Rehder f. *inclusa* Sun ex C. H. Hu; *E. fruticosa* f. *leptostachya* C. Y. Wu & S. C. Huang; *E. fruticosa* var. *parvifolia* C. Y. Wu & S. C. Huang; *E. polystachya* Benth; *E. souliei* H. Léveillé; *E. tristis*

H. Léveillé; *Leucosceptrum plectranthoideum* (H. Léveillé) Marquand.

Leaf blade lanceolate to elliptic-lanceolate, abaxially curved pubescent.

Grasslands, open hills, valleys; 1200–3200 m. Gansu, Guangxi, Guizhou, Hubei, Sichuan, Xizang, Yunnan [Bhutan, India (Sikkim), Nepal].

Used medicinally.

3b. *Elsholtzia fruticosa* var. *glabrifolia* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 12: 338. 1974.

光叶变种 guang ye bian zhong

Leaf blade oblong, abaxially glabrous except for sparsely puberulent veins.

- Forests on limestone mountains; 3100–3800 m. Sichuan, Yunnan.

4. *Elsholtzia glabra* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 12: 338. 1974.

光香薷 guang xiang ru

Shrubs 1.5–2.5 m tall. Branchlets glabrous. Petiole short or obsolete; leaf blade rhombic-lanceolate, 6–15 × 2–4.6 cm, base cuneate-decurrent, margin crenate-serrate, entire at base, apex acuminate; veins densely puberulent, lateral veins 7- or 8-paired. Spikes 5–13 cm, gray tomentose, glandular; verticillasters short pedunculate, many flowered; bracts subulate, minute, early deciduous. Pedicel ca. 0.5 mm. Calyx campanulate, ca. 1.2 mm, densely gray tomentose, glandular outside, glabrous except for tomentose teeth inside; teeth triangular-subulate, ca. 0.5 mm, subequal. Corolla white, ca. 4 mm, pubescent, glandular outside, bearded annulate inside; tube funnellform, base ca. 1 mm, throat to 1.8 mm wide; upper lip ca. 0.5 mm, apex emarginate; middle lobe of lower lip subcircular, ca. 1 mm, margin erose; lateral lobes subtriangular, obtuse. Nutlets brownish, oblong, ca. 1 mm. Fl. Oct.

- Thicket margins, sparse forests; 1900–2400 m. Sichuan, Yunnan.

5. *Elsholtzia eriocalyx* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 12: 338. 1974.

毛萼香薷 mao e xiang ru

Subshrubs 1.5–2 m tall. Branches subcylindrical, brown-purple when dry, floccose-pilose. Petiole 1–3 mm; leaf blade elliptic to oblong, 4–12 × 1.5–4.5 cm, adaxially puberulent or subglabrous, abaxially puberulent or tomentose, glandular, base broadly cuneate to rounded, margin crenate-serrate, apex acute; lateral veins 4- or 5-paired, prominent abaxially. Spikes 5–8 × ca. 1.5 cm, densely lanate-pilose; verticillasters 8–10-flowered; bracts oblong to ovate-lanceolate, 4–7 × 1–1.5 mm. Pedicel ca. 1 mm. Calyx campanulate, ca. 2 mm, densely lanate-pilose, yellowish glandular outside, glabrous except for slightly puberulent teeth inside, margin ciliolate; teeth lanceolate, equal. Corolla yellow-white, ca. 7 mm, pubescent, glandular outside, hairy annulate inside; tube funnellform, throat to 2 mm wide; upper lip emarginate; middle lobe of lower lip circular, margin entire; lateral lobes smaller, semicircular. Nutlets unknown. Fl. Sep-Oct.

• Grasslands, thicket margins, forests, hills; 2700–3400 m. Sichuan, Yunnan.

1a. Leaves puberulent abaxially 5a. var. *ericalyx*

1b. Leaves densely white lanate-tomentose abaxially 5b. var. *tomentosa*

5a. *Elsholtzia ericalyx* var. *ericalyx*

毛萼香薷 mao e xiang ru

Elsholtzia fruticosa (D. Don) Rehder var. *paucidentata* Handel-Mazzetti.

Leaf blade puberulent abaxially.

• Wet grasslands, hills; 2700–3400 m. Yunnan.

5b. *Elsholtzia ericalyx* var. *tomentosa* C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 12: 339. 1974.

绒毛变种 rong mao bian zhong

Leaf blade abaxially densely white lanate-tomentose.

• Thicket margins, pine-oak forests; 3100 m. Sichuan.

6. *Elsholtzia ochroleuca* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 161. 1913.

黄白香薷 huang bai xiang ru

Aphanochilus fruticosus (D. Don) Kudô var. *ochroleuca* (Dunn) Kudô; *Elsholtzia lampradena* H. Léveillé; *E. ochroleuca* Dunn var. *parvifolia* C. Y. Wu & S. C. Huang.

Shrubs erect 1–1.5 m tall. Branches cylindrical, brownish, bark exfoliating; young branches dark brown, densely antrorse gray villous. Petiole 0.5–1.5 cm; leaf blade ovate to ovate-elliptic, (1.5–)5–8 × (0.6–)2.5–4.3 cm, densely yellowish glandular, gray strigose, densely so on veins abaxially, base cuneate-decurrent, margin crenate except entire at base, apex acute, lateral veins 4–6-paired. Spikes terminal only, 5–10 cm, ca. 1 cm in diam. in flower; verticillasters short pedunculate, ± widely spaced at base; peduncle and rachis densely gray-yellow tomentose; bracts subulate-lanceolate. Pedicel 0.5–1.5 mm, densely gray-yellow tomentose. Calyx campanulate, ca. 1.2 × 1 mm, yellow-white tomentose outside and on teeth inside; teeth triangular-subulate, ca. 0.4 mm, subequal. Corolla yellowish white, ca. 3.2 mm, sparsely pilose, yellowish glandular outside, bearded annulate inside, tube ca. 2.2 mm, funnelform, throat to 1 mm wide; upper lip ca. 1 mm, apex emarginate; middle lobe of lower lip subcircular, ca. 1 mm, margin incised; lateral lobes semicircular. Immature nutlets oblong, ca. 1 mm, apex rounded, adaxially ribbed. Fl. Aug.

• Sunny hills, ravines, thickets; 1600–2600 m. Sichuan, Yunnan.

7. *Elsholtzia stantonii* Benth. Labiat. Gen. Spec. 161. 1833.

木香薷 mu xiang ru

Aphanochilus stantonii (Benth.) Kudô.

Subshrubs erect, 0.7–1.7 m tall. Stems much branched apically, purple-red, gray puberulent. Petiole 4–6 mm, purplish, puberulent; leaf blade lanceolate to elliptic-lanceolate, 8–12 × 2.5–4 cm, adaxially glabrous, puberulent along margin and midrib, abaxially whitish, densely glandular, base attenuate, margin serrate-crenate, apex acuminate. Spikes secund, gray puberulent, 3–12 cm; verticillasters 5–10-flowered; bracts lanceolate to linear-

lanceolate, 2–3 mm, purplish. Pedicel 0.5 mm. Calyx tubular-campanulate, ca. 2 × 1 mm, densely gray tomentose outside, glabrous except for gray tomentose teeth inside; teeth ovate-lanceolate, ca. 0.5 mm, subequal; fruiting calyx to 4 × 1.5 mm. Corolla rose-purple, ca. 9 mm, white villous outside, sparsely glandular, interrupted bearded annulate inside; tube ca. 6 mm, funnelform, to 2.5 mm wide at throat; upper lip ca. 2 mm, apex emarginate; middle lobe of lower lip subcircular, ca. 3 mm; lateral lobes subovate, rounded, slightly shorter than middle lobe. Anterior stamens much exerted. Nutlets ellipsoid, smooth. Fl. and fr. Jul-Oct.

• Valley streamsides, grassy hills, rocky mountains, riverbanks; 700–1600 m. Gansu, Hebei, Henan, Shaanxi, Shanxi.

8. *Elsholtzia winitiana* Craib, Bull. Misc. Inform. 1918: 368. 1918.

白香薷 bai xiang ru

Herbs erect, 1–1.7 m tall. Branches densely white floccose-villous. Petiole 0.7–1.5 cm, densely gray villous; leaf blade oblong-lanceolate, 4–10 × 1.5–3.5 cm, thin papery, adaxially gray-green, densely gray villous, abaxially gray, densely gray villous, glandular, base cuneate, margin crenate, apex acuminate. Spikes 3–9 cm, 5–6 mm in diam. after anthesis; rachis densely gray villous; lower bracts oblong oblanceolate, 2.5–3 mm, abaxially white pubescent, glandular, glabrous inside, ciliate, apex acuminate; upper bracts subulate-lanceolate, longer than verticillasters. Pedicel densely gray villous. Calyx campanulate, ca. 1 mm, densely white villous especially toward base outside; teeth sparsely puberulent inside, narrowly triangular, subequal; fruiting calyx slightly enlarged, ca. 2 × 1.2 mm. Corolla white, villous, glandular outside, bearded annulate inside; tube ca. 2 mm, throat to 1 mm wide; upper lip ca. 0.3 mm, margin entire; middle lobe of lower lip subcircular; lateral lobes semicircular. Nutlets brownish yellow, oblong, apex rounded, base attenuate. Fl. Nov-Dec, fr. Jan-Mar.

• Open forests, grassy hills, thickets; 600–2200 m. Guangxi, Yunnan.

9. *Elsholtzia capituligera* C. Y. Wu, Acta Phytotax. Sin. 8:49. 1959.

头花香薷 tou hua xiang ru

Acrocephalus fruticosus Dunn.

Shrubs 15–30 cm tall. Stems robust, twisted, brown, glabrous, much branched, bark exfoliating longitudinally; branches slender, white floccose-pubescent. Petiole to 4 mm; leaf blade elliptic-oblong to oblong, 0.8–2 cm × 2–5 mm, herbaceous, densely floccose-pubescent, sparsely golden glandular, base cuneate, margin crenate, apex obtuse. Spikes capitate, terminal, 5–10 × 4–8 mm, long pedunculate, white pubescent; verticillasters compact; bracts subulate, ca. 2 mm. Pedicel less than 1 mm. Calyx campanulate, ca. 2 mm, white pubescent outside; teeth lanceolate, subequal, sparsely puberulent inside; fruiting calyx tubular, slightly constricted at throat, ca. 3.5 × 1 mm, scarious. Corolla green or white to purplish, ca. 4.5 mm, pilose outside, hairy annulate inside; upper lip circular, ciliate; lower lip dilated, middle lobe circular, slightly concave; lateral lobes oblong. Nutlets chestnut brown, obovoid, apex rounded, base acute, ca. 1.2 mm. Fl. and fr. Sep-Nov.

• Dry, sunny, weathered gravelly areas; 2000–3000 m. Sichuan, Xizang, Yunnan.

10. *Elsholtzia flava* (Benth) Benth, Labiat. Gen. Spec. 161. 1833.

黄花香薷 huang hua xiang ru

Aphanochilus flavus Benth, Pl. Asiat. Rar. 1: 28. 1830.

Subshrubs erect, 0.6–2.6 m tall. Branches densely gray pubescent. Petiole 3–6 cm; leaf blade broadly ovate to sub-circular, 8–15 × 5.2–8.2 cm, adaxially pubescent especially on veins, abaxially glabrous, densely yellowish glandular, puberulent on veins, base rounded to shallowly cordate, oblique, margin mucronate- to serrate-crenate, apex abruptly caudate-acuminate. Spikes terminal and axillary, robust, 6–12 cm, pedunculate, densely gray pubescent; lower verticillasters widely spaced; bracts broadly ovate, ca. 3 × 3 mm, sparsely puberulent abaxially, margin ciliate, apex mucronate. Pedicel ca. 1 mm. Calyx campanulate, ca. 3.5 mm, pubescent, glandular outside, apex pubescent inside; teeth subulate-linear, apex linear; fruiting calyx tubular-campanulate, to 6.5 × 2.5 mm. Corolla yellow, ca. 6.5 mm, white villous, glandular outside, bearded annulate inside; tube ca. 4 mm, funnellform, to 2 mm wide at throat; upper lip emarginate; middle lobe of lower lip subcircular, margin erose; lateral lobes suboblong, rounded. Nutlets dark brown, oblong, ca. 1 mm. Fl. Jul–Oct, fr. Sep–Nov.

Open cultivated areas, valleys, forest margins, thickets; 1000–2900 m. Guizhou, Hubei, Sichuan, Yunnan, Zhejiang [India (Sikkim), Nepal].

11. *Elsholtzia penduliflora* W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 176. 1918.

大黄药 da huang yao

Aphanochilus penduliflorus (W. Smith) Kudô.

Subshrubs aromatic, 1–2 m tall. Branchlets brown when dry, sparsely floccose-puberulent shiny glandular. Leaves oblong- or ovate-lanceolate, 6–18 × 1.6–4.3 cm, membranous, adaxially glabrous, finely dusty pilose on veins, abaxially glabrous, yellowish glandular, base attenuate, cuneate, or rounded and slightly oblique or cordate, margin serrulate, apex acuminate; main veins raised, reddish abaxially. Spikes terminal and axillary, 5–15 cm, pendulous; verticillasters sessile, 6–12-flowered, lower ones widely spaced; rachis ± white pilose; bracts linear to linear-oblong, ca. 2 × as long as pedicels. Pedicel 2–4 mm, ± pendulous, ± white pilose. Calyx campanulate, ca. 3 mm, densely glandular outside; teeth triangular-subulate, subequal or anterior 2 slightly shorter; fruiting calyx tubular-campanulate, to 5 × 2 mm. Corolla white, ca. 5.5 mm, subglabrous; tube ca. 3 mm, funnellform, to 2 mm wide at throat; upper lip ca. 1.5 mm, apex emarginate; middle lobe of lower lip subcircular, lateral lobes semicircular. Nutlets brown, oblong, ca. 1.25 mm, adaxially ribbed, glabrous. Fl. Sep–Nov, fr. Oct–Jan.

• Valleys, hills, waste areas, dense forests; 1100–2400 m. Yunnan.

Used medicinally.

12. *Elsholtzia cephalantha* Handel-Mazzetti, Acta Horti Gothob. 9: 90. 1934.

小头花香薷 xiao tou hua xiang ru

Herbs annual, diffuse, 5–17 cm tall. Stems ascending, unbranched or few branched, ± with 2 rows of white floccose-pilose hairs or subglabrous. Stem leaves widely spaced, subtending short axillary shoots; petiole 3–13 mm, slightly thickened, white floccose-pilose; leaf blade broadly ovate-triangular, 0.5–4 × 0.5–4 cm, herbaceous, adaxially sparsely fine pilose, abaxially obscurely glandular, sometimes purplish, base truncate to shallowly cordate, rarely rounded, margin crenate, apex acute. Spikes capitate, terminal or axillary, lax flowered, 4–7 mm in diam., sessile or with peduncles longer than petioles; bracts linear to spatulate, shorter than calyx, villous, base cuneate. Pedicel 1–2 mm or less. Calyx cup-shaped, 3–4 mm, villous outside, glabrous inside; teeth 1.5–2 mm, subequal, linear-lanceolate, obtuse; fruiting calyx dilated, glabrescent. Corolla tube subglobose above base, as long as calyx tube; limb broadly campanulate, slightly shorter than calyx teeth, purple moniliform villous outside, 5-lobed; lobes regular, broadly ovate to subtriangular, apex rounded. Stamens subequal, included or slightly exerted. Nutlets globose, ca. 2 mm in diam., appressed puberulent. Fl. Nov.

• Streambanks, alpine meadows; 3200–4100 m. Sichuan.

13. *Elsholtzia pilosa* (Benth) Benth, Labiat. Gen. Spec. 163. 1833.

长毛香薷 chang mao xiang ru

Aphanochilus pilosus Benth, Pl. Asiat. Rar. 1: 30. 1830; *Dysophylla mairei* H. Léveillé.

Herbs procumbent, 10–50 cm tall. Stems pilose-hispid. Petiole 1–10 mm; leaf blade ovate to ovate-lanceolate, 1–4.5 × 0.3–2.5 cm, herbaceous, adaxially pilose-hispid and minutely hispid, abaxially sparsely yellowish glandular, pilose-hispid on veins, base cuneate to rounded, decurrent, margin crenate except for entire base, apex obtuse. Spikes terminal, 2.5–6 × ca. 1 cm; verticillasters overlapping, many flowered; rachis densely pilose; bracts linear-subulate, 5–6 mm, ciliate, longer than corolla. Pedicel less than 1 mm, densely pilose. Calyx campanulate, ca. 2 mm, densely pilose except for base outside; teeth lanceolate, subequal, ca. 1 mm, pilose inside. Corolla reddish, ca. 4 mm, pubescent outside, throat villous, obscurely hairy annulate inside; tube ca. 3 mm, funnellform, to 2 mm wide at throat; upper lip slightly curved, 2-lobed; middle lobe of lower lip circular, margin incised; lateral lobes semicircular. Anterior stamens reduced, posterior 2 included or slightly exerted. Anterior style lobe ca. 2 × as long as posterior. Nutlets yellowish, oblong. Fl. and fr. Aug - Oct.

Forest margins, hilly grasslands, riverbanks, marshy meadow margins, pine forests; 1100–3200 m. Guizhou, Sichuan, Yunnan [India (Sikkim), Myanmar, Nepal, Vietnam].

14. *Elsholtzia blanda* (Benth) Benth, Labiat. Gen. Spec. 162. 1833.

四方蒿 si fang hao

Aphanochilus blandus Benth, Pl. Asiat. Rar. 1: 29. 1830; *Perilla elata* D. Don.

Herbs erect, 1–1.5 m tall. Stems and branches densely pubescent. Petiole 3–15 mm, densely pubescent; leaf blade elliptic to elliptic-lanceolate, 3–16 × 0.8–4.5 cm, adaxially puberulent, glandular, abaxially gray-green, glabrous, strigose

on veins, base narrowly cuneate, margin serrate, apex acuminate. Spikes terminal or axillary, subsecund, 4–8(–20) cm, mostly pubescent; verticillasters 7–10-flowered, short pedunculate; bracts subulate to lanceolate-subulate, 1.5–3 mm. Pedicel less than 1 mm. Calyx cylindrical, 2–2.5 mm, strigose outside, teeth lanceolate; fruiting calyx slightly dilated at base, ovoid. Corolla white, 3–4 mm, strigose outside, subglabrous inside, funnellform, throat to 2 mm wide; upper lip emarginate; middle lobe of lower lip subcircular, slightly concave; lateral lobes semicircular, margin entire. Anterior stamens exerted, posterior 2 slightly longer. Nutlets yellow-brown, oblong, ca. 0.8 mm, Fl. Jun-Oct, fr. Oct-Dec.

Open forests, ravines; 800–2500 m. Guangxi, Guizhou, Yunnan [Bhutan, India (Sikkim), Indonesia, Laos, Myanmar, Nepal, Thailand, Vietnam].

Used medicinally.

15. *Elsholtzia stachyodes* (Link) C. Y. Wu, Acta Phytotax. Sin. 12: 340. 1974.

穗状香薷 sui zhuang xiang ru

Hyptis stachyodes Link, Enum. Hort. Berol. Alt. 2: 106. 1822; *Aphanochilus foetens* Benth; *A. incisus* Benth; *A. paniculatus* Benth; *Mentha blanda* de Candolle; *M. foetens* Wallich ex Benth; *M. incisus* Wallich ex Benth; *M. paniculata* Roxburgh; *Perilla leptostachya* D. Don.

Herbs 30–100 cm tall. Stems erect, yellow-brown or purplish, sparsely white floccose-pubescent, ± glabrescent, much branched. Petiole 0.5–4 cm, nearly as long as blades, white, adaxially puberulent; leaf blade rhombic-ovate, 2.5–6 × 1.5–3.5 cm, thin papery, adaxially sparsely pubescent, abaxially with sparse yellowish glands, pubescent on veins, base cuneate to broadly cuneate, decurrent, margin incised-serrate above base, apex abruptly acuminate. Spikes terminal and axillary, terminal ones 4–8.5 cm, ± interrupted; verticillasters few flowered; bracts subulate-linear, longer than corolla. Pedicel ca. 0.5 mm. Calyx campanulate, ca. 1.5 mm, densely white villous outside; teeth lanceolate, subequal, pubescent inside; fruiting calyx slightly dilated, tubular-campanulate, ca. 2 mm. Corolla white, sometimes purple-red, ca. 2 × as long as calyx, pubescent outside, glabrous inside, tube funnellform, upper lip emarginate, middle lobe of lower lip elliptic, lateral lobes rounded. Anterior stamens undeveloped, posterior 2 included or slightly exerted. Nutlets yellowish, ellipsoid. Fl. and fr. Sep-Dec.

Hills, waste areas, open forests, limestone mountains; 800–2800 m. Anhui, Guangdong, Guangxi, Guizhou, Hubei, Shaanxi, Sichuan, Yunnan, Zhejiang [India, Myanmar, Nepal].

16. *Elsholtzia communis* (Collett & Hemsley) Diels, Notes Roy. Bot. Gard. Edinburgh 7: 47. 1912.

吉龙草 ji long cao

Dysophylla communis Collett & Hemsley, J. Linn. Soc., Bot. 28: 114. 1891.

Herbs ca. 60 cm tall, with strong citral fragrance. Stems erect, purple-red, densely retrorse white pubescent, much branched at base. Petiole 2–5 mm, densely white pubescent; leaf blade ovate to oblong, herbaceous, adaxially white villous, abaxially pubescent, yellowish glandular, margin serrate. Spikes terminal, cylindrical, 1–4.5 × 0.8–1 cm, compact; verticillasters numerous; rachis densely white villous; bracts linear, to 3.5 mm, densely white pilose. Pedicel ca. 1

mm, densely white villous. Calyx tubular, to 4 mm in fruit, apex recurved, densely gray lanate-villous outside; teeth subequal, slightly closed in fruit. Corolla funnellform, ca. 3 mm, pilose, glandular outside, obscurely hairy annulate inside; upper lip oblong, emarginate, ciliate; lateral lobes of lower lip less than 1/2 as wide as middle lobe. Style apex unequally 2-cleft. Nutlets oblong, ca. 0.7 mm, sparsely brown hairy. Fl. and fr. Oct-Dec.

Cultivated or rarely naturalized in China (Yunnan) [Myanmar, Thailand].

17. *Elsholtzia cyprianii* (Pavolini) S. Chow ex P. S. Hsu, Observ. Ad Florulam Hwangshanicam 170. 1965.

野香草 ye xiang cao

Herbs. Stems 10–100 cm tall; branches and stem sometimes purple-red, densely retrorse pubescent or villous. Petiole 0.2–2 cm, narrowly triangular winged apically, densely pubescent; leaf blade ovate to oblong, 2–6.5 × 1–3 cm, herbaceous, adaxially dark green, puberulent, abaxially densely pubescent, glandular, base broadly cuneate, decurrent, margin crenate-serrate to coarsely serrate, apex acute. Spikes cylindrical, 2.5–10.5 × to 0.9 cm in flower, terminal, pubescent; verticillasters compact; bracts linear, to 3 mm. Pedicel ca. 0.5 mm. Calyx tubular-campanulate, ca. 2 mm, densely pubescent outside, glabrous inside; teeth ca. 1/4 as long as calyx, puberulent inside; fruiting calyx to 5 mm, densely lanate, teeth recurved forward, secund. Corolla rose, ca. 2 mm, villous outside, glabrous inside; tube funnellform, to 1.5 mm wide at throat; upper lip entire or emarginate; middle lobe of lower lip circular; lateral lobes semicircular, entire. Nutlets dark brown, oblong-ellipsoid, sparsely hairy. Fl. and fr. Aug-Nov.

• Field margins, riverbanks, grasslands, valleys, slopes, forests; 400–2900 m. Anhui, Guangxi, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

- 1a. Upper part of stems, branches, and petioles densely pubescent 17a. var. *cyprianii*
- 1b. Upper part of stems, branches, and petioles densely white villous 17b. var. *longipilosa*

17a. *Elsholtzia cyprianii* var. *cyprianii*

野香草 ye xiang cao

Lophanthus cyprianii Pavolini, Nuovo Giorn. Bot. Ital., n.s., 15: 434. 1908; *Aphanochilus communis* Kudô; *Elsholtzia alopecuroides* H. Léveillé & Vaniot; *E. cyprianii* (Pavolini) S. Chow ex P. S. Hsu var. *angustifolia* C. Y. Wu & S. C. Huang.; *Pogostemon cyprianii* (Pavolini) Pamp. Panini.

Upper part of stems, branches, and petioles densely pubescent.

• Field margins, riverbanks, grasslands, forests; 400–2900 m. Anhui, Guangxi, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

An aromatic herb used medicinally.

17b. *Elsholtzia cyprianii* var. *longipilosa* (Handel-Mazzetti) C. Y. Wu & S. C. Huang, Acta Phytotax. Sin. 12: 343. 1974.

长毛变种 chang mao bian zhong

Elsholtzia communis (Collett & Hemsley) Diels var. *longipilosa* Handel-Mazzetti, Acta Horti Gothob. 13: 357. 1939.

Upper part of stems, branches, and petioles densely white villous.

- Valleys, open slopes; 1600–2800 m. Sichuan, Yunnan.

18. *Elsholtzia eriostachya* (Benth) Benth, Labiat. Gen. Spec. 163. 1833.

Herbs annual. Stems 15–37 cm tall, purple-red, puberulent, unbranched or branched from base. Petiole 1.5–9 cm, densely fine villous; leaf blade oblong to ovate-oblong, 0.8–4 × 0.4–1.5 cm, herbaceous, apex subobtusely finely villous, yellowish green, base broadly cuneate to rounded, margin serrulate to serrate-crenate. Spikes cylindrical, (1–)1.5–5 × 1 cm, terminal; verticillasters many flowered, basal 1–3 widely spaced; rachis densely pubescent; bracts broadly ovate, 1.5 mm, pilose abaxially, margin ciliate, apex mucronate. Pedicel to 1.5 mm, densely pubescent. Calyx campanulate, ca. 1.2 mm, densely yellowish moniliform villous; teeth triangular, subequal, ciliate; fruiting calyx tubular, ca. 4 × 1.5 mm. Corolla yellow, ca. 2 mm, puberulent outside, margin ciliate, tube funnelliform, upper lip emarginate; lower lip ± patent, middle lobe larger. Nutlets brown, ellipsoid, ca. 1.4 mm. Fl. and fr. Jul-Sep.

- Hilly grasslands; 3500–4100 m. Gansu, Sichuan, Xizang, Yunnan.

19. *Elsholtzia densa* Benth, Labiat. Gen. Spec. 714. 1835.

密花香薷 mi hua xiang ru

Dysophylla ianthina Maximowicz ex Kanitz; *Elsholtzia calycocarpa* Diels; *E. densa* var. *calycocarpa* (Diels) C. Y. Wu & S. C. Huang; *E. densa* var. *ianthina* (Maximowicz ex Kanitz) C. Y. Wu & S. C. Huang; *E. ianthina* (Maximowicz ex Kanitz) Dunn; *E. manshurica* (Kitagawa) Kitagawa; *Platyelasma calycocarpum* (Diels) Kitagawa; *P. densum* (Benth) Kitagawa; *P. manshuricum* Kitagawa.

Herbs erect. Stems 20–60 cm tall, much branched from base, pubescent. Petiole 3–13 mm, pubescent; leaf blade lanceolate to oblong-lanceolate, 1–4 × 0.5–1.5 cm, herbaceous, pubescent, base broadly cuneate to rounded, margin serrate except for entire base, apex acute to slightly obtuse. Spikes cylindrical to subglobose, 2–6 × 1 cm, densely purple moniliform villous; verticillasters dense; bracts ovate-orbicular, ca. 1.5 mm, apex rounded, villous. Calyx campanulate, ca. 1 mm, purple moniliform villous; teeth subtriangular, posterior slightly longer; fruiting calyx subglobose, ca. 4 × 3 mm, margin and teeth reflexed. Corolla purplish, ca. 2.5 mm, densely purple moniliform villous outside, obscurely pilose annulate inside, tube funnelliform, upper lip emarginate, middle lobe of lower lip slightly shorter than lateral lobes. Anterior stamens slightly exerted. Nutlets dark brown, ovoid, ca. 2 × 1.2 mm, apex tuberculate, finely puberulent, adaxially slightly ribbed. Fl. and fr. Jul-Oct.

Forest margins, alpine meadows, hills, waste areas, riverbanks, forests; 1000–4100 m. Gansu, Hebei, Liaoning, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, India (Sikkim), Nepal, Pakistan, Tajikistan].

Used medicinally.

20. *Elsholtzia strobilifera* Benth, Labiat. Gen. Spec. 163. 1833.

球穗香薷 qiu sui xiang ru

毛穗香薷 mao sui xiang ru

Aphanochilus eriostachyus Benth, Pl. Asiat. Rar. 1: 29. 1830; *Elsholtzia eriostachya* var. *pusilla* (Benth) J. D. Hooker; *E. pusilla* Benth; *Platyelasma eriostachyum* (Benth) Kitagawa; *P. eriostachyum* var. *pusillum* (Benth) Kitagawa.

Cyclostegia strobilifera Benth; *Elsholtzia exigua* Handel-Mazzetti; *E. strobilifera* var. *exigua* (Handel-Mazzetti) C. Y. Wu & S. C. Huang.

Herbs annual. Stems (2–)5–15 cm tall; branches and stem brown, crisped white pilose. Petiole 2–12 mm, densely pilose; leaf blade ovate, 0.5–2.5 × 0.3–2 cm, herbaceous, purple at least abaxially, sparsely fine pilose, brownish glandular, densely pilose on veins, base broadly cuneate, margin serrulate, apex acute. Spikes cylindrical, 1–2.5 cm × 6–8 mm, ca. 4 cm in fruit, terminal; verticillasters 6–10-flowered; bracts united into a shallow cup at each node, each mucronate, densely overlapping, membranous, many veined, abaxially sparsely fine pilose, yellow glandular, ± purplish, margin ciliate. Calyx tubular, membranous, transparent, ca. 2 mm, sparsely pubescent, golden glandular outside, glabrous inside; teeth subequal, lanceolate, margin ciliate. Corolla white or reddish, 3–4 mm, sparsely puberulent outside, glabrous inside; tube slender, funnelliform; upper lip emarginate; middle lobe of lower lip longer and wider, margin entire. Stamens included. Nutlets yellowish, ellipsoid. Fl. and fr. Sep-Nov.

Hills, grasslands, open areas in forests, thicket margins, valleys; 2300–3700 m. Sichuan, Taiwan, Xizang, Yunnan [India (Sikkim), Nepal].

21. *Elsholtzia heterophylla* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 231. 1912.

异叶香薷 yi ye xiang ru

Herbs stoloniferous, 30–80 cm tall. Stolons slender. Stems dark purple, sparsely pilose. Stolon leaves short petiolate, broadly elliptic to subcircular, 2–6 × 2–4 mm, margin remotely obtuse serrate; stem leaves short petiolate or subsessile, lanceolate to elliptic, 1.3–2.6 cm × 3–7 mm, finely pilose on veins, densely impressed glandular abaxially, base attenuate, margin shallowly serrate to crenate-serrate, apex acuminate. Spikes solitary, terminal, cylindrical, 2.5–4 × to 1.8 cm in flower; bracts densely overlapping, broadly flabellate, 6–8 mm wide, scarious, united at base into a cup, apex mucronate to obtuse, conspicuously veined, purplish. Calyx tubular, 3.5–4 mm, pilose and glandular outside, glabrous inside; teeth lanceolate, ca. 1/3 as long as calyx. Corolla rose-purple, 1–1.2 cm, pilose and glandular outside, glabrous inside; tube funnelliform, throat to 2.5 mm wide; upper lip emarginate; middle lobe of lower lip erose, lateral lobes entire. Nutlets brown-black, oblong, ca. 1.5 mm, smooth. Fl. and fr. Oct-Dec.

Near villages, field margins, streamsides, marshes; 1200–2400 m. Yunnan [Myanmar].

22. *Elsholtzia bodinieri* Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 176. 1904.

东紫苏 dong zi su

Herbs perennial. Stems ascending, 25–30 cm tall, base ± prostrate, sometimes with numerous, short scaly stolons; branches and stem dark purple, spreading villous. Stolon

leaves subsessile, obovate to oblong, 3.5–5 × 2–3 mm, pilose, margin entire or obscurely crenate; stem leaves subsessile, lanceolate to oblanceolate, 0.8–2.5 cm × 4–7 mm, ± leathery, glabrous, rarely sparsely pilose, tinged purple-red abaxially sparsely impressed glandular, base attenuate, margin crenate, apex obtuse. Spikes solitary, terminal, 2–3.5 cm; bract pairs united into a cup, 6–8 mm wide, villous, glandular abaxially, densely overlapping, margin white ciliate, apex mucronate; teeth lanceolate, subequal, ca. 1 mm. Corolla rose-purple, ca. 9 mm, villous outside, sparsely glandular; tube recurved, funnelform, to 2 mm wide at throat; upper lip emarginate; lower lip slightly spreading, middle lobe longer, margin entire. Nutlets brown-black, oblong, ca. 1.1 mm. Fl. Sep–Nov, fr. Dec–Feb.

• Pine forests, hilly grasslands; 1200–3000 m. Guizhou, Yunnan.

Used medicinally. Young shoots used as substitute for tea.

This species is close to and may be an infraspecific taxon of *Elsholtzia heterophylla*. It is a shorter plant with smaller flowers and has a tendency to be prostrate.

23. *Elsholtzia luteola* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 232. 1912.

淡黄香薷 dan huang xiang ru

Herbs erect, annual, 8–40 cm tall. Stems yellowish, subterete, pilose. Petiole short to obsolete; leaf blade lanceolate, 1–3.5 cm × 3–10 mm, herbaceous, adaxially subglabrous, abaxially pilose, densely impressed glandular, base cuneate, margin remotely serrate, apex acute. Spikes 2–5 cm, to 1 cm in diam., secund; bracts overlapping, united, broadly reniform, margin ciliate. Pedicel short. Calyx tubular, ca. 2.5 mm, pilose, glandular; teeth lanceolate, anterior 2 longer, spinescent outside and at apex. Corolla 5–6.5 mm, pilose outside, glabrous inside; tube ca. 0.5 mm wide at base, to 2 mm wide at throat; upper lip emarginate, ciliate; lower lip slightly spreading, lobes erose, middle lobe subcircular, lateral lobes semicircular. Anterior stamens exerted; anthers ovoid. Style included, apex subequally 2-cleft. Nutlets dark brown, oblong, ca. 1 mm. Fl. Sep–Oct, fr. Oct–Nov.

• Forest margins, hills, streamsides, cultivated on foothills; 2200–3600 m. Sichuan, Yunnan.

- 1a. Bracts with many subulate teeth, middle tooth spinescent; corolla yellowish 23a. var. *luteola*
1b. Bracts entire or 1- or 2-dentate; corolla white 23b. var. *holostegia*

23a. *Elsholtzia luteola* var. *luteola*

淡黄香薷 dan huang xiang ru

Bracts with many irregular subulate teeth, middle tooth spinescent. Corolla yellowish.

• Forest margins, grassy hills, streamsides; 2200–3600 m. Sichuan, Yunnan.

23b. *Elsholtzia luteola* var. *holostegia* Handel-Mazzetti, Acta Horti Gothob. 13: 361. 1939.

全苞变种 quan bao bian zhong

Bracts entire or 1- or 2-toothed. Corolla white.

• Cultivated on foothills; 2900 m. Yunnan.

24. *Elsholtzia hunanensis* Handel-Mazzetti, Symb. Sin. 7: 935. 1936.

湖南香薷 hu nan xiang ru

Perilla frutescens (Linnaeus) Britton var. *auriculato-dentata* C. Y. Wu & Hsuan ex H. W. Li.

Herbs erect, annual. Stems 40–50 cm tall, usually much branched, densely crisped pilose, glandular. Petiole (1/3–)1/2 as long as blade, densely crisped pilose, glandular; leaf blade ovate to broadly ovate, 4–10 × 2–10 cm, herbaceous, sparsely fine strigose, abaxially densely glandular, base rounded to shallowly cordate, lowest teeth auriculate dilated, margin crenate-dentate, apex long acuminate; veins purplish, conspicuous. Spikes terminal or axillary, short pedunculate, 5–12 cm; bracts loosely overlapping, subcircular, ca. 3 mm, bright colored, softly dense ciliate, apex mucronate. Calyx villous outside, tube much longer than teeth; posterior teeth narrowly lanceolate, apex acute; anterior teeth shorter, wider, apex obtuse to mucronate. Corolla rose red, 2–3 mm, slightly exerted, sparsely pilose outside; tube straight, funnelform, pilose annulate inside; upper lip slightly shorter than tube, quadrate-orbicular, apex emarginate; lower lip slightly shorter than upper, middle lobe emarginate, lateral lobes circular. Anthers globose. Fl. and fr. Aug–Nov.

• Hills, forests; 200–2500 m. Anhui, Guizhou, Hubei, Hunan, Jiangxi.

25. *Elsholtzia kachinensis* Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 206. 1904.

水香薷 shui xiang ru

Elsholtzia kachinensis var. *petiolata* Sun ex C. H. Hu.

Herbs slender, diffuse, 10–40 cm tall. Stems prostrate, villous, rooting adventitiously at base. Petiole 3–15 mm; leaf blade ovate to ovate-lanceolate, 1–3.5 × 0.5–2 cm, herbaceous, sparsely fine pilose, adaxially puberulent on midrib, base broadly cuneate, margin crenate-serrate above base, apex acute to obtuse. Spikes ovoid in flower, 1.5–2.5 × to 2 cm, cylindrical in fruit; verticillasters dense, pilose, secund, 4–6 flowered; bracts broadly ovate, 3–4 × 4–5 mm, adaxially glabrous, margin entire, ciliate, apex subulate-mucronate. Pedicel ca. 0.5 mm. Calyx tubular, ca. 1.5 mm, pilose, glandular outside; teeth subequal, lanceolate-triangular, nearly as long as calyx tube, apex spinescent. Corolla white to purple, ca. 7 mm, pilose outside, glabrous inside, throat ca. 2 mm wide; upper lip emarginate; lower lip ± patent, middle lobe entire or emarginate; lateral lobes semicircular, margin entire. Stamens much exerted. Style ca. as long as stamens. Nutlets chestnut brown, oblong, pubescent. Fl. and fr. Oct–Dec.

• Riverbanks, forests, valleys, wet areas; 1200–2800 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan [Myanmar].

Young shoots edible.

26. *Elsholtzia pygmaea* W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 204. 1920.

矮香薷 ai xiang ru

Herbs annual. Stems 2.5–7 cm, closely strigose except for glabrous base, densely leaved. Petiole 2–3 mm; leaf blade linear to linear-lanceolate, 1–1.5 cm × 2 mm, minutely sca-

brous, abaxially often purplish, base attenuate, margin obscurely remote serrate, apex obtuse. Spikes usually solitary, secund; bracts obovate, ca. 4×2.5 mm, dark purple, margin ciliate, apex cuspidate, pubescent abaxially. Calyx tubular, ca. 2 mm, sparsely minutely pilose, margin white ciliate; teeth triangular, as long as tube. Corolla deep rose-purple, paler at base, salverform, ca. 8 mm, sparsely minutely pilose. Stamens and style exerted from corolla (specimens not seen).

- Yunnan (Lijiang Xian).

27. *Elsholtzia oldhami* Hemsley. J. Linn. Soc., Bot. 26: 277. 1890.

台湾香薷 tai wan xiang ru

Herbs cobwebby pubescent. Stems with numerous ascending branches. Petiole 1.3–1.9 cm; leaf blade papery or \pm membranous, ovate-lanceolate, 2.5–6.5 cm, sparsely minute hispid adaxially, sparsely fine cobwebby pubescent abaxially, base rounded to subcuneate, margin coarsely serrate-dentate, apex acuminate; lateral veins ca. 5-paired, conspicuous adaxially. Spikes axillary, 4-ranked when young, secund when mature, solitary, to 2.5 cm, dense, subsessile; bracts broadly spatulate-orbicular, pubescent, apex abruptly acuminate. Flowers minute (open flowers not seen). Calyx pubescent outside, glabrous inside, teeth subequal. Corolla 4-lobed, upper lobe or lip emarginate. Stamens glabrous; anthers distinctly 2-locellate (specimens not seen).

- Taiwan.

The 4-ranked bracts in the protologue are an artifact of the immature state of the type collection. This and species 28–33 of this account are very closely related.

28. *Elsholtzia saxatilis* (V. Komarov) Nakai ex Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 1: 266. 1937.

岩生香薷 yan sheng xiang ru

Elsholtzia cristata Willdenowf. *saxatilis* V. Komarov, Trudy Imp. S. Peterburgsk. Bot. Sada 25: 390. 1907; *E. angustifolia* Loesener; *E. pseudocristata* H. Léveillé & Vaniot var. *saxatilis* (V. Komarov) P. Y. Fu.

Herbs. Stems erect, 10–20 cm tall, densely puberulent, much branched. Petiole 2–5 mm, puberulent; leaf blade lanceolate to linear-lanceolate, 1–4.5 cm \times 1–10 mm, purplish, sparsely puberulent, densely impressed glandular abaxially, base cuneate decurrent, margin remotely to obscurely serrate, apex acuminate to subobtusate. Spikes 1–2(–2.5) cm, indistinctly secund; bracts broadly ovate, ca. 4×6 mm, glabrous, sparsely glandular abaxially, purplish veined, margin ciliate, apex abruptly mucronate. Calyx tubular, villous outside; teeth lanceolate, subequal, apex spinescent. Corolla rose-purple, ca. $2.5 \times$ as long as calyx, tube villous, upper lip emarginate, middle lobe of lower lip subcircular; lateral lobes semicircular, margin entire. Nutlets chestnut brown, oblong. Fl. Sep–Oct, fr. Oct–Nov.

- Rocky crevices. Heilongjiang, Jilin, Liaoning, Shandong [Japan, Korea, Russia].

29. *Elsholtzia splendens* Nakai ex F. Maekawa, Bot. Mag. (Tokyo) 48: 50. 1934.

海洲香薷 hai zhou xiang ru

Elsholtzia angustifolia (Loesener) Kitagawa; *E. cristata* Willdenow var. *angustifolia* Loesener; *E. haichowensis* Sun ex C. H. Hu; *E. loeseneri* Handel-Mazzetti; *E. lungtangensis* Sun ex C. H. Hu; *E. pseudocristata* H. Léveillé & Vaniot var. *angustifolia* (Loesener) P. Y. Fu.

Herbs erect. Stems 30–50 cm, much branched above base, tawny purple; branches erect-patent; internodes 2–12 cm, with 2 rows of pilose hairs. Petiole 0.5–1.5 cm, gradually shorter upward, adaxially pubescent; leaf blade ovate-triangular to oblong-lanceolate, $3\text{--}6 \times 0.8\text{--}2.5$ cm, sparsely fine pilose, densely impressed glandular abaxially, base cuneate, decurrent, margin remotely serrate, apex acuminate. Spikes dense, 3.5–4.5 cm, secund; rachis pubescent; bracts subcircular to broadly ovate, ca. $5 \times 6\text{--}7$ mm, caudate-cuspidate, glabrous, sparsely glandular, tinged purple, margin ciliolate, apex 1–1.5 mm. Pedicel less than 1 mm, subglabrous. Calyx 2–2.5 mm, white hispidulous, glandular; teeth triangular, subequal, margin ciliate, apex spinescent. Corolla rose-purple, 6–7 mm, slightly incurved, subfunneliform, throat less than 2 mm wide, upper lip emarginate; middle lobe of lower lip circular, margin entire; lateral lobes truncate or subcircular. Nutlets dark brown, oblong, ca. 1.5 mm, tuberculate. Fl. and fr. Sep–Nov.

- Hills, grassy areas; 200–300 m. Guangdong, Hebei, Henan, Hubei, Jiangsu, Jiangxi, Liaoning, Shandong, Zhejiang [Korea].

Used medicinally.

30. *Elsholtzia argyi* H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 425. 1910.

紫花香薷 zi hua xiang ru

E. macrostemon Handel-Mazzetti.

Herbs 50–100 cm tall. Stems purple, white pubescent on grooves. Petiole 0.8–2.5 cm, narrowly winged; leaf blade ovate to broadly ovate, $2\text{--}6 \times 1\text{--}3$ cm, adaxially pilose, abaxially impressed glandular, white pubescent on veins, base rounded to broadly cuneate, margin crenate or crenate-serrate, entire near base, apex short acuminate. Spikes 2–7 cm, secund; verticillasters 8-flowered; bracts circular, ca. 5×5 mm, apex abruptly spinescent, spines to 2 mm, abaxially white villous, yellow glandular, purplish, glabrous adaxially, margin ciliate. Pedicel ca. 1 mm. Calyx tubular, ca. 2.5 mm, white villous outside; teeth subulate, subequal, apex spinescent, margin ciliate. Corolla rose-purple, ca. 6 mm, white villous outside, glandular at apex, throat to 2 mm wide; upper lip emarginate, margin villous; lower lip slightly spreading, middle lobe oblong, apex usually mucronate; lateral lobes arcuate. Anthers dark purple. Nutlets dark brown, oblong, ca. 1 mm, minutely tuberculate. Fl. and fr. Sep–Nov.

Hilly thickets, forests, streamsides, riverside grasslands; 200–1200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang [Japan, Vietnam (cultivated)].

31. *Elsholtzia souliei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 218. 1911.

川滇香薷 chuan dian xiang ru

Herbs erect, 10–50 cm tall. Stems pyramidally branched from base; branches at 45° , white floccose. Petiole 2–8 mm, white floccose; leaf blade lanceolate, $0.3\text{--}2(4)\text{--}4$ cm \times $2\text{--}4(13)$ mm, adaxially sometimes tinged purplish red, puberulent, abaxially villous, yellowish glandular, base

attenuate, margin serrate, apex acuminate. Spikes 1.2–4 cm; verticillasters many flowered; bracts subcircular, ca. 4.5 × 4 mm, white villous abaxially, glabrous adaxially, purplish veined, margin ciliate, apex mucronate. Calyx tubular, ca. 2.5 mm, white villous, glandular outside; anterior teeth longer, apex spinescent, margin ciliate. Corolla purple, ca. 6 mm, white villous, glandular outside; upper lip emarginate, margin densely villous; lower lip slightly spreading, middle lobe circular, margin entire, apex mucronate; lateral lobes arcuate, margin sparsely ciliate. Anthers dark purple. Nutlets dark brown, oblong, ca. 1.2 mm. Fl. and fr. Sep–Nov.

- Hills, grassy areas; 2800–3300 m. Sichuan, Yunnan.
- Used medicinally.

32. *Elsholtzia feddei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 218. 1911.

高原香薷 gao yuan xiang ru

Elsholtzia feddei f. *heterophylla* C. Y. Wu & S. C. Huang; *E. feddei* f. *remotibracteata* C. Y. Wu & S. C. Huang; *E. feddei* f. *robusta* C. Y. Wu & S. C. Huang.

Herbs 3–20 cm tall. Stems branched from base; branches prostrate or ascending, pubescent. Petiole 2–8 mm, pubescent; leaf blade ovate to oblong, sometimes obovate, 0.4–2.4 cm × 3–14 mm, densely pubescent, sometimes purplish abaxially, sparsely or obscurely glandular, base rounded to broadly cuneate, margin crenate, apex obtuse. Spikes 1–1.5 cm, secund; verticillasters many flowered; rachis white villous; bracts circular, ca. 3 × 3 mm, margin ciliate, apex mucronate, villous especially on veins abaxially, glabrous adaxially, purple veined. Pedicel white villous. Calyx tubular, ca. 2 mm, white villous outside; teeth lanceolate-subulate, ciliate; anterior teeth longer, apex spinescent. Corolla rose-purple, ca. 8 mm, villous, sparsely glandular outside; tube funnelform; upper lip emarginate, margin ciliate; lower lip ± spreading, middle lobe circular, margin entire; lateral lobes arcuate. Nutlets dark brown, oblong, ca. 1 mm. Fl. and fr. Sep–Nov.

- Grassy hills, valleys, forests; 500–3200 m. Gansu, Hebei, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang, Yunnan.
- Used medicinally.

75. ROSTRINUCULA Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 304. 1929.

钩子木属 gou zi mu shu

Shrubs, usually stellate tomentose throughout. Spikes terminal, elongated, pendulous or nodding, cylindrical, of numerous, dense, 6–10-flowered verticillasters; bracts broadly triangular-ovate, glabrous inside, early deciduous; bracteoles narrowly elliptic to sublinear, early deciduous. Calyx campanulate, 10-veined, glabrous inside; teeth 5, subequal, anterior 2 wider. Corolla reddish to purple-red, 2-lipped, exserted part glandular, irregularly hairy annulate on a crescent protuberance just below base of anterior lobe inside and at base of filaments; tube exserted or nearly included; upper lip erect, margin entire; lower lip 3-lobed, middle lobe larger, concave-saccate; lateral lobes subequal to upper lip, or upper lip narrower and circular-ovate. Stamens 4, inserted at corolla throat, exserted, subequal or posterior 2 slightly longer; filaments glabrous; anthers subglobose, apex equally 2-cleft. Ovary brown, 4-lobed, stellate, glandular. Nutlets triquetrous, ellipsoid, brown, stellate tomentose, glandular; beak recurved or suberect.

Two species: endemic in China.

- 1a. Leaves oblong-elliptic to obovate-elliptic, sparsely stellate, subglabrescent except for veins abaxially, base cuneate 1. *R. dependens*
 1b. Leaves oblong to oblong-lanceolate, abaxially densely white stellate tomentose, base rounded 2. *R. sinensis*

1. *Rostrinucula dependens* (Rehder) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 304. 1929.

33. *Elsholtzia ciliata* (Thunberg) Hylander, Bot. Not. 1941: 129. 1941.

香薷 xiang ru

Sideritis ciliata Thunberg, Syst. Veg., ed. 14, 532. 1784; *Elsholtzia ciliata* var. *brevipes* C. Y. Wu & S. C. Huang; *E. ciliata* var. *depauperata* C. Y. Wu & S. C. Huang; *E. ciliata* var. *ramosa* (Nakai) C. Y. Wu & H. W. Li; *E. ciliata* var. *remota* C. Y. Wu & S. C. Huang; *E. cristata* Willdenow; *E. formosana* Hayata; *E. minina* Nakai; *E. patrini* (Lepechin) Garcke; *E. patrini* var. *ramosa* Nakai; *E. pseudocristata* H. Léveillé & Vaniot; *Hyssopus ocymifolius* Lamarck; *Mentha baicalensis* Georgi; *M. cristata* Buchanan-Hamilton ex D. Don; *M. ovata* Cavanilles; *M. patrini* Lepechin; *Perilla polystachys* D. Don.

Herbs erect, 30–50 cm tall. Stems glabrous or pilose, stramineous, purple-brown with age. Petiole 0.5–3.5 cm, narrowly winged; leaf blade ovate to elliptic-lanceolate, 3–9 × 1–4 cm, sparsely minutely hispid, adaxially sparsely resinous glandular, base cuneate decurrent, margin serrate, apex acuminate. Spikes 2–7 × to 1.3 cm, secund; verticillasters many flowered; bracts broadly ovate to oblate, ca. 4 × 4 mm, subglabrous to puberulent, sparsely resinous glandular abaxially, glabrous adaxially, ciliate or ciliolate, apical mucro to 2 mm. Pedicel ca. 1.2 mm, subglabrous, densely white pubescent. Calyx ca. 1.5 mm, pilose, sparsely glandular outside, glabrous inside; teeth triangular, anterior longer, needlelike, ciliate. Corolla purplish, ca. 4.5 mm, villous outside, sparsely glandular on posterior side; throat pilose, ca. 1.2 mm wide; upper lip emarginate; middle lobe of lower lip semicircular, lateral lobes arcuate, shorter than middle lobe. Anthers purple-black. Style included. Nutlets yellow-brown, oblong, ca. 1 mm. Fl. Jul–Oct, fr. Oct–Jan.

Hills, waste areas, sunny terraces, riverbanks, forests; 0–3400 m. In all provinces except Qinghai and Xinjiang [Cambodia, India, Japan, Laos, Malaysia, Mongolia, Myanmar, Russia, Thailand, Vietnam; introduced in Europe and North America].

Used medicinally.

钩子木 gou zi mu

Elsholtzia dependens Rehder, Pl. Wilson. 3: 383. 1917.

Plants 1–2 m tall. Branches cylindrical, brown, striate, subglabrous, dusty tomentose when young, gray-brown. Petiole 2–6 mm; leaf blade oblong-elliptic to obovate-elliptic, 4–9.5 × 1.3–4 cm, papery, adaxially glabrous, abaxially sparsely stellate, subglabrescent except on veins, with scattered yellow glands, base cuneate or rarely ± cordate, margin irregularly serrate, apex acute to short acuminate. Spikes cylindrical, 6–35 × 1.5 cm, densely white stellate-tomentose; verticillasters 6–10-flowered; bracts decussate, 4–6 × ca. 5 mm, apex subacuminate, glabrous or sometimes adaxially sparsely stellate. Calyx teeth triangular-ovate, apex acute. Corolla rose to purple-red, 5–6 mm; tube nearly included, ca. 3 mm, glabrous outside; upper lip circular-ovate, ca. 1 mm; lower lip spreading or erect-patent, middle lobe concave, ca. 2 mm. Nutlets ca. 3 mm; beak recurved, ca. 1.5 mm. Fl. Aug-Oct, fr. Nov.

• Hills; 600–2500 m. Guizhou, Shaanxi, Sichuan, Yunnan.

2. *Rostrinucula sinensis* (Hemsley) C. Y. Wu, Acta Phytotax. Sin. 10: 233. 1965.

长叶钩子木 chang ye gou zi mu

Leucosceptrum sinense Hemsley, J. Linn. Soc., Bot. 26: 310. 1890; *Elsholtzia cavaleriei* H. Léveillé & Vaniot; *L. bodinieri* H. Léveillé.

Branches and branchlets ca. 4.5 mm in diam., brown, striate, densely dusty tomentose, subglabrescent. Petiole 3–5 mm; leaf blade oblong to oblong-lanceolate, 5.5–14.5 × 1.5–3 cm, papery, adaxially glabrous, abaxially densely white stellate tomentose, base rounded, margin crenulate-serrulate, apex acute. Spikes cylindrical, 8–25 × to 1.5 cm in flower, densely white stellate tomentose; verticillasters 6–10-flowered; bracts decussate, ovate-orbicular, ca. 7 × 6 mm, apex subacuminate. Calyx teeth triangular-ovate, apex acute. Corolla 5–6 mm; tube 4–5 mm, exserted; limb spreading or erect-patent, middle lobe ca. 3 mm, concave. Immature nutlets triquetrous, oblong, ca. 2 mm, apical beak ca. 0.5 mm, suberect. Fl. Oct.

• Hills, cliffs; 1000 m. Guangxi, Guizhou, Hubei, Hunan.

76. COMANTHOSPHERE S. Moore, J. Bot. 15: 293. 1877.

绵穗苏属 mian sui su shu

Plants rhizomatous perennial, herbs or subshrubs. Stems usually unbranched, erect. Leaves petiolate or sessile, dentate. Verticillasters 6–10-flowered, in long, terminal, densely white stellate tomentose spikes; bracts leaflike or scalelike, early deciduous; bracteoles indistinct, minute. Calyx tubular-campanulate, inconspicuously 10-veined, stellate tomentose outside, glabrous inside; teeth 5, short triangular, apex acute, anterior 2 longer. Corolla reddish to purple, 2-lipped; tube funnelliform, villous annulate near middle; upper lip 2-lobed or occasionally entire; lower lip 3-lobed, middle lobe ovate, spreading, concave, ± saccate; lateral lobes erect, smaller than middle lobe. Stamens 4, anterior 2 longer, much exserted; filaments glabrous; anthers ovoid, cells 1, transversely dehiscent. Ovary brown, glabrous, glandular. Nutlets triquetrous, ellipsoid, yellow-brown, golden glandular.

About six species: China, Japan; three species in China.

- 1a. Stems, petioles, midribs, and lateral veins spreading bearded setose; leaf apex cuspidate; bracts mucronate; corolla annulus narrow, sparse 2. *C. japonica*
 1b. Stems, petioles, midribs, and lateral veins glabrous or subglabrous or stellate tomentose; leaf apex acuminate; bracts acute; corolla annulus broad, dense.
 2a. Leaf blade ovate-oblong to elliptic, 4–8(–9.5) cm wide; spikes 12–18(–40) cm, interrupted basally 1. *C. ningpoensis*
 2b. Leaf blade ovate, 3.5–4 cm wide; spikes ca. 10 cm, nearly continuous 3. *C. nanchuanensis*

1. *Comanthosphere ningpoensis* (Hemsley) Handel-Mazzetti, Symb. Sin. 7: 936. 1936.

绵穗苏 mian sui su

Herbs erect. Rhizomes woody. Stems 60–100 cm, yellow-brown, subglabrous, apically white stellate tomentose, purple-brown when dry. Petiole 5–10 mm, glabrous; leaf blade ovate-oblong, broadly elliptic, to elliptic, 7–13(–20) × 4–8(–9.5) cm, papery, adaxially ± minutely hispid, subglabrescent, abaxially stellate, base broadly cuneate-attenuate, margin serrate above base, apex acuminate. Spikes cylindrical, 8–18(–40) × ca. 1.5 cm, stellate tomentose, interrupted basally; lower bracts leaflike, sessile, broadly ovate-lanceolate, ca. 1.5 cm, adaxially sparsely minutely hispid, abaxially stellate tomentose, base subcordate, margin sparsely toothed, apex acute; upper bracts ovate-rhombic, yellow-brown at base. Pedicel 1–3 mm. Calyx tubular-campanulate or campanulate, ca. 4 mm, densely white stellate tomentose, tube ca. 3 mm, anterior teeth wider than posterior teeth. Corolla ca. 7 mm, densely white stellate tomentose, annulus densely hairy at middle of tube; tube ca. 3 mm,

gradually dilated upward; limb spreading, upper lip ca. 1 × 2 mm, apex 2-lobed or occasionally entire, straight; middle lobe of lower lip ca. 2 mm wide, lateral lobes ca. 1 mm. Nutlets unknown. Fl. Aug-Oct.

• Streamsides, hillsides, thickets, forests, open areas; 600–1400 m. Anhui, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang.

- 1a. Abaxial leaf surface subglabrous with age 1a. var. *ningpoensis*
 1b. Abaxial leaf surface densely stellate tomentose 1b. var. *stellipiloides*

1a. *Comanthosphere ningpoensis* var. *ningpoensis*

绵穗苏 mian sui su

Caryopteris ningpoensis Hemsley, J. Linn. Soc., Bot. 26: 264. 1890; *Leucosceptrumningpoense* (Hemsley) Kitamura & Murata.

Leaves subglabrous with age abaxially.

• Streamsides, grassy hillsides, thickets; 600–1400 m. Anhui, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang.

Used medicinally.

1b. *Comanthosphace ningpoensis* var. *stellipiloides* C. Y. Wu, Acta Phytotax. Sin. 8: 52. 1959.

绒毛变种 rong mao bian zhong

Leaves densely stellate tomentose abaxially.

• Subtropical evergreen forests, bamboo forests, open areas; 1000 m. Jiangxi, Zhejiang.

2. *Comanthosphace japonica* (Miquel) S. Moore, J. Bot. 15: 293. 1877.

天人草 tian ren cao

Elsholtzia japonica Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 103. 1865; *Comanthosphace stellipila* (Miquel) S. Moore var. *japonica* (Miquel) Matsumura & Kudô; *Leucosceptrum japonicum* (Miquel) Kitamura & Murata; *Pogostemon japonicus* Benth & J. D. Hooker.

Herbs or subshrubs. Rhizomes woody. Stems 60–100 cm, yellow-brown, basally subglabrescent, ± terete, bearded setose at apex except for inflorescence. Petiole 0.5–6 cm, shorter to obsolete and ± winged toward stem apex; leaf blade ovate to ovate-elliptic, 8–20 × 3.5–8 cm, thin papery, adaxially sparsely minutely hispid, densely so on veins, abaxially glabrous, glandular, spreading bearded setose on veins, base broadly cuneate-decurrent, margin coarsely serrate, apex cuspidate. Spikes cylindrical, 7–10 × 2.5–3 cm, sparsely stellate; verticillasters 10-flowered; bracts overlapping, ovate-rhombic, to 9 × 9 mm, early deciduous, adaxially yellow-brown, sparsely hairy, abaxially yellow and glabrous, apex mucronate; bracteoles oblanceolate, ca. 4 × 1.5 mm. Pedicel 1–2 mm. Calyx ca. 4 mm; teeth broadly triangular, ca. 0.5 mm, apex acute, anterior teeth wider. Corolla ca. 8 mm, sparsely stellate puberulent; annulus

narrow, villous, on middle of tube; tube ca. 6 mm; upper lip ca. 1 × 2 mm, straight; middle lobe of lower lip ca. 2 × 3 mm; lateral lobes subcircular, ca. 1 × 1.5 mm, ± patent. Nutlets ca. 3 mm. Fl. Aug-Sep, fr. Oct-Nov.

Subtropical, evergreen forests; 1300–1600 m. Anhui, Guangdong, Jiangsu, Jiangxi [Japan].

3. *Comanthosphace nanchuanensis* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 234. 1965.

南川绵穗苏 nan chuan mian sui su

Herbs erect. Stems ca. 60 cm, unbranched, finely striate, basally glabrous, apically stellate tomentose, subglabrescent. Petiole ca. 5 mm, densely stellate, sometimes corky; leaf blade ovate, 7–10 × 3.5–4 cm, golden glandular abaxially when young, adaxially sparsely stellate, glabrescent, base cuneate, margin serrate or double serrate above, apex acuminate; veins stellate or hirtellous, abaxially glabrous, golden glandular. Spikes erect, 10 × 1.5–2 cm in flower, cylindrical, densely stellate tomentose, continuous; verticillasters 10-flowered; floral leaves lanceolate to subulate, 1–1.5 cm × 5–7 mm, margin sparsely serrate or entire; bracts broadly triangular-ovate, 2–3 mm, 5-veined, gray stellate tomentose, apex subacuminate. Pedicel 1–1.5 mm. Calyx ca. 4 mm, densely white stellate tomentose; teeth broadly triangular, ca. 1 mm, anterior teeth wider. Corolla purplish, ca. 8 mm, stellate tomentose, base glabrous, annulus densely villous; tube ca. 6 mm, exerted; upper lip flat, ca. 1 × 2 mm; middle lobe of lower lip ca. 2 mm, ± saccate; lateral lobes ca. 1 mm, ± patent. Stamens purple. Ovary dotted. Nutlets unknown. Fl. Aug.

• Open areas; 1100 m. Sichuan (Nanchuan Xian).

77. **KEISKEA** Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 105. 1865.

香筒草属 xiang jian cao shu

Herbs or subshrubs. Leaves petiolate, dentate. Verticillasters 2-flowered, in terminal and axillary racemes; bracts persistent, somewhat lax or imbricate. Calyx campanulate, sparsely hairy, throat tufted hairy at each tooth sinus or pilose annulate; teeth 5, subequal or posterior tooth smaller. Corolla white, yellowish, or purple; tube funnelform to subcylindrical, annulate; upper lip 2-lobed; middle lobe of lower lip flat; longer than circular lateral lobes. Stamens 4, exerted or rarely included, anterior 2 longer; filaments separate, glabrous, edentate; anther cells 2, divergent, apex confluent. Style filiform, apex 2-cleft; lobes subulate or ± linear, equal or unequal. Nutlets subglobose, glabrous.

About six species: China, Japan; five species in China.

- 1a. Bracts broadly ovate-orbicular, ± imbricate 1. *K. elsholtzioides*
 1b. Bracts indistinct, loosely arranged.
 2a. Leaves lanceolate to oblong-lanceolate, base attenuate to obtuse, usually asymmetrical 5. *K. szechuanensis*
 2b. Leaves ovate to oblong.
 3a. Corolla dark purple, ca. 11 mm; middle lobe of lower lip widest, densely white barbate inside, red glandular 3. *K. australis*
 3b. Corolla white or purplish, 5–8 mm; middle lobe of lower lip smaller, sparsely bearded inside, glandular.
 4a. Leaves ovate, 10–15 × 4–6.5 cm; stem finely retrorse pilose 2. *K. sinensis*
 4b. Leaves ovate-oblong to oblong, 3.5–9 × 2.5–4 cm; stem white floccose-villous 4. *K. glandulosa*

1. *Keiskea elsholtzioides* Merrill, Sunyatsenia 3: 258. 1937.

香薷状香筒草 xiang ru zhuang xiang jian cao

Keiskea elsholtzioides f. *purpurea* X. H. Guo.

Herbs. Stems ca. 40 cm, purplish red, densely spreading ciliate villous, subglabrescent. Petiole 5.5–7 cm; leaf blade ovate to ovate-oblong, 1.5–15 × 1.2–8 cm, ± leathery or thick papery, adaxially dark green, sparsely minutely hispid,

subscabrous, abaxially sparsely ciliate and impressed glandular, base cuneate to shallow cordate, margin crenate-serrate to coarsely serrate, apex acuminate. Racemes terminal and axillary, to 18 cm after anthesis, ciliate villous; verticillasters ± widely spaced. Pedicel ca. 2.5 mm. Calyx ca. 3 mm, ciliate hirsute, throat tufted ciliate on each tooth sinus; teeth ca. 2 mm, lanceolate, oblong-lanceolate, or ovate-lanceolate, margin sparsely ciliate. Corolla white, tinged purple, or purple, ca. 8 mm, puberulent; tube funnelform, ca.

1.7 mm wide at base, ca. 4.7 mm wide at throat; limb 2-lipped, lips straight; lobes circular, upper lobe ca. 1.6 mm, lower lobe ca. 2 mm. Exserted filaments purple. Ovary glabrous. Fl. Jun-Oct, fr. Oct-Nov.

• Grassy areas, thickets, broad-leaved forests on hills; 200–500 m. Anhui, Guangdong, Hubei, Hunan, Jiangxi, Zhejiang.

2. *Keiskea sinensis* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 9: 199. 1924.

中华香筒草 zhong hua xiang jian cao

Herbs. Stems 40–70 cm, purplish, finely retrorse pilose. Petiole 0.8–1.5 cm, densely fine pilose; leaf blade ovate, 10–15 × 4–6.5 cm, adaxially glabrous, yellow-brown strigose on veins, abaxially yellow brownish, dark glandular, base cuneate to rounded, margin ± coarsely serrate, apex acuminate to caudate-acuminate. Racemes terminal and axillary, 7–9 cm including peduncles ca. 5 mm, densely glandular pubescent; bracts persistent, ovate, ca. 2 mm, glandular pubescent, abruptly acuminate. Pedicel 1.5–2 mm, glandular pubescent. Calyx ca. 2.5 mm, 5–7 × 4 mm in fruit, throat ciliate hirsute at each tooth sinus, teeth acute. Corolla white, margin yellowish, ca. 5 mm, glabrous; tube funnellform, annulus at throat, densely villous-barbate, sparsely villous above throat, yellow resinous glandular, throat to 4.5 mm wide; upper lip straight, ca. 1 mm; middle lobe of lower lip oblong, ca. 2 mm, lateral lobes ca. 1 mm. Ovary glabrous. Nutlets slightly attenuate at base, ca. 2 mm in diam. Fl. Sep-Oct, fr. Nov.

• Forests, low mountains. Anhui, Jiangsu, Zhejiang.

3. *Keiskea australis* C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 585. 1977.

南方香筒草 nan fang xiang jian cao

Herbs erect. Stems 50–80 cm, reddish, sparsely pubescent, basally glabrescent, branched. Petiole reddish, 1–4 cm; leaf blade ovate to ovate-oblong, (2.5–)4–11 × (1.3–)2–5.5 cm, papery, adaxially puberulent or dusty hairy, pubescent on veins, abaxially sometimes entirely glandular, with sparsely puberulent veins, base broadly cuneate to obliquely shallow cordate, margin subcrenate, apex short acuminate to acute. Racemes 8–9 cm; rachis densely glandular pubescent; bracts ovate-subulate, ca. 5 × 2 mm, abaxially fine pilose along 3 veins, base cuneate, margin entire, white ciliate, apex caudate-acuminate. Pedicel 1–2 mm, to 5 mm following anthesis, densely glandular pubescent. Calyx to 4 mm, glandular pubescent, throat pilose annulate, margin ciliolate; teeth of upper lip subequal or middle tooth smaller, teeth of lower lip lanceolate. Corolla dark purple, to 1.1 cm; tube subcylindric, ca. 9 mm, to 2 mm wide at throat, sparsely puberulent, horizontally fine pilose annulate ca. 2.5 mm above base inside; upper lip ca. 2 mm, emarginate; lower lip ca. 3 mm,

middle lobe densely white barbate, red glandular. Posterior stamens included. Ovary glabrous. Fl. Oct.

• Sparse forests in valleys; 600–700 m. Fujian, Guangdong.

4. *Keiskea glandulosa* C. Y. Wu, Acta Phytotax. Sin. 10: 236. 1965.

腺毛香筒草 xian mao xiang jian cao

Herbs erect. Stems ca. 30 cm, subglabrescent basally, white floccose-villous at apex. Petiole 0.7–3 cm, glandular floccose-pilose; basal leaves ca. 3.5 cm, base attenuate, decurrent; blades of upper leaves ovate-oblong to oblong, 6–9 × 2.5–4 cm, papery, adaxially brown or olive green, puberulent, dusty hairy, pubescent on midrib, abaxially sparsely villous on midrib, base rounded to cuneate, margin shallowly crenate-serrate, apex acuminate to obtuse. Racemes ca. 8 cm; rachis white villous; bracts ovate-subulate, ca. 7 × 2.5 mm, margin white ciliate, apex caudate-acuminate. Pedicel ca. 2 mm, glandular pilose. Calyx ca. 4 mm, glandular pilose, inconspicuously tufted hairy at each tooth sinus; teeth lanceolate, ca. 2.3 mm. Corolla limb purple when dry, ca. 8 mm, puberulent, villous-barbate annulate inside; tube funnellform, throat ca. 4 mm wide; upper lip longer, ca. 2.2 mm; lower lip lobes subequal, circular, ca. 1.8 mm. Stamens included, anterior 2 ca. 3 mm. Ovary glabrous. Fl. Nov.

• Fujian.

5. *Keiskea szechuanensis* C. Y. Wu, Acta Phytotax. Sin. 10: 236. 1965.

香筒草 xiang jian cao

Herbs erect. Stems ca. 80 cm, glabrous, apex purple-red, grooves floccose-pilose. Petiole 0.7–1.8 cm; leaf blade lanceolate to oblong-lanceolate, 3.5–4.5 × 1.2–5.4 cm, ± leathery, adaxially olive green, glabrous, scabrous with age, abaxially glabrescent, densely impressed glandular, base attenuate to obtuse, usually asymmetrical, margin serrate, apex subobliquely caudate-acuminate; veins spreading fine pubescent when young, distinctly netted. Racemes terminal and axillary, 5–7 cm; peduncle 4–10 mm; rachis finely glandular villous; bracts ovate-subulate, ca. 5 mm, slightly reddish, glabrous, margin ciliolate. Pedicel 1–1.5 mm, finely glandular villous. Calyx ca. 4 × 3 mm, puberulent, finely tufted villous at each tooth sinus inside; teeth lanceolate, subequal, ca. 2 mm; posterior tooth subcircular, minute, apex mucronate. Corolla yellowish, ca. 7 mm, puberulent; tube funnellform, pilose annulate slightly below middle, throat to 3.2 mm wide; upper lip straight, ca. 1.5 mm; middle lobe of lower lip ca. 1.1 mm. Stamens much exserted, straight, posterior 2 longer. Ovary glabrous. Fl. Aug-Oct.

• Hills; 1100–2200 m. Sichuan, Yunnan.

78. POGOSTEMON Desfontaines, Mém. Mus. Hist. Nat. 2: 154. 1815.

刺蕊草属 ci rui cao shu

Herbs or subshrubs. Stems solid. Leaves petiolate or sessile, ovate to narrowly ovate, rarely linear to falcate, margin dentate, ± hairy or tomentose. Verticillasters regular or secund, in continuous or interrupted spikes, thyrses, or panicles; bracts and bracteoles linear to ovate. Calyx ovoid-tubular or campanulate, equally or subequally 5-toothed, with crystals. Corolla limb nearly 2-lipped, upper lip 3-lobed, lower lip entire, as long as to slightly longer than upper. Stamens 4, exserted, erect, free; filaments bearded at middle; anthers globose, 1-locular, cell apex dehiscent. Style apex 2-cleft, lobes subulate, equal or subequal. Nutlets ovoid to globose, slightly flattened, smooth.

About (40–)60 species: Africa, Asia; 16 species in China.

- 1a. Inflorescences interrupted spikate racemes.
- 2a. Subrepent herbs, base prostrate, with adventitious roots.
- 3a. Stems and leaves densely yellow hirsute or yellow strigose; petioles rarely to 1.2 cm; upper leaves sessile 15. *P. auricularius*
- 3b. Apical part of stems and rachises glandular hairy, pubescent; leaves adaxially glabrescent, abaxially strigose along veins or subglabrous and glandular; petioles 1–4 cm, glandular hairy or pubescent, glabrescent 14. *P. menthoides*
- 2b. Erect herbs.
- 4a. Leaves long falcate, 4–7 mm wide 16. *P. falcatus*
- 4b. Leaves not long falcate, 15–30 mm wide.
- 5a. Leaves ovate-lanceolate to elliptic, lateral veins 8- or 9-paired; calyx urceolate-campanulate, 2.5 × 3 mm 12. *P. hispidocalyx*
- 5b. Leaves ovate, lateral veins 3-paired; calyx tubular-campanulate, 3–3.5 mm 13. *P. nigrescens*
- 1b. Inflorescences spikes in panicles.
- 6a. Calyx 2–2.5 mm; corolla shorter than calyx; spikes interrupted 6. *P. brevicorollus*
- 6b. Calyx more than 3 mm; corolla subequal to longer than calyx.
- 7a. Anterior filaments glabrous; plants densely minutely hispid 11. *P. xanthiifolius*
- 7b. All filaments bearded.
- 8a. Calyx more than 6 mm, densely tomentose outside; leaves circular to broadly ovate; cultivated plants. 5. *P. cablin*
- 8b. Calyx 3–5 mm, not tomentose outside.
- 9a. Bracts and bracteoles linear-lanceolate to linear; leaves rhombic-lanceolate to ovate, apex acute to short acuminate, base cuneate-attenuate 4. *P. formosanus*
- 9b. Bracts and bracteoles oblong-lanceolate to ovate; leaves ovate, rhombic-ovate, to ovate-lanceolate.
- 10a. Bracteoles slightly shorter than to longer than calyx.
- 11a. Calyx subtubular, teeth narrowly triangular, subequal or 2 shorter, ca. 1/3 as long as calyx tube 1. *P. chinensis*
- 11b. Calyx narrowly campanulate, teeth triangular, 1/3–1/2 as long as calyx tube.
- 12a. Calyx teeth ca. 1/3 as long as calyx; corolla ca. 7 mm 3. *P. championii*
- 12b. Calyx teeth ca. 1/2 as long as calyx; corolla 4–5 mm 2. *P. septentrionalis*
- 10b. Bracteoles to slightly more than 1/2 as long as calyx.
- 13a. Calyx ca. 3 mm; spikes (3–)5–20 cm × 7–8 mm; stems, branches, and leaves glabrescent 7. *P. glaber*
- 13b. Calyx more than 3.5 mm; spikes rather robust; stems, branches, and leaves hairy.
- 14a. Leaves lanceolate; corolla ca. 8 mm 8. *P. dielsianus*
- 14b. Leaves ovate to broadly ovate; corolla ca. 6 mm.
- 15a. Lobes of style 2–2.5 mm; calyx pubescent 10. *P. griffithii*
- 15b. Lobes of style ca. 1.5 mm; calyx sparsely pubescent on veins or villous (in var. *singpingensis*) 9. *P. esquirolii*

1. *Pogostemon chinensis* C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 742. 1977.

长苞刺蕊草 chang bao ci rui cao

Herbs erect, 0.5–2 m tall. Stems green or brown when dry, strigose, slightly dilated at nodes. Petiole obsolete to 6 cm; leaf blade ovate, 5–10(–13) × 2–6(–7) cm, papery or ± membranous, adaxially strigose, abaxially strigose along veins, base cuneate-attenuate, margin double serrate to double crenate-serrate, apex acuminate; lateral veins 3-paired. Spikes 1.5–7 cm × 8–9 mm, terminal and axillary, interrupted or continuous, pedunculate; verticillasters ± secund; peduncle 0.5–2 cm, densely strigose; bracteoles ovate-lanceolate, elliptic, to ovate, 3–4 mm, strigose or sometimes glandular. Calyx subtubular, 3–4 mm, strigose, sparsely glandular outside; teeth narrowly triangular, subequal, or 2 smaller, ca. 1/3 as long as calyx tube, strigose inside, ciliate. Corolla reddish, subequal to slightly longer than calyx; upper lip minutely hirsute outside. Stamens bearded at middle. Style almost as long as stamens. Fl. Jul–Nov.

• Streamsides, grasslands; 1500 m. Guangdong, Guangxi, Yunnan.

2. *Pogostemon septentrionalis* C. Y. Wu & Y. C. Huang, Fl. Reipubl. Popularis Sin. 66: 585. 1977.

北刺蕊草 bei ci rui cao

Herbs or subshrubs 1.5–2 m tall. Stems finely strigose, slightly dilated at nodes. Petiole 0.5–3(–4) cm; leaf blade ovate to rhombic-ovate, 4–10(–11) × 2–5(–7) cm, herbaceous, finely strigose, base cuneate to cuneate-attenuate, margin irregularly double dentate, apex short acuminate; lateral veins ca. 4-paired, conspicuously elevated abaxially. Spikes 1–5(–7) cm, densely strigose, cymes sessile or short pedunculate, unbranched or in panicles; peduncle 0.5–1.5(–2) cm; bracteoles lanceolate, oblong-lanceolate, to ovate-lanceolate, slightly shorter to as long as calyx. Calyx narrowly campanulate, 3.5–4 mm, pubescent outside, sometimes only on veins, glandular, pubescent on teeth inside; teeth equal, triangular, apex acute, ca. 1/2 as long as calyx tube, ciliate. Corolla purple, nearly as long to slightly longer than calyx, 4–5 mm. Stamens slightly exerted, bearded at middle. Nutlets subglobose.

• Guangdong, Jiangxi.

3. *Pogostemon championii* Prain, Bull. Misc. Inform. 1908: 254. 1908.

短穗刺蕊草 duan sui ci rui cao

Subshrubs suberect, few branched. Stems and branches sparsely pubescent. Petiole 1–1.3 cm; leaf blade ovate-lanceolate, 6–8 × 2.5–4 cm, membranous, sparsely appressed pubescent especially along veins, base cuneate, margin

obscurely double crenate, entire at base, apex acuminate. Spikes ovoid-cylindric, 1.5–3.5 × 1 cm, continuous, appressed pubescent; verticillasters in loose panicles on branch apices; peduncle ca. 5 mm; bracts ovate-lanceolate, ca. 3 mm. Calyx narrowly campanulate, ca. 4 mm, pubescent outside; teeth triangular, apex acute, equal, ca. 1/3 as long as calyx. Corolla purplish, ca. 7 mm, glabrous, margin sparsely ciliate pubescent, lobes subequal. Filaments bearded. Style lobes subequal, ca. 1.5 mm. Nutlets broadly ovoid, smooth.

- Guangdong.

4. *Pogostemon formosanus* Oliver, Hooker's Icon. Pl. 25: t. 2440. 1896.

台湾刺蕊草 tai wan ci rui cao

Herbs branched. Stems and branches pubescent, glabrescent. Petiole to 4.5 cm; leaf blade rhombic-lanceolate to ovate, 4–10 × 1–5 cm, ± membranous, finely strigose, adaxially glabrescent, abaxially inconspicuously glandular, base cuneate-attenuate, margin entire basally, irregularly incised toward apex, apex acute to short acuminate; lateral veins 2- or 3-paired. Spikes 2–8 cm, terminal or axillary, cymes (1–)5–8-flowered, short pedunculate or sessile, in 3's on stem and branch apices; bracts and bracteoles linear-lanceolate to linear, 2–3 mm, ciliate. Flowers sessile or subsessile. Calyx subtubular, ca. 4 mm, membranous, sparsely pubescent outside; teeth subulate-lanceolate, equal, ciliate, ca. 1/3 as long as calyx tube. Corolla purplish, ca. 5 mm, slightly exerted. Bearded portions of stamens included. Nutlets ovoid.

- Taiwan.

5. *Pogostemon cablin* (Blanco) Bentham, Prodr. 12: 156. 1848.

广藿香 guang huo xiang

Mentha cablin Blanco, Fl. Filip. 473. 1837; *Pogostemon javanicus* Backer ex Adelbert; *P. patchouly* Pelletier; *P. patchouly* var. *suavis* J. D. Hooker.

Herbs or subshrubs, perennial, aromatic. Stems erect, 30–100 cm tall, tomentose. Petiole 1–6 cm; leaf blade circular to broadly ovate, 2–10.5 × 1–8.5 cm, herbaceous, adaxially dark green, sparsely tomentose, abaxially tomentose, base cuneate-attenuate, margin irregularly incised, apex obtuse to acute; lateral veins ca. 5-paired. Spikes 4–6.5 × 1.5–1.8 cm, densely tomentose, terminal and axillary; verticillasters 10- to many flowered, basally somewhat lax; peduncle 0.5–2 cm; bracts and bracteoles linear-lanceolate, somewhat shorter than to as long as calyx, densely tomentose. Calyx tubular, 7–9 mm, tomentose outside, minutely tomentose inside; teeth subulate-lanceolate, ca. 1/3 as long as calyx tube. Corolla purple, ca. 1 cm, lobes villous outside. Stamens bearded. Fl. Apr.

Fujian, Guangdong, Guangxi, Hainan, Taiwan [India, Indonesia, Malaysia, Philippines, Sri Lanka].

Cultivated in China. Source of patchouly oil, an essential oil obtained from the leaves and used in soaps and perfumes. Employed in scented carpets and shawls. It is also used medicinally.

6. *Pogostemon brevicorollus* Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 49. 1966.

短冠刺蕊草 duan guan ci rui cao

Herbs or subshrubs. Stems erect, branched, pubescent, glabrescent. Petiole 1–3 cm; leaf blade lanceolate-ovate to ovate, 6–13 × 1.5–6.5 cm, adaxially dark green, sparsely puberulent, abaxially minutely hispid on veins, base cuneate, margin double serrate except entire at base, apex acuminate. Spikes sessile, terminal and axillary, (2–)4–9(–11) cm, interrupted; verticillasters globose, 6–8 mm in diam., 12–14-flowered. Calyx ovoid-tubular, 2–2.5 mm, subglabrous or pubescent along veins outside; teeth triangular, equal, ca. 0.5 mm, ciliate, closed in fruit. Corolla shorter than to subequaling calyx, 2–2.1 mm, glabrous outside; tube ca. 1.6 mm, lobes subequal, triangular, apex obtuse; bearded portions of filaments included. Nutlets black, obovoid, ca. 0.8 mm. Fl. and fr. Sep–Nov.

- Valleys, forests; 1200–2300 m. Sichuan, Yunnan.

7. *Pogostemon glaber* Bentham, Labiat. Gen. Spec. 154. 1833.

刺蕊草 ci rui cao

Herbs erect. Stems 0.5–2 m tall, villous, glabrescent. Petiole to 6 cm, obsolete in uppermost leaves; leaf blade ovate, 5–8(–10) × 2.5–5 cm, adaxially strigose-villous or subglabrous, abaxially pilose along veins otherwise glabrous, base broadly cuneate to rounded or subcordate, margin double serrate, apex acuminate; lateral veins 5-paired. Spikes (3–)5–20 cm × 7–8 mm, terminal and axillary; verticillasters many flowered; peduncle 0.5–4 cm; bracteoles ovate, 1–1.5 mm, ciliate. Calyx ovoid-tubular, ca. 3 mm, glabrous or pubescent outside, sparsely pubescent on teeth but otherwise glabrous inside; teeth equal, triangular, ca. 1/3 as long as calyx tube. Corolla white or whitish, ca. 5 mm, upper lip bearded outside, lower lip glabrous. Exserted portion of filaments nearly as long as corolla. Nutlets globose. Fl. and fr. Nov–Mar.

Hills, waste areas, valleys, forests; 1300–2700 m. Yunnan [Bangladesh, Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Thailand].

Used medicinally.

8. *Pogostemon dielsianus* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 159. 1913.

狭叶刺蕊草 xia ye ci rui cao

Shrubs branched, 1.3–2.7 m tall. Stems terete, glabrous. Petiole 5–10 mm; leaf blade lanceolate, 10–14 cm, papery, sparsely strigose-puberulent, base acuminate, margin serrate, apex acuminate. Thyrses terminal, ca. 4 cm, continuous, many leaved, densely appressed pubescent except for corolla; verticillasters sessile, 10–14-flowered, 1–1.5 cm. Calyx tubular, 3.5–4 × 1–1.2 mm; teeth acute, 1/5–1/4 as long as calyx tube. Corolla rose, ca. 8 mm; tube cylindric, slightly dilated at throat, lobes subequal. Stamens lanate at middle, ca. 3 × as long as corolla (specimens not seen).

- Thickets on stony slopes; 1600–2000 m. Yunnan.

9. *Pogostemon esquirolii* (H. Léveillé) C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 743. 1977.

膜叶刺蕊草 mo ye ci rui cao

Herbs or subshrubs. Stems 1–1.5 m tall, pubescent, subglabrescent. Petiole 1.5–7 cm; leaf blade ovate, to 12 × 7(–9) cm, membranous or ± papery, base abruptly attenuate to cuneate-attenuate, rarely double rounded, margin double crenate to double serrate, apex acuminate; lateral veins 5-paired. Spikes subcylindric, continuous or rarely interrupted, 3–7 (–15) cm,

terminal and axillary; verticillasters many flowered; peduncle 1–2.5 cm, densely villous; bracteoles ovate, 1/3–1/2 as long as calyx, glabrous or subglabrous, ciliate. Calyx subtubular, 4–5 mm, glabrous or sparsely pubescent along veins; teeth equal, narrowly triangular, ca. 1/3 as long as calyx tube, hirsute inside, ciliate. Corolla white or purplish, 6–7 mm, lobes bearded outside. Stamens ca. 2 × as long as corolla, bearded parts exerted. Fl. Dec–Apr.

• Streamsides, hills, valleys; to 2000 m. Guangxi, Guizhou, Hainan, Yunnan.

- 1a. Stems, abaxial leaf surface, bracteoles, and calyx veins pubescent or subglabrous 9a. var. *esquirolii*
1b. Stems, abaxial leaf surface, bracteoles, and calyx villous 9b. var. *tsingpingensis*

9a. *Pogostemon esquirolii* var. *esquirolii*

膜叶刺蕊草 mo ye ci rui cao

Caryopteris esquirolii H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 449. 1911.

Stems, abaxial leaf surface, bracteoles, and outer part of calyxes pubescent or subglabrous.

• Streamsides, valleys; to 2000 m. Guangxi, Guizhou, Hainan, Yunnan.

Used medicinally.

9b. *Pogostemon esquirolii* var. *tsingpingensis* C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 744. 1977.

金平变种 jin ping bian zhong

Stems, abaxial leaf surface, bracteoles, and outer part of calyxes villous.

• Open situations in hills; 1400 m. Yunnan.

10. *Pogostemon griffithii* Prain var. *latifolius* C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 744. 1977.

宽叶长柱刺蕊草 kuan ye chang zhu ci rui cao

Herbs. Stems erect, to 2 m tall, densely appressed pubescent. Petiole 0.5–1.5 cm; leaf blade ovate to broadly ovate, 5.5–8.5 × 3.5–5.8 cm, herbaceous, adaxially appressed pubescent, abaxially densely pubescent, base obtuse, margin irregularly double serrate, apex acute; lateral veins 3-paired, conspicuously raised abaxially. Spikes cylindrical, (1.5–)5–10 × ca. 1.2 cm, terminal and axillary; verticillasters many flowered, densely appressed pubescent; peduncle 0.5–3.5 cm; bracteoles ovate-lanceolate to lanceolate, 2–2.5 mm, densely pubescent, ciliate. Calyx narrowly campanulate, 4–5 mm, pubescent outside; teeth equal, triangular-lanceolate, ca. 1/2 as long as calyx tube. Corolla bluish, ca. 6 mm, sparsely pubescent on upper lip outside. Bearded parts of stamens exerted. Fl. Mar.

• Dense valley forests; 700 m. Yunnan (Ximeng Xian).

Pogostemon griffithii var. *griffithii* in Myanmar has leaves 10 × 2.5–3 cm. Calyx ca. 4 mm; spikes 2–6 cm × 8 mm. *Pogostemon griffithii* var. *latifolius* may be only a form, but more material is needed for resolution.

11. *Pogostemon xanthiifolius* C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 744. 1977.

苍耳叶刺蕊草 cang er ye ci rui cao

Herbs. Stems ca. 1 m. tall, much branched; branches and stems densely minutely hispid, slightly swollen at nodes. Petiole 0.5–4 cm; leaf blade ovate to broadly ovate, 3–8 × 2–7 cm, densely minutely hispid, adaxially dark green, base broadly cuneate to rounded, margin double incised-serrate, apex acute to short acuminate; lateral veins ca. 3-paired. Spikes terminal and axillary, solitary or in 3's, 2–11 cm, interrupted basally, of 3–14 verticillasters; peduncle 0.5–2 cm, densely minutely hispid; bracteoles sessile, oblong-lanceolate to broadly lanceolate, slightly shorter than calyx, midrib sparsely hispid, margin minutely hispid. Calyx tubular, ca. 4 mm, sparsely and minutely hispid on veins, sparsely pubescent inside; teeth subequal, triangular-lanceolate, ca. 1/3 as long as calyx tube, margin rigidly ciliate. Corolla white, as long as to slightly longer than calyx. Posterior filaments longer, bearded at middle, anterior 2 glabrous. Nutlets unknown. Fl. Oct.

• Forests, forest margins; 700–800 m. Yunnan.

12. *Pogostemon hispidocalyx* C. Y. Wu & Y. C. Huang, Fl. Yunnan. 1: 745. 1977.

刚毛萼刺蕊草 gang mao e ci rui cao

Herbs erect, slender. Stems 40–65 cm tall, unbranched or few branched, pubescent or glabrescent. Petiole 1–2 cm, strigose; leaf blade ovate-lanceolate to elliptic, 4.5–6 × 1.6–2.8 cm, ± membranous, adaxially strigose to subglabrescent, abaxially strigose along veins, glandular, base cuneate to attenuate, margin double serrate, apex acuminate; lateral veins 8- or 9-paired. Racemes 3–9.5 cm, terminal or axillary, blackish or dark brown when dry; verticillasters 6 to many, 2–16-flowered; peduncle 1–2 cm, densely pubescent; bracts and bracteoles linear, nearly as long as pedicels, ciliate. Calyx urceolate-campanulate, 2.5–3 mm, sparsely hispid or subglabrous; teeth subulate, subequal. Corolla unknown. Nutlets black, subglobose, ca. 0.8 mm, smooth. Fr. Oct.

• Forests; 2800 m. Yunnan (Fugong Xian).

13. *Pogostemon nigrescens* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 159. 1913.

黑刺蕊草 hei ci rui cao

Pogostemon fraternus Miquel var. *nigrescens* (Dunn) Kudô.

Herbs erect. Stems 30–70 cm tall, few branched, densely pubescent. Petiole 0.5–2 cm; leaf blade ovate, 2.5–6 × 1.5–3 cm, blackish or brownish when dry, adaxially densely appressed pubescent, abaxially pubescent, densely so on veins, glandular, base obtuse to rounded, margin double crenate, apex acute to short acuminate, lateral veins 3-paired. Racemes terminal, 6–11(–19) cm, blackish or dark brown when dry, ± interrupted basally; verticillasters many flowered; rachis densely spreading gray pubescent; bracteoles subulate, rigidly ciliate. Pedicel 1–2 mm, densely spreading gray pubescent. Calyx tubular-campanulate, 3–3.5 mm, densely gray pubescent, throat densely white hirsute annulate; teeth subequal, subulate, margin minutely hispid. Corolla purplish or purple, slightly exerted, 4–4.5 mm; lobes subequal, bearded inside. Filaments moniliform barbate. Nutlets subglobose, adaxially ribbed. Fl. Sep–Oct, fr. Oct–Nov.

• Hills, thickets, forests; 1100–2600 m. Yunnan.

14. *Pogostemon menthoides* Blume, Bijdr. 825. 1826.

小刺蕊草 xiao ci rui cao

Pogostemon fraternus Miquel.

Herbs procumbent or diffuse, perennial. Stems ascending, branched, purplish, basally rooting adventitiously, apex glandular hairy. Petiole 1–4 cm; leaf blade ovate to ovate-lanceolate, 2–5.5(–8) × 1.2–3.2 cm, ± membranous or papery, strigose or subglabrous, base rounded to subcordate, margin serrate to double serrate, apex acute to acuminate; lateral veins ca. 3-paired, rather conspicuous. Thyrses terminal, 5–16 cm, interrupted, glandular hairy, pubescent; verticillasters 5–11-flowered; peduncle 2.5 cm or more; bracteoles subsubulate, almost as long as pedicels, rigidly ciliate. Pedicel 2–4 mm. Calyx subtubular, 4–5 mm, glandular hairy, hirsute, ± 2-lipped, throat densely hispid annulate; teeth subulate to linear-subulate, margin minutely hispid, 3 of upper lip wider, 2 of lower lip slightly longer. Corolla purplish to 2 × as long as calyx, lobes subequal. Stamens bearded. Nutlets subglobose, flattened, adaxially veined. Fl. and fr. Mar–Apr.

Streamsides, wet areas in forests; 400–1200 m. Yunnan [India, Indonesia, Myanmar, Philippines, Thailand, Vietnam].

15. *Pogostemon auricularius* (Linnaeus) Hasskarl, Tijdsch. Nat. Geschied. 10: 127. 1843.

水珍珠菜 shui zhen zhu cai

Mentha auricularia Linnaeus, Mant. Pl., ed. 1, 81. 1767; *Dysophylla auricularia* (Linnaeus) Blume; *M. foetida* N. Burman.

Herbs annual. Stems 0.4–2 m tall, prostrate basally, rooting at nodes, ascending, apex much branched, densely yellow spreading hirsute. Petiole rarely to 1.2 cm, upper stem leaves subsessile; leaf blade oblong to ovate-oblong, 2.5–7 × 1.5–2.5 cm, yellow strigose, with scattered impressed glands, base rounded to shallowly cordate, rarely cuneate, margin serrate, apex obtuse to acute; lateral veins 5- or 6-paired, conspicuous abaxially. Spikes 6–18 cm, apex caudate-acuminate, ca. 1 cm in diam. in flower, continuous or sometimes interrupted at base; bracts ovate-lanceolate, as long as corolla, margin strigose. Calyx campanulate, ca. 1 × 1 mm, glabrous, yellow glandular; teeth broadly triangular, ca. 1/4 as long as calyx tube, margin pilose. Corolla purplish to white, ca. 2.5 × as long as calyx, glabrous. Stamens much exerted, exerted parts bearded. Nutlets brown, subglobose, ca. 0.5 mm in diam., glabrous. Fl. and fr. Apr–Nov.

Wet areas in sparse forests, streamsides; 300–1700 m. Fujian, Guangdong, Guangxi, Jiangxi, Taiwan, Yunnan [Cambodia, India (Sikkim), Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

16. *Pogostemon falcatus* (C. Y. Wu) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13: 76. 1975.

镰叶水珍珠菜 lian ye shui zhen zhu cai

Dysophylla falcata C. Y. Wu, Acta Phytotax. Sin. 10: 237. 1965.

Herbs erect. Rhizomes woody. Stems 30–40 cm tall, base ± woody, densely appressed hirsute, apex densely gray hairy, subterete, slightly swollen at nodes. Petiole densely silky; leaf blade falcate, 4.5–6.5 cm × 4–7 mm, appressed silky, densely so along veins, base attenuate, margin remotely serrate except for ± entire lower margin, apex acuminate; lateral veins 3–5-paired, conspicuous abaxially. Spikes 4.5–5.5 cm × ca. 6.5 mm, dense, subtended by floral leaves at base; bracts linear, slightly longer than calyx, densely silky. Calyx ca. 1.7 × 1 mm, membranous, pilose outside, teeth short. Corolla red, black when dry, ca. 1.5 × as long as calyx. Filaments black when dry, sparsely hairy. Nutlets unknown. Fl. Oct.

• Rocky areas near water; 800 m. Yunnan (Jinghong Xian).

79. *DYSOPHYLLA* Blume, Bidjr. 826. 1826.

水蜡烛属 shui la zhu shu

Herbs. Stems hollow. Leaves 3–10, in whorls, rarely opposite, sessile, linear to oblanceolate, margin entire or remotely dentate, usually subglabrous. Verticillasters many flowered, in continuous or rarely interrupted terminal spikes; bracts slightly shorter to as long as flowers. Flowers sessile. Calyx campanulate, hairy outside, glabrous inside, short 5-toothed, usually without crystals. Corolla exerted, tube gradually widened at apex, limb 4-lobed; lobes subequal, posterior lobe entire or emarginate. Stamens 4, exerted; filaments long, subequal, straight, bearded; anthers subglobose, 1-locular. Style subequal to stamens, apex 2-cleft; lobes equal, subulate. Disc ringlike, subtentire. Nutlets subglobose, smooth.

About 27 species: Asia (the majority in India), one in Australia; seven species in China.

Many workers regard *Dysophylla* to be synonymous with *Pogostemon*.

- 1a. Calyx 5-sulcate; spikes subcapitate, 1–2.7 cm × 8–9 mm; leaves 1–2 cm × 2.5–3.2 mm 5. *D. pentagona*
- 1b. Calyx not grooved; spikes longer.
 - 2a. Stems hairy.
 - 3a. Leaf margins entire, strongly revolute; stem yellow strigose 3. *D. cruciata*
 - 3b. Leaves ± dentate.
 - 4a. Stems appressed strigose; leaves 1.2–3.5 cm × 1.8–3.8 mm, margin remotely shallow serrate 4. *D. szemaoensis*
 - 4b. Stems glandular rust colored pilose; leaves 2.5–7.5 cm × 2–4.5 mm, margin entire or apex obscurely to

- remotely serrate 7. *D. linearis*
 2b. Stems subglabrous.
 5a. Leaves 3.5–4.5 cm × 5–7 mm, entire, apex obscurely remote serrate 6. *D. yatabeana*
 5b. Leaves shorter, conspicuously serrate.
 6a. Leaves linear to lanceolate, 1.5–4(–7.5) mm wide, abaxially gray 1. *D. stellata*
 6b. Leaves oblong to obovate, 4–8 mm wide, abaxially greenish 2. *D. sampsonii*

1. *Dysophylla stellata* (Loureiro) Benth., Pl. Asiat. Rar. 1: 30. 1830.

水虎尾 shui hu wei

Mentha stellata Loureiro, Fl. Cochinch. 2: 361. 1790; *Dysophylla benthamiana* Hance; *D. benthamiana* var. *hainanensis* C. Y. Wu & Hsuan; *D. benthamiana* var. *intermedia* C. Y. Wu & Hsuan; *D. esquirolii* H. Léveillé; *D. japonica* Miquel; *D. stellata* var. *hainanensis* (C. Y. Wu & Hsuan) C. Y. Wu & H. W. Li; *D. stellata* var. *intermedia* (C. Y. Wu & Hsuan) C. Y. Wu & H. W. Li; *D. verticillata* (Roxburgh) Benth.; *Eusteralis pumila* Rafinesque-Schmaltz; *M. verticillata* Roxburgh; *Pogostemon benthamianus* Kuntze; *P. verticillatus* Miquel.

Herbs annual. Stems erect, 15–40 cm, base to 1 cm in diam., glabrous, nodes sometimes gray villous, lower internodes short. Leaves in whorls of 4–8, linear to lanceolate, 2–7 cm × 1.5–4(–7.5) mm, glabrous, abaxially gray, base attenuate, margin remotely serrulate or entire, revolute or flat, apex acute. Spikes 0.5–7(–9) cm × 4–6.5(–8) mm, continuous, compact; bracts lanceolate, conspicuously longer than calyx. Calyx densely gray tomentose outside, ca. 12 × 1 mm; fruiting calyx to 1.8 mm. Corolla purple-red, 1.8–2 mm, lobes subequal. Nutlets brown, obovoid. Fl. and fr. year round.

Rice paddies, wet areas along streams; 300–1500 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Yunnan, Zhejiang [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Thailand, Vietnam; Australia].

2. *Dysophylla sampsonii* Hance, Ann. Sci. Nat. Bot., sér. 5, 5: 234. 1866.

齿叶水蜡烛 chi ye shui la zhu

Dysophylla tsangii Sun ex C. H. Hu.

Herbs annual. Stems erect to trailing at base, 15–50 cm tall, basal internodes short, glabrous, reddish. Leaves in whorls of 3(–5), rarely opposite, obovate-oblong to oblanceolate, 0.9–6.2 cm × 4–8 mm, papery, glabrous, densely black glandular, base attenuate, margin conspicuously serrate except basal 1/3 entire, apex obtuse to acute. Spikes 1.2–7 × ca. 0.8 cm; rachis glandular villous; bracts ovate-lanceolate, scarcely longer than calyx, reddish. Calyx broadly campanulate, ca. 1.4 × 1.4 mm, pubescent, basally yellow glandular outside, purplish red; teeth ovate, more than 1/3 as long as calyx. Corolla purple-red, ca. 2 mm, lobes subequal. Stamens much exerted; filament hairs purplish red. Nutlets dark brown, ovoid, ca. 0.7 × 0.5 mm, shiny. Fl. Sep–Oct, fr. Oct–Nov.

• Marshy areas, beside water. Guangdong, Guangxi, Guizhou, Hunan, Jiangxi.

3. *Dysophylla cruciata* Benth., Pl. Asiat. Rar. 1: 30. 1830.

毛茎水蜡烛 mao jing shui la zhu

Dysophylla tetraphylla Wight; *Mentha quadrifolia* D. Don; *Pogostemon cruciatum* (Benth.) Kuntze.

Herbs annual. Stems erect, 18–45 cm tall, sometimes branched from base, yellow strigose, lower internodes short. Leaves sessile, obliquely spreading, in whorls of 4, linear, 1.3–3.5 cm × 2.5–4 mm, papery, strigose, base broad, margin entire and strongly revolute, apex acute. Spikes 1.5–10 cm × 7–8 mm, compact; bracts linear to narrowly lanceolate, as long as calyx to longer than corolla, gray strigose, gray-purple. Calyx ca. 1.5 × 1.2 mm, villous outside; teeth ovate-triangular, ca. 1/3 as long as calyx tube. Corolla ca. 2 × as long as calyx, purplish red, ca. 4 mm, villous outside, limb subequally 4-lobed. Stamens much exerted. Nutlets dark brown, minute, shiny. Fl. Sep–Nov, fr. Nov.

Marshy areas, waste areas; 1100–1500 m. Yunnan [Cambodia, India, Laos, Nepal, Vietnam].

4. *Dysophylla szemaensis* C. Y. Wu & Hsuan, Acta Phytotax. Sin. 10: 238. 1965.

思茅水蜡烛 si mao shui la zhu

Herbs annual. Stems ascending, trailing at base, 20–30 cm tall, branched, apex appressed strigose, basally subglabrous, reddish. Leaves in whorls of 4, linear, 1.2–3.5 × 1.8–3.8 cm, adaxially appressed ciliate, abaxially densely black glandular, densely ciliate on midrib and margin, margin remotely shallow serrate, flat or slightly revolute, apex acuminate. Spikes 1.2–6 cm × ca. 7 mm, continuous; bracts linear-lanceolate, almost as long as corolla, gray villous, grayish purple-red. Calyx ca. 1.2 × 1 mm, pilose outside. Corolla purplish, ca. 2 × as long as calyx. Nutlets unknown.

• Aquatic; 1000 m. Yunnan.

5. *Dysophylla pentagona* C. B. Clarke ex J. D. Hooker, Fl. Brit. India 4: 641. 1885.

五棱水蜡烛 wu leng shui la zhu

Herbs annual. Stems 10–40 cm tall, erect-ascending, base trailing, glabrous. Leaves in whorls of 4, linear to oblanceolate, 1–2 × 2.5–3.2 cm, glabrous, abaxially sparsely glandular, base attenuate, margin entire or slightly revolute, apex obtuse. Spikes subcapitate, 1–2.7 cm × 8–9 mm; bracts purple, lanceolate, slightly longer than calyx, margin gray villous. Calyx ca. 1 × 0.8 mm, pilose, glandular, 5-sulcate. Corolla reddish, ca. 2 × as long as calyx. Stamens much exerted. Nutlets unknown.

Aquatic, marshy streamsides; 900–1500 m. Yunnan [India].

Specimens from Yunnan do not have the slender, erect stems and slender spikes as described by C. B. Clarke for Indian plants. This may be due to local variation.

6. *Dysophylla yatabeana* Makino, Bot. Mag. (Tokyo) 12: 55. 1898.

水蜡烛 shui la zhu

Dysophylla linearis Benth. var. *yatabeana* (Makino) Kudô; *D. lythroides* Diels; *D. martini* Vaniot.

Herbs perennial. Stems 40–60 cm tall, glabrous except for puberulent apex, usually unbranched or rarely short branched. Leaves in whorls of 3 or 4, narrowly lanceolate, 3.5–4.5 cm × 5–7 mm, papery, glabrous, inconspicuously brown glandular, margin entire or obscurely remote serrate toward apex, apex obtuse. Spikes 2.8–7 × ca. 1.5 cm, compact, sometimes interrupted at base; bracts purplish, linear-lanceolate, almost as long as corolla. Calyx ovoid-campanulate, 1.6–2 mm, pilose and rust colored glandular outside; teeth triangular, ca. 1/2 as long as calyx tube. Corolla purple-red, ca. 2 × as long as calyx, glabrous, limb subequally 4-lobed. Stamens much exerted; filaments densely purple-red barbate. Nutlets unknown. Fl. Aug-Oct.

Rice paddies, open wet areas. Anhui, Guizhou, Hunan, Zhejiang [Japan, Korea].

7. *Dysophylla linearis* Bentham, Prodr. 12: 157. 1848.

线叶水蜡烛 xian ye shui la zhu

Herbs annual. Stems ca. 80 cm tall, base trailing, glabrescent, rust colored, glandular pilose. Leaves in whorls of 4–6, linear-lanceolate, 2.5–7.5 cm × 2–4.5 mm, papery, adaxially puberulent, abaxially glandular pubescent on midrib otherwise glandular, margin entire or obscurely remote serrate toward apex, slightly revolute, apex acuminate. Spikes ca. 4.5 × 1.2 cm, base interrupted; bracts lanceolate, at least as long as corolla, apex purple-red. Calyx narrowly campanulate, ca. 3 × 1.6 mm, sparsely pubescent; teeth suberect. Corolla ca. 1.5 × as long as calyx, puberulent outside, limb subequally 4-lobed. Stamens much exerted; filaments bearded. Nutlets unknown.

Wet areas. Yunnan [India].

80. COLEBROOKEA Smith, Exot. Bot. 2: 111. 1806.

羽萼木属 yu e mu shu

Shrubs gynodioecious, erect, densely lanate-tomentose. Stems yellow-brown. Leaves sometimes in whorls of 3, oblong-elliptic, dentate. Panicles terminal, branches spicate, pedunculate; verticillasters subtended by linear bracts, ± united at base, involucrelike. Flowers white, sessile. Calyx campanulate, tube very short; teeth 5, subulate, plumose, elongate, spinescent, ± adnate to nutlets in fruit. Corolla tube to slightly longer than calyx in pistillate flowers, much longer in bisexual flowers; limb ± 2-lipped, upper lip emarginate; lower lip 3-lobed, middle lobe longer. Stamens 4, subequal, free, included in pistillate flowers, exerted in bisexual flowers; filaments glabrous; anthers subglobose, 1-locellate. Style slightly exerted in bisexual flowers, much exerted in pistillate flowers, apex equally 2-cleft; lobes subulate to linear, divaricate. Nutlets ovoid, apex villous.

Monotypic: China, India (Sikkim), Myanmar, Nepal, Thailand.

1. *Colebrookea oppositifolia* Smith, Exot. Bot. 2: 111. 1806.

羽萼木 yu e mu

Colebrookea ternifolia Roxburgh; *Elsholtzia oppositifolia* (Smith) Poiret.

Plants 1–3 m, much branched. Petiole 0.8–2.5 cm; leaf blade 10–20 × 3–7 cm, base broadly cuneate to rounded, margin crenulate-serrulate, apex long acuminate, adaxially rugulose and puberulent, abaxially densely-tomentose to lanate-tomentose. Panicles 10–15 cm, branches 4–7 cm; verticillasters 10–18-flowered, globose; bracteoles ca. 1 mm, densely tomentose outside, glabrous inside. Flowers ca. 2 mm. Pistillate flowers: calyx campanulate, ca. 1.5 mm, to 6

mm in fruit, tube very short, becoming conspicuously ribbed; teeth subulate, later spinescent, ± purple. Corolla tube puberulent, lower lip slightly longer than upper lip, with middle lobe ovate. Stamens inserted on apical part of tube, included. Style 2 × as long as corolla. Bisexual flowers: calyx minute, ca. 0.6 mm. Corolla to 3 mm; upper lip ovate-oblong, ca. 0.5 mm, straight, emarginate; lower lip elongated, spreading, ca. 1.5 mm, middle lobe ovate-oblong, 2 × as long as ovate lateral lobes. Style erect, slightly longer than corolla. Nutlets obovoid, ca. 1 mm, yellow-brown, with a small basal white scar. Fl. Jan-Mar, fr. Mar-Apr.

Savanna forests, thickets in hot, dry regions; 200–2200 m. Yunnan [India (Sikkim), Myanmar, Nepal, Thailand].

81. SIPHOCRANION Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 53. 1929.

筒冠花属 tong guan hua shu

Herbs perennial, rhizomatous. Stems slender, leafless basally. Leaves mostly aggregated at apex. Racemes terminal, solitary or sometimes 3 together; verticillasters 2-flowered; bracteoles opposite, persistent. Flowers pedicellate. Calyx broadly campanulate, conspicuously 2-lipped; upper lip 3-toothed; lower lip longer, 2-toothed, teeth narrower. Corolla tubular, straight, narrow, base not saccate, sometimes slightly constricted at middle, slightly dilated at throat; limb very short, 2-lipped; upper lip 4-lobed, lobes subequal or middle 2 smaller; lower lip larger, margin entire, ± concave. Stamens 4, included, anterior 2 longer; filaments glabrous; anther cells 2, divaricate, apex confluent. Ovary glabrous. Style apex equally 2-cleft. Nutlets oblong to ovoid, dotted, with a small basal white scar.

Two species: China, India (Sikkim), Myanmar, Vietnam; both species in China.

- 1a. Corolla 1.2–1.5 cm, tube slightly constricted at middle; stamens inserted slightly above middle of tube; fruiting calyx less than 1 cm; bracteoles less than 2 mm; stem puberulent or subglabrous 2. *S. nudipes*
 1b. Corolla to 2.5 cm, tube gradually dilated toward throat; stamens inserted on or near throat; fruiting calyx usually more than 1 cm; bracteoles 4–10 mm; stem densely spreading, floccose glandular villous or nearly so 1. *S. macranthum*

1. Siphocranion macranthum (J. D. Hooker) C. Y. Wu, Acta Phytotax. Sin. 8: 56. 1959.

筒冠花 tong guan hua

Plectranthus macranthus J. D. Hooker, Fl. Brit. India 4: 616. 1885; *Hancea hemsleyana* H. Léveillé; *H. prainiana* H. Léveillé; *Isodon macranthus* (J. D. Hooker) Kudô; *P. prainiana* (H. Léveillé) Kudô; *Rabdosia macrantha* (J. D. Hooker) H. Hara; *S. macranthum* var. *microphyllum* C. Y. Wu; *S. macranthum* var. *prainianum* (H. Léveillé) C. Y. Wu & H. W. Li.

Stems prostrate-ascending, 20–70 cm, densely spreading villous to glandular floccose-villous, sometimes subglabrous. Petiole 0.5–3 cm; leaf blade ovate-lanceolate to ovate, (1–)3–10 × (1–)2.5–5 cm, puberulent on veins, adaxially sparsely appressed minutely hispid, abaxially subglabrous, base broadly cuneate, margin coarsely remote serrate, apex acute. Racemes 4–20 cm; bracteoles lanceolate, 4–10 mm, ciliate. Pedicel ca. 5 mm. Calyx ca. 4 mm, glandular puberulent; upper lip ca. 3 mm, teeth triangular, apex mucronate; lower lip ca. 2.5 mm, teeth narrowly triangular, subulate; fruiting calyx conspicuously veined, declinate, to 1.2 cm; teeth of upper lip to 4 mm, teeth of lower lip narrow lanceolate, ca. 2 mm. Corolla reddish to purplish blue, tubular, to 2.5 cm, ± straight, throat slightly dilated; upper lobes ovate, subequal, ca. 3 mm; lower lip 4–9 mm, subcircular, slightly concave, margin entire. Stamens included, anterior 2 inserted on or near throat of corolla. Nutlets yellow-brown, ovoid, ca. 1.5 mm wide. Fl. Jul-Oct, fr. Oct-Nov.

Subtropical evergreen and mixed forests; 1300–3200 m. Guangxi, Guizhou, Sichuan, Xizang, Yunnan [India (Sikkim), Myanmar, Vietnam].

A medicinal herb.

2. Siphocranion nudipes (Hemsley) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 53. 1929.

光柄筒冠花 guang bing tong guan hua

Plectranthus nudipes Hemsley, J. Linn. Soc., Bot. 26: 272. 1890; *Hancea nudipes* (Hemsley) Dunn.

Stems erect, 35–50 cm, basal half leafless, puberulent or subglabrous. Petiole 0.5–2 cm, puberulent; leaf blade lanceolate, 6–15 × 3–7 cm, puberulent on veins, adaxially sparsely fine bristly, abaxially glabrous, yellow glandular, base cuneate-decurrent, margin serrulate, apex acute to long acuminate. Racemes 6–25 cm, elongated, sometimes with an axillary raceme just below terminal one(s), lax, sparsely puberulent or subglabrous; bracts lanceolate to subulate. Pedicel ca. 3 mm, glandular puberulent. Calyx 3–4 mm, glandular puberulent; teeth triangular, subequal, subulate; fruiting calyx dilated to ca. 8 mm, many veined, declinate, tube ca. 3 mm; upper lip ca. 3 mm, teeth triangular, apex acuminate; lower lip ca. 5 mm, teeth lanceolate, apex acuminate. Corolla white and purple-red, tubular, straight or slightly incurved, 1.2–1.5 cm, slightly constricted at middle, puberulent; upper lip ca. 5 mm, lobes circular, subequal or middle 2 smaller; lower lip larger, concave, margin entire. Anterior stamens inserted slightly above middle of tube. Nutlets oblong, ca. 1.5 mm, brown. Fl. Jul-Sep, fr. Oct-Nov.

• Subtropical evergreen and mixed forests; 1000–2100 m. Fujian, Guangdong, Guizhou, Hubei, Jiangxi, Sichuan, Yunnan.

82. HANCEOLA Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 54. 1929.

四轮香属 si lun xiang shu

Herbs annual or rhizomatous perennial, sometimes with woody tubers. Leaf base cuneate-decurrent. Verticillasters 2–14-flowered, pedunculate, in elongated terminal racemes. Calyx subcampanulate, 8–10-veined; teeth 5, posterior tooth larger, apex caudate, or limb 2-lipped and lower lip 2-toothed; fruiting calyx very dilated, conspicuously veined. Corolla tube straight to arcuate, exerted, funnelform, 2-lipped, without hairy annulus, sometimes puberulent or villous inside; upper lip 2-lobed, lobes circular; lower lip 3-lobed, middle lobe longest. Stamens 4, subequal or anterior 2 longer, inserted on apical half of corolla tube; filaments complanate, glabrous or puberulent; anthers ovoid, cells 2, divaricate, becoming confluent at apex. Style as long as to longer than stamens. Disc swollen in front. Nutlets oblong, few striate, glabrous, basal scar white, apex rounded.

Six to eight species: all endemic to China.

1a. Stamens exerted.

2a. Plants very sparsely fine strigose; anterior stamens longer 5. *H. exserta*

2b. Plants glabrous; anterior stamens shorter 6. *H. cavaleriei*

1b. Stamens included or nearly so.

3a. Plants robust, rhizome without woody tubers on nodes; corolla ± arcuate recurved, very dilated apically, more than 3 cm.

4a. Leaves lanceolate to oblanceolate, 10–25 × 4–11 cm; stamens subequal 1. *H. sinensis*

4b. Leaves broadly ovate-cordate to ovate, 4–8 × 3–6 cm; anterior stamens longer 2. *H. cordiovata*

3b. Plants slender, rhizome with woody tubers on nodes; corolla erect, slender, less than 2.6 cm.

5a. Stems solitary or numerous arising from rhizome, ascending; leaves 2.5–15 × 1–4.5 cm, coarsely to double serrate; corolla ca. 2.1 cm, upper lip subequal to lower lip, tube usually dilated upward, glabrous inside 4. *H. flexuosa*

5b. Stem erect, solitary, 20 cm tall including inflorescence; leaves 3–5.5 × 1.2–2 cm, irregularly shallow serrate; corolla 2.6 cm, lower lip ca. 2 × as long as upper lip, tube gradually dilated above middle, pilose near base inside 3. *H. tuberifera*

Hanceola labordei and *H. mairei* are poorly known and doubtfully belong here. They are not included in the key above, but brief descriptions are given.

1. *Hanceola sinensis* (Hemsley) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 54. 1929.

四轮香 si lun xiang

Hancea sinensis Hemsley, J. Linn. Soc., Bot. 26: 310. 1890.

Herbs perennial. Rhizomes thick, woody. Stems erect, solitary, 0.5–1.5 m, puberulent. Petiole 1–1.5 cm, puberulent; leaf blade lanceolate to obovate-lanceolate, 10–25 × 4–11 cm, adaxially sparsely minutely hispid-puberulent, ± densely so on veins, abaxially subglabrous, glandular, sparsely puberulent on veins, base attenuate to cuneate-decurrent, margin coarsely serrate-dentate, apex acuminate to caudate-acuminate. Racemes or panicles axillary and terminal, to 13 cm; bracts oblanceolate to lanceolate, margin dentate. Pedicel 0.5–7 mm; peduncle 2–5 mm. Calyx ca. 4 mm, puberulent, obscurely 10-veined; teeth triangular, apex long acuminate, posterior tooth larger; fruiting calyx to 1 cm. Corolla white, yellow, to purple, to 3.5 cm; tube arcuate, throat to 1 cm wide, puberulent outside and inside near base; upper lip ca. 3 mm; lower lip ca. 6 mm, middle lobe to 6 mm, lateral lobes 4 mm. Stamens included; filaments puberulent. Nutlets 3.5 × 2 mm. Fl. Jul-Aug, fr. Sep.

• Subtropical evergreen and mixed forests; 1200–2200 m. Guangxi, Guizhou, Hunan, Sichuan, Yunnan.

2. *Hanceola cordiovata* Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 12: 127. 1942.

心卵叶四轮香 xin luan ye si lun xiang

Herbs annual. Stems erect, prostrate at base, densely yellow floccose-villous. Petiole 1–6 cm; leaf blade broadly ovate-cordate to ovate, 4–8 × 3–6 cm, densely villous on veins, adaxially shiny, sparsely villous, abaxially gray-green, glabrous, margin dentate or double dentate. Racemes terminal, 9–10 cm, villous; verticillasters 8–14-flowered; peduncle 4–9 mm; bracts sessile, ovate, lower to 1 cm; bracteoles 1–1.5 mm. Pedicel to 9 mm. Calyx campanulate, ca. 3.5 mm, puberulent; tube ca. 2 mm, 10-veined; teeth subequal, triangular, teeth of upper lip acuminate, middle tooth larger. Corolla funnellform, recurved, ca. 3 cm, finely puberulent, glabrous inside; tube ca. 2.2 cm; upper lip ca. 3 mm; lower lip ca. 8 mm, lobes elliptic-oblong. Anterior stamens longer than posterior, to as long as lower lip; filaments puberulent at base.

• Guizhou, Sichuan.

3. *Hanceola tuberifera* Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 12: 123. 1942.

块茎四轮香 kuai jing si lun xiang

Herbs. Rhizomes with woody, moniliform tubers ca. 6 mm in diam. Stems ca. 20 cm, solitary, base glabrous, apex very densely dusty puberulent. Petiole short to obsolete; leaf blade elliptic-lanceolate to elliptic, rarely ovate, 3–5.5 × 1.2–2 cm, adaxially sparsely appressed puberulent, abaxially subglabrous, yellow glandular, dusty puberulent on veins, base cuneate-decurrent, margin shallowly serrate, apex long acuminate to acute. Raceme terminal, slender, ca. 11 cm, lax, dusty puberulent; verticillasters 2-flowered; peduncle ca. 2 mm; bracts lanceolate, ca. 1 mm. Pedicel ca. 6 mm. Calyx campanulate, ca. 3.2 mm, dusty puberulent, 10-veined, nearly 2-lipped; upper teeth triangular, ca. 1.4 mm, apex acute; lower

teeth lanceolate, ca. 1.6 mm, apex subulate. Corolla purple, narrowly funnellform; tube slender, ± straight, ca. 2.1 cm, puberulent; upper lip ca. 2.5 mm, triangular, apex obtuse; lower lip ca. 5 mm, middle lobe ovate, wider, reflexed; lateral lobes narrowly elliptic, straight. Stamens nearly included, anterior ca. 6 mm, posterior ca. 4 mm. Fl. Jul-Aug.

• Hills. Sichuan.

4. *Hanceola flexuosa* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10: 240. 1965.

曲折四轮香 qu she si lun xiang

Herbs perennial. Rhizome nodes forming woody tubers 0.5–2 cm in diam. Stems ascending, slender, flexuous, 30–60 cm, densely dusty puberulent, leafless at base. Petiole 0.5–4 cm; leaf blade lanceolate, rarely ovate, 2.5–15 × 1–4.5 cm, glabrous, yellow glandular, dusty puberulent on veins, base cuneate-decurrent, margin coarsely to double serrate, apex long acuminate to acute. Racemes terminal, slender, 10–20 cm, loose, densely glandular puberulent; verticillasters 2(–6)-flowered; peduncle 1–2.5 mm; bracts lanceolate to subulate, ca. 2 mm. Pedicel 3.5–5 mm, with 1 scalelike bracteole at base. Calyx campanulate, ca. 4 mm, glandular puberulent, obscurely 10-veined, nearly 2-lipped; teeth triangular to triangular-lanceolate, apex subulate. Corolla purple, ca. 2.1 cm; tube ca. 1.8 cm, throat ca. 4 mm wide, very finely puberulent, subglabrous inside; upper lip ca. 3 mm, lobes circular; lower lip ca. 4 mm, middle lobe slightly longer, lateral lobes ca. 2 mm wide. Anterior stamens longer, included. Fl. Sep-Nov.

• Subtropical evergreen forests, streamsides. Guangxi.

5. *Hanceola exserta* Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 12: 125. 1942.

蕊四轮香 chu rui si lun xiang

Herbs perennial, rhizomatous. Stems prostrate-ascending, 30–50 cm, sparsely fine strigose, dark purple, much branched. Petiole 0.5–5 cm; leaf blade ovate to lanceolate, 0.5–9(–17) × 0.3–3(–4.5) cm, adaxially shiny, sparsely minutely hispid, abaxially glabrous, finely puberulent on veins, base cuneate-decurrent, margin serrate, apex acute to acuminate, rarely obtuse. Raceme terminal, 6–10 cm, lax, densely puberulent, capitate glandular; verticillasters 2(–6)-flowered; peduncle ca. 2 mm; bracts lanceolate to linear, to 1.2 cm; bracteoles subulate, 1–3 mm. Pedicel 4–10 mm. Calyx campanulate, to 3 mm, glandular puberulent, obscurely 10-veined; teeth subequal, triangular, apex subulate, posterior tooth slightly larger. Corolla purple-blue, funnellform-tubular, to 2.5 cm; tube ca. 1.9 cm, throat ca. 1 cm wide, puberulent; limb glabrous inside, upper lip ca. 3 mm; lower lip ca. 6 mm, spreading, lobes elliptic. Stamens distinctly exerted. Fl. Sep-Oct.

• Grassy shaded slopes, subtropical evergreen forests; 500–1400 m. Fujian, Guangdong, Hunan, Jiangxi, Zhejiang.

6. *Hanceola cavaleriei* (H. Léveillé) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 55. 1929.

贵州四轮香 gui zhou si lun xiang

Hancea cavaleriei H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 224. 1911.

Plants glabrous. Stems robust, grooved, slightly winged. Leaves 2–5 × 1–3 cm, adaxially dark green, abaxially pale, base long cuneate, decurrent, margin coarsely serrate except entire at base, apex acuminate. Bracts lanceolate, margin dentate. Flowers violet, in loose short racemes. Calyx conspicuously 8-veined, 2-lipped, upper lip more elongated, with 2 robust teeth, lower lip 3-toothed, with middle tooth larger than lateral teeth. Corolla exerted, ca. 10 × as long as calyx, tube erect or curved, lips circular, ± entire. Stamens and style nearly exerted. Nutlets conspicuously veined, ovoid, slightly scabrid. Fl. and fr. Sep (specimens not seen).

- Guizhou.

"The material is quite poor but mature calyces indicate that this species may be a *Plectranthus*." (D. R. McKean, Notes Roy. Bot. Gard. Edinburgh 40: 166. 1982). Perhaps it should be compared with *Siphonocranion*.

7. *Hanceola labordei* (H. Léveillé) Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 12: 123. 1942.

高坡四轮香 gao po si lun xiang

Hancea labordei H. Léveillé, Repert. Spec. Nov. Regni Veg. 12: 22. 1913.

Plants glabrous. Stems elongated, slender, grooved. Leaves lanceolate, ca. 10 × 2.5 cm, base cuneate-attenuate,

margin dentate except entire basally, apex acuminate. Flowers rose. Calyx striate, teeth linear. Corolla pink, ca. 4 cm, swollen on 1 side. Nutlets ovoid, ca. 2 mm (specimens not seen).

- Guizhou (Qingyan).

8. *Hanceola mairei* (H. Léveillé) Sun, Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot. 12: 123. 1942.

龙溪四轮香 long xi si lun xiang

Hancea mairei H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 297. 1912.

Stems striate, glabrous. Leaves long petiolate, lanceolate, adaxially dark green, glabrous, abaxially gray, sparsely villous, margin entire except crenate apically. Flowers bluish, in terminal spicate racemes. Calyx glabrescent, veined. Corolla very short, finely pilose, tube much exerted. Style very elongated (specimens not seen).

- Yunnan (Longxi).

"The specimen is insufficient for definite identification but it bears a close resemblance to *Plectranthus macranthus* J. D. Hooker (= *Siphonocranion macranthum* (J. D. Hooker) C. Y. Wu) and may belong to that species." (D. R. McKean, Notes Roy. Bot. Gard. Edinburgh 40: 166. 1982).

83. *HYPTIS* Jacquin, Collectanea 1: 101. 1787, nom. cons.

山香属 shan xiang shu

Herbs, subshrubs, or shrubs, erect. Leaves dentate. Bracts subulate to spinescent. Flowers in capitula, compact spikes, or loose panicles. Calyx tubular-campanulate to tubular, erect to oblique, 10-veined, throat tufted villous or glabrous; teeth 5, subequal, straight; fruiting calyx dilated. Corolla 2-lipped; tube cylindrical to swollen on 1 side, nearly cylindrical to narrowly funnelform; upper lip 2-lobed, lobes erect, spreading, or reflexed; lower lip 3-lobed, middle lobe saccate, reflexed in flower, base constricted, sometimes with projected teeth; lateral lobes similar, conspicuous, close together to lobes of upper lip or to middle lobe. Stamens 4, anterior 2 longer, declined; filaments free, edentate; anther cells 2, apically confluent. Style apex 2-cleft or subentire. Disc entire or slightly swollen in front. Nutlets ovoid to oblong, smooth or dotted, scabrid, membranous winged in a few species.

Some 350–400 species: tropical and subtropical regions of the New World, four naturalized species in China.

- 1a. Cymes (1– or) 2–5-flowered, inserted in axils of gradually reduced leaves, in racemes or panicles 1. *H. suaveolens*
 1b. Verticillasters many flowered, in capitula or spikes.
 2a. Flowers in spikes ± interrupted at base 4. *H. spicigera*
 2b. Flowers in globose or subglobose axillary capitula.
 3a. Capitula ca. 1.5 cm in diam.; peduncles 5–10 cm 2. *H. rhomboidea*
 3b. Capitula ca. 1 cm in diam.; peduncles 0.5–1.6 cm 3. *H. brevipes*

1. *Hyptis suaveolens* (Linnaeus) Poiteau, Ann. Mus. Natl. Hist. Nat. 7: 472. 1806.

山香 shan xiang

Ballota suaveolens Linnaeus, Syst. Nat., ed. 10, 2: 1100. 1759; *Bysteropogon graveolens* (Linnaeus) Blume; *Mesosphaerum suaveolens* (Linnaeus) Kuntze; *Schaueria graveolens* (Linnaeus) Hasskarl.

Herbs annual, aromatic, robust, branched, erect. Stems 0.6–1.6 m, spreading hispid. Petiole slender, 0.5–6 cm; leaf blade ovate to broadly ovate, 1.4–11 × 1.2–9 cm, adaxially olive green, abaxially pilose, base rounded to shallow cordate, oblique, margin serrulate, apex subacute to obtuse. Cymes (1– or) 2–5-flowered, in racemes or panicles. Calyx ca. 5 × 3 mm, dilated to 12 × 6.5 mm in fruit, villous, yellowish glandular, throat tufted villous, veins very elevated; teeth broadly

triangular, long subulate, 1.5–2 mm. Corolla blue, 6–8 mm, puberulent except near base; tube ca. 2 mm wide at throat; upper lip lobes reflexed; middle lobe of lower lip shorter, lateral lobes similar to upper lip. Nutlets dark brown, 2, flattened, ca. 4 × 3 mm, dotted, with 2 basal white scars. Fl. and fr. year round.

Weeds in open waste areas. Fujian, Guangdong, Guangxi, Taiwan [native in tropical America, widespread tropical weed].

Used medicinally.

2. *Hyptis rhomboidea* Martius & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 11(2): 188. 1844.

吊球草 diao qiu cao

Hyptis decurrens (Blanco) Epling; *Pycnanthemum decurrens* Blanco.

Herbs annual, robust, erect. Stems 0.5–1.5 m, finely striate, scabrid, angles pubescent. Petiole 1–3.5 cm; leaf blade lanceolate, 8–18 × 1.5–4 cm, adaxially sparsely minute hispid, abaxially densely glandular, pilose on veins, base attenuate, margin obtuse serrate, apex attenuate. Flowers numerous, in axillary globose capitula ca. 1.5 cm in diam.; peduncle 1–10 cm; bracts numerous, appressed, lanceolate to linear, longer than capitulum, entire, densely pilose. Calyx green, ca. 4 × 2 mm, minutely hispid, base villous; teeth subulate, ca. 2.2 mm; fruiting calyx tubular-dilated, to 10 × ca. 3.2 mm. Corolla cream-white, ca. 6 mm, puberulent; tube ca. 1 mm wide at base, throat slightly wider; upper lip 1–1.2 mm, lobes ovate, reflexed; lower lip ca. 2.5 × as long as upper, middle lobe concave, clawed at base; lateral lobes smaller, triangular. Nutlets chestnut brown, oblong, adaxially ribbed, ca. 1.2 × 0.6 mm, with 2 basal white scars.

Open waste areas. Guangdong, Guangxi, Taiwan [native in tropical America, widespread tropical weed].

3. *Hyptis brevipes* Poiteau, Ann. Mus. Natl. Hist. Nat. 7: 465. 1806.

短柄吊球草 duan bing diao qiu cao

Mesosphaerum brevipes (Poiteau) Kuntze.

Herbs erect, annual. Stems 50–100 cm, angles appressed pilose. Petiole ca. 5 mm; leaf blade ovate-oblong to lanceolate, 5–7 × 1.5–2 cm, adaxially olive green, abaxially greenish, pilose, base narrowly cuneate, margin serrate, apex acuminate. Capitula axillary, ca. 1 cm in diam.; peduncle 0.5–

1.6 cm, densely appressed pilose; bracts lanceolate to subulate, 4–6 mm, margin entire. Calyx subcampanulate, 2.5–3 × ca. 1.5 mm, minutely hispid; teeth as long as tube, apex subulate; fruiting calyx dilated. Corolla white, ca. 3.5 mm, puberulent, throat to 1 mm wide; upper lip ca. 0.5 mm, lobes circular, reflexed; middle lobe of lower lip larger, concave, circular, ca. 1 mm, constricted at base, recurved; lateral lobes triangular, reflexed. Stamens slightly exerted. Nutlets dark brown, ovoid, ca. 1 × less than 0.5 mm, adaxially ribbed, with 2 basal white scars.

Open waste areas at low elevations. Hainan, Taiwan [North America, widespread tropical weed].

4. *Hyptis spicigera* Lamarck, Encycl. 3: 185. 1789.

穗序山香 sui xu shan xiang

Pycnanthemum elongatum Blanco.

Herbs erect, annual. Stems 1–1.5 m, angles scabrid. Petiole 0.3–2.2 cm, scabrid; leaf blade lanceolate to ovate-lanceolate, 2.5–7.5 × 1–2.5 cm, adaxially olive green, tuberculate hairy, abaxially glandular, minutely hispid on veins, base cuneate, margin serrulate, apex acute to acuminate. Spikes continuous, cylindrical, terminal or axillary, 1.6–6.5 × 1–1.3 cm; verticillasters many flowered; bracts subulate, as long as calyx; fruiting calyx tubular dilated, ca. 7 × 3 mm, minutely hispid, transparently glandular; veins 10, prominent, arcuate transverse; teeth subulate, ca. 2 mm. Nutlets brown, oblong, ca. 1 × 0.6 mm, adaxially ribbed.

Taiwan [Indonesia, Philippines; South America].

84. ANISOCHILUS Wallich ex Benth, Edward's Bot. Reg. 15: t. 1300. 1830.

排草香属 pai cao xiang shu

Herbs or subshrubs. Leaves succulent, petiolate or sessile, margin dentate. Verticillasters dense, overlapping, in ovoid-oblong or cylindrical terminal spikes. Calyx ovoid, nearly straight, lower half dilated in fruit, mouth oblique; teeth small or obscure, posterior tooth large, margin entire, reflexed or incurved and closing mouth in fruit. Corolla 2-lipped; tube slender, exerted, recurved at middle, dilated at throat; upper lip obtuse, 3- or 4-lobed; lower lip entire, elongated, incurved. Stamens 4, anterior 2 longer, declinate; filaments free, edentate; anthers ovoid, cells 2. Style longer than stamens, apex subequally 2-cleft, lobes subulate. Nutlets flattened, ovoid, smooth, glandular.

About 20 species: Africa, Asia; one native and another cultivated in China.

- 1a. Posterior calyx tooth ovate 1. *A. carnosus*
 1b. Posterior calyx tooth subulate, clawlike, recurved 2. *A. pallidus*

1. *Anisochilus carnosus* (Linnaeus f.) Benth, Edward's Bot. Reg. 15: t. 1300. 1830.

排草香 pai cao xiang

Lavandula carnosus Linnaeus f., Suppl. Pl. 273. 1781.

Herbs annual. Stems erect, 30–60 cm tall, robust, branched, villous, subglabrous at apex. Petiole 1.3–5 cm, densely white tomentose; leaf blade ovate-oblong to circular, 5–7 × 5–7 cm, corrugate, white tomentose, sparsely red glandular, base cordate to rounded, margin crenulate, apex obtuse to rounded. Spikes 2.5–7.5 × 0.9–1.9 cm, long pedunculate, 4-angled in fruit. Calyx ca. 4.5 mm, puberulent, rarely lanate; tube constricted at mouth, dilated in fruit; upper lip ovate, margin entire, reflexed, membranous, ciliate, covering mouth; lower lip truncate, margin indistinctly dentate. Corolla purplish, ca. 9 mm, densely pubescent outside; tube slender, exerted, recurved at middle, dilated at

throat; upper lip 4-lobed; lower lip concave. Anterior stamens slightly exerted. Nutlets unknown. Fl. Mar.

Guangzhou Shi, Nanning Shi, and other cities [India, Myanmar, Sri Lanka].

Cultivated in China. An aromatic herb used medicinally.

2. *Anisochilus pallidus* Wallich ex Benth, Pl. Asiat. Rar. 2: 18. 1830.

异唇花 yi chun hua

Herbs annual. Stems erect, to 1 m, striate, branched, appressed pubescent, densely so at apex. Petiole 1–3 cm; leaf blade ovate- to lanceolate-oblong, 5.5–15 × 2.5–8 cm, ± membranous when dry, adaxially sparsely puberulent to finely hirtellous, abaxially puberulent, rust colored glandular, densely pubescent on veins, base rounded to decurrent, margin serrate to crenate-serrate, apex acuminate. Spikes ovoid-oblong to cylindrical, 1–4 × ca. 1 cm, pedunculate,

apically grouped into panicles. Calyx ovoid, ca. 4 × 2 mm in fruit, base dilated, pubescent, rust colored glandular outside; teeth minute, posterior tooth subulate, clawlike, recurved. Corolla bluish; tube slender, exerted, recurved at middle, dilated at throat; upper lip 3-lobed, middle lobe emarginate;

lower lip entire, concave. Nutlets ca. 1 mm in diam., brownish and golden glandular. Fl. Oct, fr. Nov-Dec.

Grassy hills, forest margins; 1200–1700 m. Yunnan [India (Sikkim), Laos, Myanmar, Vietnam].

85. SKAPANTHUS C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13(1): 77. 1975.

葶花属 ting hua shu

Herbs perennial. Rootstocks massive, woody. Stems few. Leaves usually in rosettes, petiolate. Cymes 6–10-flowered, widely spaced, in long, narrow terminal thyrses. Calyx broadly campanulate, dilated, declinate in fruit, 10-veined, glabrous inside, strongly 2-lipped; upper lip with 3 reflexed teeth; lower lip longer, with 2 projected teeth; teeth ovate-triangular, apex acute. Corolla declinate, 2-lipped; tube abaxially saccate, throat slightly constricted; upper lip ± spreading, 3-lobed; middle lobe largest, 2-lobulate, lateral lobes narrower; lower lip almost as long as upper, concave, subnavicular. Stamens 4, didynamous, declinate, included; filaments free, complanate, posterior 2 dilated, basally pilose; anthers 1-locellate. Style included, apex equally 2-cleft. Nutlets globose, smooth.

Monotypic: endemic to China.

Many workers regard *Skapanthus* to be synonymous with *Plectranthus*.

1. **Skapanthus oreophilus** (Diels) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13(1): 78. 1975.

葶花 ting hua

Stems 15–25 cm tall, densely puberulent. Petiole 1–5 mm; basal leaves 4–6; leaf blades 3–6 × 2–3.5 cm, broadly cuneate, densely gray or brown strigose brown-glandular, base rounded to truncate, margin crenate above base, apex obtuse; stem leaves sessile, 1–3-paired, reduced, ovate-lanceolate, ca. 6 × 3 mm, margin entire. Cymes densely glandular pubescent; peduncle 1–10 mm; floral leaves similar to stem leaves or reduced; bracts sessile, purple-red to purplish blue, ± lanceolate, 2–5 × 1–3 mm; bracteoles linear, 1–2 mm. Pedicel 2–3 mm. Calyx ca. 2 × 3 mm, densely glandular puberulent, glandular outside, to ca. 5 × 5 mm, abaxially purplish in fruit, 2-lipped to 1/2 or more. Corolla purple-blue, to 8 mm, scattered brown glandular outside, glabrous inside; tube ca. 4 × 1.2 mm; upper lip ca. 4 × 5 mm, middle lobe to 2 mm wide; lower lip ca. 5 mm. Nutlets ca. 1 mm in diam. Fl. Jul-Aug, fr. Sep-Oct.

• Forests, slopes, thickets, hills; 2500–3700 m. Yunnan.

- 1a. Stems elongated; leaves in 3 or 4 separated pairs; lower floral leaves similar to stem leaves
..... 1b. var. *elongatus*

- 1b. Stems abbreviated; leaf pairs 2 or 3 in rosette; floral leaves reduced, becoming bracts

..... 1a. var. *oreophilus*

1a. *Skapanthus oreophilus* var. *oreophilus*

葶花 ting hua

Plectranthus oreophilus Diels, Notes Roy. Bot. Gard. Edinburgh 5: 227. 1912; *Dielsia oreophila* (Diels) Kudô.

Stems abbreviated, with 2 or 3 pairs of leaves in a rosette. Floral leaves reduced, bractlike.

• Pine forests, grassy slopes; 2700–3100 m. Yunnan.

1b. **Skapanthus oreophilus** var. *elongatus* (Handel-Mazzetti) C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 13: 78. 1975.

茎叶变种 jing ye bian zhong

Plectranthus oreophilus Diels var. *elongatus* Handel-Mazzetti, Symb. Sin. 7: 941. 1936.

Stems elongated, with 3 or 4 pairs of leaves on basal part. Lower floral leaves similar to stem leaves.

• Forests, thickets, grassy hills; 2500–3700 m. Yunnan.

86. ISODON (Schrader ex Benth) Spach, Hist. Nat. Veg. Phan. 9: 162. 1840.

香茶菜属 xiang cha cai shu

Plectranthus L'Héritier sect. *Isodon* Schrader ex Benth, Labiat. Gen Spec. 40. 1832; *Rabdosia* (Blume) Hasskarl.

Shrubs, subshrubs, or perennial herbs. Rhizomes woody, massive. Leaves usually petiolate, dentate. Cymes (1–)3- to many flowered, in ± lax thyrses or narrow or open panicles, rarely in dense spikes. Flowers pedicellate. Calyx campanulate to tubular-campanulate, straight or declinate, often dilated; limb equally or subequally 5-toothed or 2-lipped, upper lip 3-toothed, lower lip 2-toothed. Corolla tube exerted, declinate or abruptly deflexed, sometimes straight, ± saccate to spurred abaxially near base, 2-lipped; upper lip 4-cleft, recurved or reflexed; lower lip entire, concave, navicular. Stamens 4, declinate; filaments free, edentate; anther cells 2, apex usually confluent. Style apex short 2-cleft. Nutlets subcircular or occasionally oblong to ovoid, glabrous or hairy, smooth, granular or dotted.

About 100 species: Asia, only a few species in Africa; 77 species in China.

- 1a. Fruiting calyx with 5, equal or subequal straight teeth.
2a. Fruiting calyx tubular or tubular-campanulate to ovoid; inflorescences pyramidal paniculate.
3a. At least some leaves in whorls of 3 or 4 1. *I. ternifolius*

- 3b. Leaves always opposite.
- 4a. Stems and inflorescences densely, spreading, purplish or brownish, villous-velutinous or softly tomentose; leaves corrugate.
- 5a. Leaves ovate to triangular-ovate, 1.5–7 × 1–4 cm; petiole 2–8 mm; corolla purple to whitish blue 2. *I. enanderianus*
- 5b. Leaves triangular-ovate, 1–2.5 × 1–2.5 cm; petiole 15–25 mm; corolla white 3. *I. brevifolius*
- 4b. Stems and inflorescences with indumentum not as above; leaves not or only slightly rugulose.
- 6a. Leaves long petiolate, slightly pubescent along midribs and veins; panicles without floral leaves; calyx gray lanate, glabrescent and tubular in fruit 4. *I. ericalyx*
- 6b. Leaves sessile or short petiolate; inflorescence and calyx not as above.
- 7a. Leaves ovate, sometimes cordate, 1.5–5 × 0.8–4.5 cm; adaxially puberulent or finely pilose; abaxially gray tomentose; fruiting calyx densely pilose, ovoid 5. *I. phyllostachys*
- 7b. Leaves broadly ovate, 7–17 cm, ca. 1/2 as wide as long; abaxially densely strigose, sparsely glandular; calyx pubescent 6. *I. pantadenius*
- 2b. Fruiting calyx campanulate to broadly campanulate; inflorescences loosely paniculate.
- 8a. Leaves lanceolate to narrowly lanceolate; calyx teeth lanceolate; nutlets apex pubescent 7. *I. nervosus*
- 8b. Leaves broadly ovate to ovate-lanceolate; calyx teeth triangular; nutlets glabrous.
- 9a. Fruiting calyx as long as wide; nutlets glandular 8. *I. amethystoides*
- 9b. Fruiting calyx longer than wide; nutlets not glandular.
- 10a. Terminal panicle few flowered, ca. 2 cm 9. *I. websteri*
- 10b. Terminal panicle spreading, many flowered.
- 11a. Adaxial leaf surface sparsely puberulent, abaxial surface whitish pilose along midrib and veins; calyx with minute hairs, glabrescent especially in fruit 10. *I. inflexus*
- 11b. Leaves sparsely puberulent, glandular or glabrescent; calyx densely pubescent.
- 12a. Leaves ovate to ovate-lanceolate, ± glabrescent, apex subacuminate, base cuneate, coarsely incurved, serrate; calyx densely whitish pubescent, teeth equal to calyx tube in length; stamens and style included; nutlets apex whitish barbate 11. *I. serra*
- 12b. Leaves ovate to broadly ovate, sparsely puberulent, glandular; apical tooth ovate to lanceolate, apex acuminate, base broadly cuneate to abruptly attenuate, acutely serrate to crenate-dentate; calyx densely appressed whitish pubescent, bluish (especially in var. *glaucoalyx*), teeth shorter than calyx tube; stamens and style exerted; nutlets apex verruculose 12. *I. japonicus*
- 1b. Fruiting calyx with subequal teeth or 2-lipped, recurved.
- 13a. Cymes few flowered, axillary, in widely spaced verticillasters or in terminal racemose panicles; corolla tube conspicuously pouched or spurred on upper side near base; fruiting calyx conspicuously 2-lipped.
- 14a. Leaves narrowly lanceolate to oblong, 3 × or more longer than broad.
- 15a. Corolla to 8 mm, tube conspicuously pouched, to 2 mm in diam. on upper side near base, abruptly declinate above base, slightly constricted, ca. 1.2 mm in diam. at throat 73. *I. gibbosus*
- 15b. Corolla ca. 7 mm, tube pouched on upper side near base, not abruptly declinate above base, throat subequal to tube 74. *I. lungshengensis*
- 14b. Leaves much narrower, 2 × or less longer than broad.
- 16a. Cymes in axils of mid and upper cauline leaves not reduced upwards, in many widely spaced verticillasters 75. *I. melissoides*
- 16b. Cymes in axils of floral leaves gradually reduced toward branch apex, in terminal spicate panicles.
- 17a. Petiole to 4.5 cm; corolla tube abruptly spurred on upper part near base, spur ca. 3 mm wide, conspicuously exerted, throat ca. 1.5 mm wide 76. *I. brevicealcaratus*
- 17b. Petiole 0.2–1 cm; corolla tube saccate on upper part above base, tube equal in width elsewhere, ca. 2 mm in diam. at throat 77. *I. adenanthus*
- 13b. Cymes loosely many flowered, often conspicuously pedunculate, rarely in a dense verticillaster; corolla tube subequal or saccate, never short spurred on upper side near base; fruiting calyx with 5 subequal teeth or 2-lipped.
- 18a. Corolla 1.2–2.0 cm, tube 2 × or more longer than limb.
- 19a. Fruiting calyx conspicuously 2-lipped; corolla tube ca. 3 × longer than limb 13. *I. longitubus*
- 19b. Fruiting calyx inconspicuously 2-lipped; corolla tube less than 3 × longer than limb.
- 20a. Plants less than 30 cm tall; cymes 1–3-flowered, in narrow terminal panicles 14. *I. gesneroides*
- 20b. Plants more than 30 cm tall; cymes 3- to many flowered, in ± spreading panicles.
- 21a. Calyx broadly campanulate, purplish or dark purple-red.
- 22a. Panicles strongly spreading, to 30 × 8–9 cm; pedicels 2–7 mm 15. *I. forrestii*
- 22b. Panicles slightly spreading, (6–)10–15(–20) cm; floral leaves gradually becoming small bracts at apex; pedicels 1–3 mm 16. *I. irroratus*
- 21b. Calyx campanulate, not tinged purplish.
- 23a. Leaves rhombic, coarsely crenate-serrate above middle; petioles to 3.5 cm 17. *I. wardii*
- 23b. Leaves narrowly ovate, crenate-dentate above basal 1/3; petioles less than 1 cm 18. *I. bulleyanus*
- 18b. Corolla less than 1.2 cm, to 2 × as long as limb if tube stout.
- 24a. Fruiting calyx conspicuously 2-lipped.

- 25a. Calyx lips extending to middle of calyx.
- 26a. Cymes in narrow panicles.
- 27a. Leaf blade base cordate; panicles secund 58. *I. secundiflorus*
- 27b. Leaf blade base not cordate; panicles not secund.
- 28a. Stamens included; lower corolla lip usually longer than corolla tube 56. *I. coetsa*
- 28b. Stamens slightly exerted; lower corolla lip shorter than corolla tube 57. *I. phyllopodus*
- 26b. Cymes in spreading panicles.
- 29a. Leaf blade base cordate 59. *I. sculponeatus*
- 29b. Leaf blade base broadly cuneate to subcuneate, never cordate.
- 30a. Terminal panicles to 30 × 20 cm, of 5–11-flowered cymes 60. *I. megathyrsus*
- 30b. Terminal panicles 6–10(–15) × ca. 2.5 cm, of 3–5-flowered cymes 61. *I. henryi*
- 25b. Calyx lips extending below middle of calyx.
- 31a. Cymes in spreading panicles.
- 32a. Leaf blade base ± shallow cordate.
- 33a. Teeth of fruiting calyx broadly triangular, apex acute; filaments basally pilose
..... 69. *I. scrophularioides*
- 33b. Teeth of fruiting calyx triangular to lanceolate-triangular, apex acuminate; filaments
bearded below middle 70. *I. flabelliformis*
- 32b. Leaf blade base not cordate.
- 34a. Stem shallowly grooved, densely retrorse puberulent; leaves very broadly ovate to
oblate-ovate, apex rounded, margin crenate-serrate, apical tooth acute; corolla reddish
purple or white 71. *I. latifolius*
- 34b. Stem strongly grooved, puberulent on angles otherwise glabrous with scattered glands;
leaves broadly ovate to ovate-orbicular, apex acuminate, margin coarse serrate or double
serrate, apical tooth acuminate; corolla white 72. *I. weisiensis*
- 31b. Cymes in racemose or falsely racemose narrow panicles.
- 35a. Leaves crenate-serrate.
- 36a. Corolla less than 5.5 mm 66. *I. rosthornii*
- 36b. Corolla more than 5.5 mm.
- 37a. Stem densely retrorse white puberulent along angles; corolla gray or reddish, to
10 mm 67. *I. liangshanicus*
- 37b. Stem appressed pubescent; corolla purple or purple-red, ca. 8 mm 68. *I. macrocalyx*
- 35b. Leaves coarsely serrate, dentate, or serrate-dentate.
- 38a. Inflorescences racemose or falsely racemose (in latter case basal cymes of inflorescence
each with 3 flowers and a short peduncle), terminal and axillary, elongated, 8–20 cm
..... 62. *I. racemosus*
- 38b. Inflorescences ± conspicuously narrow paniculate.
- 39a. Leaf apex long acuminate, sometimes ± excised 63. *I. excisoides*
- 39b. Leaf apex not long acuminate, excised.
- 40a. Plants densely white pilose; leaves dentate-serrate 64. *I. albopilosus*
- 40b. Plants sparsely white puberulent; leaves coarsely serrate 65. *I. grosseserratus*
- 24b. Fruiting calyx with 5 equal or subequal teeth or inconspicuously 2-lipped.
- 41a. Leaf apex conspicuously excised.
- 42a. Abaxial leaf surface densely hairy; apical leaf tooth narrowly lanceolate, 2–2.5 cm, slightly
cuneate, not extending to midrib of blade at base; cymes 10–15-flowered 19. *I. macrophyllus*
- 42b. Abaxial leaf surface sparsely hairy or subglabrescent; apical leaf tooth caudate, 4–6 cm,
cuneate, extending to midrib of blade at base, entire or 1- to few serrate; cymes
(1–)3–5-flowered 20. *I. excisus*
- 41b. Leaf apex not excised.
- 43a. Fruiting calyx with 5 short teeth to 1/3 as long as fruiting calyx tube; corolla tube spreading or
straight.
- 44a. Corolla mostly yellow or yellowish, rarely rose 21. *I. flavidus*
- 44b. Corolla purplish, blue, rose, or white.
- 45a. Inflorescences gray tomentulose 22. *I. calcicolus*
- 45b. Inflorescences with hairs not as above, hairs never gray.
- 46a. Leaves narrowly lanceolate to elliptic-lanceolate, base narrowly cuneate, margin ±
remotely serrate above middle 23. *I. walkeri*
- 46b. Leaves ovate to ovate-lanceolate, base rounded to cuneate-attenuate, margin crenate
or serrate except at base.
- 47a. Inflorescences papillate velutinous; leaves scaly hirsute especially on midrib
and veins of abaxial surface 24. *I. yuennanensis*
- 47b. Inflorescences not papillate velutinous; leaves villous or hirtellous especially on
midrib and veins of abaxial surface.
- 48a. Calyx densely villous 25. *I. hispidus*

- 48b. Calyx sparsely villous basally 26. *I. lophanthoides*
- 43b. Fruiting calyx with 5 long teeth more than 1/3 as long as fruiting calyx tube; corolla tube declinate.
- 49a. Calyx teeth extending to middle of calyx or more.
- 50a. Cymes in interrupted spikelike panicles 50. *I. interruptus*
- 50b. Cymes in \pm continuous narrow spikes.
- 51a. Calyx teeth apex filiform-acuminate 51. *I. barbeyanus*
- 51b. Calyx teeth apex never filiform-acuminate.
- 52a. Leaves subcircular to ovate-oblong, 1.2–1.8 \times 0.6–1.8 cm, strongly netted 52. *I. scoparius*
- 52b. Leaves larger, inconspicuously netted.
- 53a. Floral leaves bractlike; calyx teeth ovate-triangular 53. *I. muliensis*
- 53b. Floral leaves \pm similar to stem leaves; calyx teeth narrowly lanceolate to lanceolate-triangular.
- 54a. Panicles terminal, 1.5–13 cm, cymes 3–5(–11)-flowered, peduncle 2–5(–9) mm 54. *I. setschwanensis*
- 54b. Panicles terminal or axillary, to 20(–34) cm, cymes 3–15(–23)-flowered, peduncle 4–25(–48) mm 55. *I. angustifolius*
- 49b. Calyx with small teeth never extending to middle of calyx.
- 55a. Branchlets, leaves, and calyces sparsely hairy; leaves usually not corrugate.
- 56a. Stems ascending; branches and petioles densely pilose; stem leaves triangular-ovate, petiole 1.5–3 cm 43. *I. flexicaulis*
- 56b. Stems erect; branches and petioles sparsely pilose; stem leaves broadly ovate to oblong-lanceolate, petiole less than 1.5 cm.
- 57a. Stem leaves less than 2 cm.
- 58a. Stem leaves broadly truncate-ovate to subcircular, glandular puberulent 44. *I. glutinosus*
- 58b. Stem leaves mostly ovate, subrhombic-ovate, to oblong-lanceolate, sometimes broadly ovate, not glandular hairy.
- 59a. Corolla white, ca. 6 mm, tube included; calyx densely white pilose inside on teeth 45. *I. medilungensis*
- 59b. Corolla purplish, ca. 9 mm, tube exserted; calyx glabrous inside 46. *I. pharicus*
- 57b. Stem leaves more than 2 cm.
- 60a. Stems subcylindric, densely glandular pubescent; calyx teeth triangular, apex conspicuously mucronate 47. *I. mucronatus*
- 60b. Stems obtusely 4-angled, pubescent or glandular pubescent; calyx teeth ovate-triangular, apex acute, never mucronate.
- 61a. Branchlets and petioles densely gray pubescent, not glandular pubescent 48. *I. silvaticus*
- 61b. Branchlets and petioles densely glandular pubescent 49. *I. pleiophyllus*
- 55b. Branchlets, leaves, and calyces variously dense hairy; leaves mostly corrugate.
- 62a. Branchlets, leaves, and calyces densely stellate tomentose or stellate lanate.
- 63a. Calyx teeth ca. 1/3 as long as calyx tube.
- 64a. Leaves without a brown gland on lower surface of each tooth apex 29. *I. rugosus*
- 64b. Leaves with a brown gland on lower surface of each tooth apex.
- 65a. Panicles 8–20 cm 27. *I. leucophyllus*
- 65b. Panicles 3–5 cm 28. *I. adenolomus*
- 63b. Calyx teeth ca. as long as calyx tube.
- 66a. Leaves 3–8 cm 30. *I. grandifolius*
- 66b. Leaves less than 2.5 cm.
- 67a. Leaf blade base rounded to shallowly cordate 31. *I. oresbius*
- 67b. Leaf blade base cuneate to truncate-cuneate 32. *I. dawoensis*
- 62b. Branchlets, leaves, and calyces with different hairs than above.
- 68a. Leaves conspicuously discolored.
- 69a. Calyx teeth narrowly triangular or triangular-lanceolate.
- 70a. Leaves ovate, 1.5–3.5 \times 1–2.8 cm, margin crenate, adaxially dusty pubescent; petiole 5–13 mm 33. *I. lihsienensis*
- 70b. Leaves lanceolate to oblanceolate, 0.8–1.5 \times 0.5–0.7 cm, margin entire or obscurely few dentate above middle, adaxially densely tomentulose and papillate glandular; petiole 1–4 mm 34. *I. wikstroemioides*
- 69b. Calyx teeth triangular to ovate-triangular.
- 71a. Leaves 2.5–4.4 cm 35. *I. smithianus*
- 71b. Leaves less than 2 cm.

- 72a. Leaves oblong-ovate, ovate, to broadly ovate, adaxially glandular pubescent, margin coarsely crenate or entire, apex rounded; cymes widely spaced 36. *I. parvifolius*
- 72b. Leaves lanceolate to ovate-lanceolate, adaxially densely pilose, margin remotely crenulate-serrulate above middle to entire, apex acute; cymes compact, in terminal panicles 37. *I. tenuifolius*
- 68b. Leaves not discolored.
- 73a. Cymes sessile or very short pedunculate; branchlets, inflorescences, and calyces densely hirtellous 38. *I. hirtellus*
- 73b. Cymes conspicuously pedunculate; branchlets, inflorescences, and calyces not hirtellous.
- 74a. Leaves and branchlets densely tomentose when young, subglabrescent with age 39. *I. rubescens*
- 74b. Leaves and branchlets hairy.
- 75a. Leaves ovate-lanceolate, 3.5–6(–10) × 1.5–2.5(–4) cm 40. *I. loxothyrsus*
- 75b. Leaves ovate-oblong, rhomboid, to ovate-triangular, less than 4 cm.
- 76a. Branchlets and petioles antrorsely dull yellow velutinous-pubescent; leaves ovate-oblong, 1–2.5 × 0.5–1.4 cm, base rounded 41. *I. xerophilus*
- 76b. Branchlets and petioles gray tomentulose; leaves rhombic to triangular-ovate, 1.5–4 × 1–2.5 cm, base broadly cuneate to truncate 42. *I. rugosiformis*

1. *Isodon ternifolius* (D. Don) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 140. 1929.

牛尾草 niu wei cao

Plectranthus ternifolius D. Don, Prodr. Fl. Nepal. 117. 1825.

Plants perennial, robust herbs or shrubs. Stems erect, 0.5–2(–7) m, densely tomentose-villous, much branched. Leaves opposite or in whorls of 3 or 4; petiole 2–3(–10) mm; leaf blade narrowly lanceolate to oblong, rarely ovate-oblong, 2–12 × 0.7–5 cm, papery to ± leathery, corrugate, adaxially pilose to villous, abaxially densely whitish or dull yellow tomentose, base broadly cuneate to cuneate, rarely rounded, apex acute to acuminate, rarely obtuse. Spikes terminal and axillary, compact, 9–35 × 6–10 cm; floral leaves similar to stem leaves, gradually reduced, bractlike apically. Calyx campanulate, ca. 2.3 × 2.5 mm, densely gray or dull yellow villous; teeth triangular, equal, ca. 0.5 mm; fruiting calyx dilated, tubular, ca. 4 mm, obscurely veined. Corolla white to purplish; upper lip purple spotted, 5–6 mm. Stamens and style usually included. Nutlets triquetrous, ovoid, ca. 1.8 × 1 mm, glabrous. Fl. Sep–Feb, fr. Dec–May.

Open hills, sparse forests; 100–2200 m. Guangdong, Guangxi, Guizhou, Yunnan [Bangladesh, India (Sikkim), Myanmar, Nepal, Vietnam].

Used medicinally.

2. *Isodon enanderianus* (Handel-Mazzetti) H. W. Li, J. Arnold Arbor. 69: 295. 1988.

紫毛香茶菜 zi mao xiang cha cai

Plectranthus enanderianus Handel-Mazzetti, Acta Horti Gothob. 9: 96. 1934.

Subshrubs 0.6–1.2(–2) m tall. Stems erect, densely spreading purplish or dull yellow villous-velutinous. Petiole 2–8 mm (excluding winged portion), densely puberulent; leaf blade ovate to triangular-ovate, 1.5–7 × 1–4 cm, ± membranous to papery, corrugate, base broadly cuneate, abruptly attenuate, margin serrate to subcrenate, apex acute to short acuminate, velvety, lateral veins ca. 4-paired. Thyrses 5–10 cm, lax, narrow; cymes pedunculate, 3–7-flowered,

densely velvety; floral leaves ovate to subcircular. Calyx campanulate, 2.5–3 mm, pilose outside; teeth subequal, ovate-lanceolate to ovate-triangular, apex acute, ca. 1/2 as long as calyx; fruiting calyx tubular-campanulate, slightly dilated, to 4 mm, conspicuously veined. Corolla purple or whitish blue, 5–7 mm, sparsely puberulent outside, glandular. Stamens included. Style slightly exerted. Nutlets dark brown, depressed subglobose, ca. 1 mm, glabrous. Fl. Aug–Sep, fr. Sep.

• Hills, forests, thickets; 700–2500 m. Sichuan, Yunnan.

3. *Isodon brevifolius* (Handel-Mazzetti) H. W. Li, J. Arnold Arbor. 69: 296. 1988.

短叶香茶菜 duan ye xiang cha cai

Plectranthus brevifolius Handel-Mazzetti, Acta Horti Gothob. 13: 368. 1939.

Shrubs. Stems erect, to 1 m tall, much branched, densely appressed, flaccid dull yellow velutinous at apex. Petioles of stem leaves 1.5–2.5 cm; leaf blade triangular-ovate, 1–2.5 × 1–2.5 cm, papery, strongly corrugate, minutely hispid, abaxially densely yellowish or white glandular, base cuneate, margin serrulate above base, apex acute to slightly obtuse, lateral veins ca. 3-paired. Panicles (2–)3–7 cm; cymes 3–5-flowered, pedunculate; floral leaves ovate, 0.7–1.5 × 0.7–1.5 mm. Calyx campanulate ca. 1.5 mm, densely villous; teeth 5, narrowly triangular, 1/2 as long as calyx, apex acute. Corolla white, to 7 mm, puberulent outside, tube ca. 3.5 mm. Nutlets unknown. Fl. Oct.

• Stony slopes; 2000 m. Yunnan.

4. *Isodon eriocalyx* (Dunn) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 137. 1929.

毛萼香茶菜 mao e xiang cha cai

Plectranthus eriocalyx Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 155. 1913; *Rabdosia eriocalyx* (Dunn) H. Hara var. *laxiflora* C. Y. Wu & H. W. Li.

Plants perennial, herbs or shrubs, 0.5–3 m tall. Stems reddish, densely appressed pubescent. Petiole 0.6–5 cm; leaf blade ovate-oblong to ovate-lanceolate, 2.5–18 × 0.8–6.5 cm,

papery, sparsely pubescent on veins, base broadly cuneate to rounded, abruptly attenuate, margin crenate-serrate to crenate-dentate, sometimes entire, apex acuminate. Panicles spikelike, terminal and axillary, 2.5–35 cm × ca. 1 cm, densely whitish floccose-puberulent; cymes compact, many flowered. Calyx campanulate, 1.5–1.8 × 1.8–2 mm, gray lanate, glabrescent; teeth ovate, subequal, ca. 1/3 as long as calyx; fruiting calyx straight, dilated, ca. 4 mm. Corolla purplish or purple, 6–7 mm, pilose outside. Style included or sometimes exserted. Nutlets dull yellow, ovoid. Fl. Jul–Nov, fr. Nov–Dec.

• Sunny slopes, thickets; 700–2600 m. Guangxi, Guizhou, Sichuan, Yunnan.

5. *Isodon phyllostachys* (Diels) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 121. 1929, excl. syn.

叶穗香茶菜 ye sui xiang cha cai

Plectranthus phyllostachys Diels, Notes Roy. Bot. Gard. Edinburgh 5: 230. 1912; *Rabdosia phyllostachys* (Diels) Kudô; *R. phyllostachys* var. *leptophylla* C. Y. Wu.

Shrubs or subshrubs 0.9–3 m. Branches erect, densely spreading pilose, glabrescent. Petiole 1–6 mm, pilose; leaf blade ovate, 1.5–5 × 0.8–4.5 cm, corrugate, adaxially puberulent or pilose, abaxially gray tomentose, base cordate, margin crenate, apex obtuse, sometimes acute. Panicles spikelike, 4–25 × 1–2 cm; cymes 4–15-flowered, pedunculate; upper floral leaves bractlike. Calyx campanulate, ca. 2 × 2 mm, densely pilose outside; teeth ovate-triangular, ca. 1/2 as long as calyx; fruiting calyx dilated, ovoid, teeth ca. 1/3 as long as calyx. Corolla yellowish or white with purple spots, ca. 6 mm, pilose outside, tube ca. 3 mm. Nutlets brown, ovoid. Fl. Aug–Oct, fr. Oct.

• Thickets, grassy hills; 1000–3000 m. Sichuan, Yunnan.

6. *Isodon pantadenius* (Handel-Mazzetti) H. W. Li, J. Arnold Arbor. 69: 298. 1988.

全腺香茶菜 quan xian xiang cha cai

Plectranthus pantadenius Handel-Mazzetti, Symb. Sin. 7: 944. 1936

Herbs perennial, with small reddish glands throughout. Stems 70–90 cm, pubescent, basally leafless, glabrescent. Leaves sessile, broadly ovate, 7–17 cm, ca. 1/2 as wide as long, adaxially densely strigose, sparsely glandular, abaxially densely glandular, strigose on veins, base cuneate-attenuate, margin crenate-dentate, apex caudate-acuminate, lateral veins 3–5-paired. Panicles ± terminal, spikelike, to 18 cm; cymes 7–9-flowered; floral leaves ovate, shorter than cymes. Calyx campanulate, 1–2 mm, pubescent outside; teeth 5, subequal, broadly ovate, shorter than calyx tube. Corolla 4–5 mm; tube straight, 2.5–3.5 mm; limb much shorter than tube, densely pilose outside, glandular. Stamens and style much exserted. Nutlets unknown. Fl. Sep.

• Grassy areas with *Pteridium*; 2800 m. Yunnan.

7. *Isodon nervosus* (Hemsley) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 123. 1929.

显脉香茶菜 xian mai xiang cha cai

Plectranthus nervosus Hemsley, J. Linn. Soc., Bot. 26: 272. 1890.

Herbs perennial, to 1 m tall. Stems erect, unbranched or few branched, pubescent, glabrescent. Petiole 2–10 mm, obsolete in basal leaves, pubescent; leaf blade lanceolate, 3.5–13.5 × 1–2 cm, papery, adaxially pubescent along veins, abaxially glabrescent, base cuneate, margin coarsely crenate, apex acuminate; lateral veins 4- or 5-paired, elevated. Panicles terminal, loose; cymes pedunculate, (3–)5–9(–15)-flowered; bracts narrowly lanceolate, 1–1.5 cm, densely pubescent; bracteoles linear, 1–2 mm. Calyx purplish, campanulate, ca. 1.5 mm, densely pubescent outside; teeth 5, lanceolate, subequal, apex acute, ca. 0.8 mm; fruiting calyx broadly campanulate, ca. 2.5 × to 3 mm; teeth triangular-lanceolate, erect, ca. 1.3 mm. Corolla blue or purple, 6–8 mm, sparsely pilose outside; tube 3–4 mm. Stamens exserted. Style exserted. Nutlets ovoid, 1–1.5 mm, apex pubescent. Fl. Jul–Oct, fr. Aug–Nov.

• Grassy banks, forest margins, shady areas in forests, among bushes; 100–1700 m. Anhui, Guangdong, Guangxi, Guizhou, Henan, Hubei, Jiangsu, Jiangxi, Shaanxi, Sichuan, Zhejiang.

Used medicinally.

8. *Isodon amethystoides* (Benth) H. Hara, J. Jap. Bot. 60: 233. 1985.

香茶菜 xiang cha cai

Plectranthus amethystoides Benth, Labiat. Gen. Spec. 45. 1832; *P. daitonensis* Hayata.

Herbs erect, perennial. Stems 30–150 cm tall, densely appressed incurved-pilose or puberulent, axillary branchlets sterile. Petiole 0.2–2.5 cm; leaf blade ovate-orbicular to lanceolate, 0.8–11 × 0.7–3.5 cm, thin papery, adaxially olive green, ± densely hispidulous, sometimes subglabrous, abaxially greenish, pilose or tomentulose, sometimes subglabrous, base abruptly attenuate or broadly cuneate-attenuate, margin crenate except for entire base, apex acuminate to obtuse. Panicles terminal; cymes loose, many flowered, 2–9 × 1.5–8 cm, with divaricate elongated branchlets; floral leaves ovate, similar to stem leaves, smaller. Calyx campanulate, ca. 2.5 × 2.5 mm, sparsely hirtellous or subglabrous outside, with scattered white or yellow glands; teeth 5, subequal, triangular, ca. 1/3 as long as calyx; fruiting calyx erect, broadly campanulate, 4–5 × ca. 5 mm. Corolla white bluish, white, or purplish, purple bluish on upper lip, ca. 7 mm, sparsely puberulent outside. Stamens included. Style included. Nutlets ovoid, ca. 2 mm, brown to yellow or white glandular. Fl. Jun–Oct, fr. Sep–Nov.

• Forests, wet grassy areas; 200–900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Jiangxi, Taiwan, Zhejiang.

Used medicinally.

9. *Isodon websteri* (Hemsley) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 130. 1929.

辽宁香茶菜 liao ning xiang cha cai

Plectranthus websteri Hemsley, J. Linn. Soc., Bot. 26: 275. 1890.

Herbs perennial. Stems erect, sparsely retrorse white pilose along angles, glabrescent at apex, unbranched or branched. Petiole 0.5–3 cm, sparsely white pilose; leaf blade broadly ovate, 3–6 × 1.5–3.5 cm, adaxially sparsely pilose along veins, otherwise subglabrous, abaxially pilose along midvein otherwise glabrous, sparsely yellowish glandular,

base broadly cuneate, margin crenate-serrate, apex acute to subacuminate, lateral veins 4–9-paired. Panicles terminal, few flowered, ca. 2 cm; cymes 3-flowered; floral leaves ovate-lanceolate, shorter than cymes, except lowermost 1 or 2; bracts and bracteoles minute, linear, 1–1.5 mm. Calyx campanulate, ca. 1.5 mm, pubescent outside; teeth triangular, apex acute, ca. 0.5 mm; fruiting calyx dilated, to 5.5 mm, glabrescent, rigid, bluish. Corolla blue, 4–6 mm, pilose outside. Stamens exerted. Style exerted. Nutlets brown, oblate, glabrous. Fl. Sep, fr. Oct.

- Valleys at low elevation. Liaoning.

10. *Isodon inflexus* (Thunberg) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 127. 1929.

内折香茶菜 nei zhe xiang cha cai

Ocimum inflexum Thunberg, Syst. Veg., ed. 14, 546. 1784; *Plectranthus inflexus* (Thunberg) Vahl ex Bentham var. *canescens* Nakai; *P. inflexus* var. *macrophyllus* Maximowicz.

Herbs perennial. Stems flexuous, erect, 40–100(–150) cm tall, much branched basally, densely retrorse white pilose along angles. Petiole 0.5–3.5 cm, densely white pilose; leaf blade broadly triangular-ovate to ovate, 3–5.5 × 2.5–5 cm, papery, adaxially olive green, sparsely puberulent, abaxially greenish, whitish pilose along veins, base broadly cuneate, abruptly attenuate-decurrent, margin coarsely crenate-serrate above base, apex acute to obtuse; lateral veins ca. 4-paired, slightly impressed adaxially, elevated abaxially. Panicles narrow, 6–10 cm; cymes 3–5-flowered, pedunculate, terminal and axillary; floral leaves subsessile, ovate, margin remotely serrate or subtire. Calyx campanulate, ca. 2 mm, pubescent outside, glabrescent; fruiting calyx slightly dilated, to 5 mm, conspicuously veined. Corolla reddish to purplish, ca. 8 mm, puberulent outside, sparsely glandular; tube ca. 3.5 mm. Stamens included. Style included. Nutlets brownish, broadly ovoid, ca. 1.5 mm, glabrous. Fl. Aug-Oct, fr. Oct.

Sparse valley forests, streamsides, hills, sunny areas; 200–1400 m. Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shandong, Zhejiang [Japan, Korea].

11. *Isodon serra* (Maximowicz) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 125. 1929.

溪黄草 xi huang cao

Plectranthus serra Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint Pétersbourg 9: 428. 1875.

Herbs perennial. Stems erect, to 1.5(–2) m tall, ± glabrescent basally, densely retrorse pubescent, much branched at apex. Petiole 0.5–3.5 cm, broadly winged at apex, densely pubescent; leaf blade ovate to ovate-lanceolate, 3.5–10 × 1.5–4.5 cm, thin papery, adaxially dark green, abaxially greenish, ± glabrescent, sparsely yellowish glandular, base cuneate, margin coarsely incurved serrate, apex ± acuminate; lateral veins 4- or 5-paired, elevated. Panicles loose, 10–20 cm, terminal; cymes 5- to many flowered, pedunculate; floral leaves short petiolate, lanceolate to linear-lanceolate; bracteoles 1–3 mm, pubescent. Calyx campanulate, ca. 1.5 mm, densely whitish pubescent outside, glandular; teeth erect, narrowly triangular, subequal, ca. 0.8 mm; fruiting calyx dilated, broadly campanulate, base ± urceolate, ca. 3 mm, conspicuously veined. Corolla purple, to 6 mm, puberulent outside; tube ca. 3 mm. Stamens included. Style

included. Nutlets broadly ovoid, ca. 1.5 mm, apex whitish barbate. Fl. Aug-Oct, fr. Sep-Oct.

Hills, riverbanks, streamsides, thickets, forests, sandy areas; 100–1200 m. Anhui, Gansu, Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shanxi, Sichuan, Taiwan, Zhejiang [Korea, Russia].

12. *Isodon japonicus* (N. Burman) H. Hara, Enun. Spermat. Japon. 1: 206. 1948.

毛叶香茶菜 mao ye xiang cha cai

Herbs perennial. Stems erect, 40–150 cm tall, base woody, subglabrous, apex pubescent, glandular, much branched. Petioles 1–3.5 cm, pubescent; leaf blades ovate to broadly ovate, (4–)6.5–13 × (2.5–)3–7 cm, papery, pubescent or puberulent, glandular, adaxially dark green, abaxially greenish, base broadly cuneate, abruptly attenuate, margin crenate-serrate, apex acuminate, apical tooth ovate to lanceolate; lateral veins 5-paired, elevated. Panicles loose, patent, terminal; cymes (3–)5–7-flowered, pedunculate, pubescent, glandular; floral leaves ovate, much shorter than cymes, except basal 1 or 2; bracteoles linear, ca. 1 mm. Calyx campanulate, 1.5–2 mm, bluish or densely appressed whitish pubescent outside; teeth triangular, 0.5–0.7 mm, apex acute, lower 2 slightly longer and wider; fruiting calyx tubular-campanulate, to 4 mm, conspicuously veined, slightly curved. Corolla purplish to blue, with dark spots on upper lip, ca. 5 mm. Stamens exerted. Style exerted. Nutlets brownish, triquetrous, ovoid, ca. 1.5 mm, glabrous except apex verruculose. Fl. Jul-Aug, fr. Sep-Oct.

Hills, thickets, valleys, forests, forest margins, grasslands; 0–2100 m. Gansu, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan [Japan, Korea, Russia].

- 1a. Leaves pubescent, glandular, serrate to crenate-serrate; calyx densely appressed whitish pubescent 12a. var. *japonicus*
- 1b. Leaves sparsely puberulent, glandular, obtusely serrate; calyx bluish, densely appressed pubescent 12b. var. *glaucocalyx*

12a. *Isodon japonicus* var. *japonicus*

毛叶香茶菜 mao ye xiang cha cai

Scutellaria japonica N. Burman, Fl. Indica 130. 1768; *Amethystanthus japonicus* (N. Burman) Nakai; *Isodon glaucocalyx* (Maximowicz) Kudô var. *japonicus* (N. Burman) Kudô; *Plectranthus glaucocalyx* Maximowicz var. *japonicus* (N. Burman) Maximowicz; *P. japonicus* (N. Burman) Koidzumi.

Leaves pubescent, glandular, margin serrate to crenate-serrate. Calyx densely appressed whitish pubescent.

Hills, thickets, valleys; 0–2100 m. Gansu, Henan, Jiangsu, Shaanxi, Sichuan [Japan, Korea].

Used medicinally for stomach cancer.

12b. *Isodon japonicus* var. *glaucocalyx* (Maximowicz) H. W. Li, J. Arnold Arbor. 69: 307. 1988.

蓝萼变种 lan e bian zhong

Plectranthus glaucocalyx Maximowicz, Prim. Fl. Amur. 212. 1859; *Amethystanthus galucocalyx* (Maximowicz) Nemoto; *Isodon glaucocalyx* (Maximowicz) Kudô;

P. japonicus (N. Burman) Koidzumi var. *glaucocalyx* (Maximowicz) Koidzumi; *Rabdosia japonica* (N. Burman) H. Hara var. *glaucocalyx* (Maximowicz) H. Hara.

Leaves sparsely puberulent, glandular, margin obtusely serrate. Calyx bluish, densely appressed pubescent outside.

Hilly forest margins, grasslands, forests; 0–1800 m. Hebei, Heilongjiang, Jilin, Liaoning, Shandong, Shanxi [Japan, Korea, Russia].

13. *Isodon longitubus* (Miquel) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 139. 1929.

长管香茶菜 chang guan xiang cha cai

Plectranthus longitubus Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 102. 1865; *Amethystanthus longitubus* (Miquel) Nakai; *Rabdosia longitubus* (Miquel) H. Hara.

Herbs perennial, to 1 m tall. Stems ascending, purplish, densely retrorse pubescent, branched basally. Petiole (0.2–)0.5–2 cm, densely pubescent; leaf blade lanceolate-ovate to ovate, 3.5–12 × 2–4 cm, papery, adaxially olive green, pubescent along veins, otherwise minutely strigose, abaxially green-purple, densely pubescent on veins, sparsely golden glandular, base cuneate to cuneate-decurrent, margin serrate except for entire base, apex short acuminate; lateral veins 3- or 4-paired, elevated. Panicles 10–20 cm, terminal and axillary; cymes 1–3(–5)-flowered, pedunculate, finely pubescent; upper floral leaves sessile, bractlike, margin entire; bracteoles linear, finely pubescent. Calyx campanulate, to 4–6 mm, purplish, finely pubescent along veins outside and margin, otherwise glandular, 2-lipped to middle; upper lip reflexed, with 3, triangular, ± acute short teeth; lower lip with 2, ovate-triangular, ± acute teeth; fruiting calyx to 6 mm, conspicuously veined. Corolla purple-blue, to 2 cm, puberulent outside; tube ca. 3 × as long as limb. Stamens included. Style included. Nutlets dark brown, depressed globose, ca. 1.5 mm wide, verruculose. Fl. Jun–Oct, fr. Oct.

Streamsides in forests; 500–1100 m. Anhui, Zhejiang [Japan].

14. *Isodon gesneroides* (J. Sinclair) H. Hara, J. Jap. Bot. 60: 234. 1985.

苣苔香茶菜 ju tai xiang cha cai

Plectranthus gesneroides J. Sinclair, Notes Roy. Bot. Gard. Edinburgh 20: 124. 1948; *Rabdosia gesneroides* (J. Sinclair) H. Hara.

Herbs perennial, less than 30 cm tall. Stems ascending, repent, producing fibrous rootlets basally, densely glandular pubescent, few leaved. Petiole 0.8–1.5 cm, densely glandular pubescent; leaf blade of lower stem leaves ovate to orbicular-ovate, 3–5.5 × 2–3 cm; blade of upper leaves larger, rhombic-ovate, papery, adaxially sparsely strigose-hirtellous, yellowish glandular, abaxially subglabrous, base broadly cuneate-attenuate, margin remotely coarse crenate-serrate, apex obtuse to acute; lateral veins 3- or 4-paired, slightly elevated adaxially. Panicles terminal, to 15 cm, few flowered; cymes 1–3-flowered, pedunculate, densely glandular pubescent; floral leaves sessile, broadly ovate to ovate-lanceolate, apex acuminate; bracteoles linear, ca. 1 mm. Calyx broadly campanulate, ca. 3 mm, puberulent and glandular outside; teeth subequal, triangular-ovate, ca. 1.5 mm. Corolla purple, ca. 1.3 cm, pilose outside, glandular, tube ca. 8 mm. Stamens included. Style included. Nutlets unknown. Fl. Aug.

• Limestone cliffs in woods; 3000 m. Sichuan.

15. *Isodon forrestii* (Diels) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 130. 1929.

紫萼香茶菜 zi e xiang cha cai

Plectranthus forrestii Diels, Notes Roy. Bot. Gard. Edinburgh 5: 229. 1912; *Rabdosia forrestii* (Diels) H. Hara; *R. forrestii* var. *intermedia* C. Y. Wu & H. W. Li.

Herbs perennial. Stems numerous, 60–100(–180) cm tall, robust, pilose. Petiole ca. 5 mm, densely pilose; leaf blade ovate to rhombic-ovate, 5–10 × 4–7 cm, papery, densely pilose, sparsely yellowish glandular, adaxially olive green, abaxially greenish, base broadly cuneate-decurrent, margin crenate-dentate except for entire base, apex obtuse to acute; lateral veins 4-paired, conspicuously elevated. Panicles patent, to 30 × 8–9 cm; cymes 7–11-flowered, pedunculate, densely glandular pubescent; floral leaves bractlike, ovate, 5–7 mm; bracteoles spatulate, 2–3 mm, ciliate. Pedicel 2–7 mm. Calyx dark purple-red, broadly campanulate, 4–5 mm, pubescent on veins outside otherwise yellowish glandular, slightly 2-lipped; teeth ovate-lanceolate, apex acuminate; fruiting calyx dilated, 7–8 mm, conspicuously veined. Corolla dark blue, bluish, or reddish, to 1.6 cm, pilose outside especially basally; tube ca. 1 cm. Stamens included. Style included. Nutlets yellow-brown, ovoid, ca. 1.8 × 1.5 mm. Fl. Jul–Aug, fr. Aug–Sep.

• Stony grasslands, forest margins, grassy openings in pine forests; 2600–3500 m. Sichuan, Yunnan.

16. *Isodon irroratus* (Forrest ex Diels) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 121. 1929.

露珠香茶菜 lu zhu xiang cha cai

Plectranthus irroratus Forrest ex Diels, Notes Roy. Bot. Gard. Edinburgh 5: 228. 1912; *Rabdosia irrorata* (Forrest ex Diels) H. Hara; *R. irrorata* var. *crenata* C. Y. Wu; *R. irrorata* var. *longipes* C. Y. Wu & H. W. Li; *R. irrorata* var. *rungshiaensis* C. Y. Wu & H. W. Li.

Shrubs erect, 30–100 cm tall. Stems erect or ascending, brown-gray, much branched at apex; puberulent. Petiole 1–2 mm; leaf blade ovate to broadly ovate, 1.5–3 × 1.3–2.5 cm, papery, abaxially sparsely hirtellous along veins, sparsely yellowish glandular, base broadly cuneate, margin crenate except for entire base, apex obtuse; lateral veins 3- or 4-paired, elevated. Panicles slightly patent, (6–)10–15(–20) cm, glandular pubescent; floral leaves similar to stem leaves, smaller; bracteoles linear, 1–2 mm. Pedicel 1–3 mm. Calyx purplish, 4–5 mm, slightly declinate, broadly campanulate, hirtellous on veins outside, sparsely yellowish glandular, ± 2-lipped; teeth lanceolate-ovate, 1–1.5 mm, lower 2 slightly wider; fruiting calyx dilated, 6–7 mm, conspicuously 10-veined. Corolla blue or purple, sparsely pubescent outside, tube to 1 cm, limb ca. 5 mm. Stamens included. Style included. Nutlets dark brown, ovoid, ca. 1.5 mm wide, glabrous. Fl. Jul–Aug, fr. Aug–Oct.

• Dry shady areas among shrub layer in pine, bamboo, and fir forests; 2700–3500 m. Xizang, Yunnan.

17. *Isodon wardii* (Marquand & Airy Shaw) H. Hara, J. Jap. Bot. 60: 237. 1985.

西藏香茶菜 xi zang xiang cha cai

Plectranthus wardii Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 216. 1929; *Rabdosia wardii* (Marquand & Airy Shaw) H. Hara.

Shrubs patent, to 2 m tall. Branches densely pubescent. Stem leaves opposite; petiole slender, (1-)1.5-3.5 cm, pubescent; leaf blade rhombic, (2-)3-6 × (1.5-)2.5-4 cm, subglabrous or sparsely pubescent on veins, base broadly cuneate, margin coarsely crenate-serrate above middle, apical tooth acuminate or ± obtuse. Panicles terminal, 15-20 cm; cymes 3-7-flowered, pedunculate, pubescent; floral leaves similar to stem leaves, smaller, margin entire; bracteoles linear, to 1.5 mm. Pedicel to 3 mm. Calyx campanulate, ca. 3.5 mm, pubescent outside, 2-lipped nearly to middle; teeth triangular-lanceolate, lower 2 slightly longer, apex acuminate. Corolla pale violet, to 1.2 cm, puberulent outside. Stamens included. Style included. Nutlets unknown. Fl. Jul.

• Xizang.

18. *Isodon bulleyanus* (Diels) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 124. 1929.

苍山香茶菜 cang shan xiang cha cai

Plectranthus bulleyanus Diels, Notes Roy. Bot. Gard. Edinburgh 5: 229. 1912; *P. provicarii* H. Léveillé; *Rabdosia bulleyana* (Diels) H. Hara; *R. bulleyana* var. *foliosa* C. Y. Wu; *R. provicarii* (H. Léveillé) H. Hara.

Shrubs 60-90 cm tall, much branched near base. Branches slender, purple, densely whitish hispidulous. Leaves opposite; petiole 1-3 mm, hispidulous; leaf blade narrowly ovate, (1.5-)4-6 × (1-)2-2.5 cm, thin papery, adaxially sparsely whitish hirtellous, abaxially glandular, whitish hispidulous on veins, base cuneate, margin crenate-dentate above basal 1/3 or coarsely serrate above base, apex acute. Panicles terminal, 6-10 cm; cymes (1-)3-5-flowered, pedunculate, white pilose; bracts ovate, 5-13 × 3-7 mm, margin entire; bracteoles linear, to 1 mm. Pedicel 1.5-3 mm. Calyx campanulate, ca. 2.5 mm, whitish pilose or pubescent outside, glandular, 2-lipped to middle; teeth subequal, ovate-triangular, apex acute. Corolla dark blue except pinkish at base, to 1.4 cm, basally pilose outside. Stamens included. Style included. Nutlets brown, triquetrous, ovoid, glabrous. Fl. Jun-Sep, fr. Sep.

• Dry areas among scrub or in sparse mixed forests; 2400-3200 m. Yunnan.

19. *Isodon macrophyllus* (Migo) H. Hara, J. Jap. Bot. 60: 235. 1985.

岐伞香茶菜 qi san xiang cha cai

Amethystanthus macrophyllus Migo, J. Shanghai Sci. Inst. 3: 230. 1937.

Herbs or subshrubs, perennial. Stems numerous, 1-1.5 m tall, woody at base, densely floccose-puberulent. Petiole (1-)3-5 cm, densely puberulent; blade of stem leaves subcircular to orbicular-ovate, occasionally broadly lanceolate, (5.5-)10-15 × (4.7-)5-10 cm, papery, adaxially puberulent, glabrescent, densely puberulent along veins, abaxially densely tomentulose, base cuneate to rounded, abruptly attenuate, margin coarsely crenate-serrate, apex excised, apical tooth narrowly lanceolate 2-2.5 cm; lateral veins ca. 4-paired, elevated abaxially. Panicles terminal or

axillary, to 15 cm; cymes 10-15-flowered, pedunculate, densely pubescent; floral leaves bractlike, spatulate; bracteoles minute, linear, ca. 1 mm, densely pubescent. Calyx campanulate, 2.2-2.4 mm, densely pubescent outside, slightly 2-lipped; lower 2 teeth ovate-triangular, 1-1.5 mm, apiculate; upper 3 teeth smaller; fruiting calyx dilated, obviously veined, 2-lipped to 1/3 its length. Corolla bluish or purplish, 5-6 mm, tube ca. 2.5 mm. Stamens exerted. Style exerted. Nutlets obovoid, ca. 2.5 mm, hairy, glandular. Fl. and fr. Sep-Oct.

• Anhui, Jiangsu.

20. *Isodon excisus* (Maximowicz) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 133. 1929.

尾叶香茶菜 wei ye xiang cha cai

Plectranthus excisus Maximowicz, Prim. Fl. Amur. 213. 1859; *Amethystanthus excisus* (Maximowicz) Nakai; *Rabdosia excisa* (Maximowicz) H. Hara.

Herbs perennial. Stems numerous, erect, 60-100 cm tall, semiwoody basally, sparsely pubescent. Petiole 0.6-6 cm, sparsely pubescent; blade of lower leaves broadly cuneate to ± truncate and abruptly attenuate-decurrent, margin coarsely dentate-serrate, adaxially strigose-hispidulous, densely pubescent on veins, abaxially glabrous, yellow glandular, sparsely pubescent on veins; stem leaves opposite, orbicular or orbicular-ovate, (4-)6-13 × (3-)4-10 cm, base cuneate, margin entire or 1- to few serrate, apex excised, apical tooth 4-6 cm; lateral veins 3- or 4-paired, elevated. Panicles terminal or axillary, 6-15 cm; cymes (1-)3-5-flowered, pedunculate, densely pubescent; floral leaves bractlike, ovate, to 5 mm; bracteoles linear, ca. 1 mm. Pedicel 1-2 mm. Calyx campanulate, ca. 3 mm, pubescent outside, glandular, 2-lipped to 2/3 its length; lower lip slightly longer than upper lip, to 1.8 mm; teeth narrowly triangular, acute; fruiting calyx slightly dilated, ca. 4 mm, obscurely 2-lipped, teeth subequal. Corolla purplish, purple, or blue, to 9 mm, puberulent outside, glandular, tube ca. 4 mm. Stamens and style included or slightly exerted. Nutlets brown, obovoid, ca. 1.5 mm, hairy, glandular. Fl. Jul-Aug, fr. Aug-Sep.

Grasslands, forest margins, forests; 500-1100 m. Hebei, Heilongjiang, Jilin, Liaoning, Shanxi [Japan, Korea, Russia].

21. *Isodon flavidus* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 234. 1985.

淡黄香茶菜 dan huang xiang cha cai

Plectranthus flavidus Handel-Mazzetti, Symb. Sin. 7: 942. 1936.

Herbs perennial. Stems 40-90 cm tall, glabrous, narrowly winged on angles. Stem leaves opposite; petiole less than 1 cm; leaf blade ovate, rhombic to ovate-oblong, 3.5-15 × 1.2-6.7 cm, membranous or papery, adaxially olive green, scurfy-strigillose, glabrescent, abaxially greenish, glabrous, with scattered brown or dark glands, base broadly cuneate to ± truncate-attenuate, margin crenate, apex acute. Panicles terminal, 4.5-35 × 3.2-7(-10) cm; cymes 3-15-flowered, pedunculate, short papillose velutinous; floral leaves subsessile or sessile, lanceolate, ca. 5 mm, upper floral leaves bractlike; bracteoles linear, 1-2 mm. Pedicel 4-10 mm. Calyx campanulate, ca. 2.5 × 3 mm, reddish brown glandular, short papillose velutinous, slightly 2-lipped; teeth almost 1/2 as long as calyx, broadly ovate-triangular, apex acute, lower 2 teeth slightly longer; fruiting calyx 4-4.5 mm, obliquely

tubular-campanulate, teeth much shorter than calyx tube. Corolla mostly yellow or yellowish, rarely rose, ca. 7 mm, limb with scattered red glands. Stamens exserted. Style exserted. Nutlets greenish, ovoid, ca. 1 mm, glabrous. Fl. and fr. Sep-Nov.

• Mixed forests, wet forest margins; 1500–2600 m. Guizhou, Yunnan.

22. *Isodon calcicolus* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 233. 1985.

灰岩香茶菜 hui yan xiang cha cai

Herbs perennial. Stems erect, numerous, 40–60 cm tall, branched at apex, densely retrorse gray tomentose. Stem leaves opposite; petiole 1–2 mm; leaf blade narrowly lanceolate to obovate-lanceolate, 3–9 × 0.5–1.5(–2.5) cm, papery, adaxially green, densely pilose or papillose glandular hairy, abaxially rusty, gray, or white tomentulose or densely papillose hairy or glandular, base narrowly attenuate, margin crenulate-serrulate except base, apex acute; lateral veins ca. 4-paired, immersed adaxially, elevated abaxially. Panicles terminal, loose, 10–30 cm; cymes 3–7-flowered, pedunculate, densely gray tomentose; floral leaves subsessile, lanceolate, less than 1 cm; bracteoles minute, linear, less than 1 mm. Pedicel 1–4 mm. Calyx campanulate, ca. 2 mm, densely gray tomentose outside, obscurely 2-lipped, teeth ovate-triangular, subequal, shorter than calyx tube; fruiting calyx tubular-campanulate, to 4 mm, curved, 10-veined, lower 2 teeth longer. Corolla white, purplish, or rose, 6–7 mm, white pilose outside, glandular, tube slightly exserted. Stamens exserted. Style exserted. Nutlets brownish yellow, triquetrous, ovoid, ca. 1 mm, glabrous. Fl. Sep-Oct, fr. Oct-Nov.

• Hills, slopes, grasslands; 1600–3000 m. Yunnan.

- 1a. Adaxial leaf surface densely pilose, abaxial surface rust colored tomentulose on elevated veins, otherwise gray tomentulose and glandular; corolla white or purplish 22a. var. *calcicolus*
1b. Leaves white tomentulose on elevated vein meshes of lower surface otherwise densely papillose glandular hairy; corolla white or rose 22b. var. *subcalvus*

22a. *Isodon calcicolus* var. *calcicolus*

灰岩香茶菜 hui yan xiang cha cai

Plectranthus calcicolus Handel-Mazzetti, Symb. Sin. 7: 944. 1936.

Leaf blade densely pilose adaxially, abaxially rust colored tomentulose on elevated midvein and veins, otherwise gray tomentulose and glandular. Corolla white or purplish.

• Grassy slopes, grasslands near forest margins in limestone regions; 1600–2600 m. Yunnan.

22b. *Isodon calcicolus* var. *subcalvus* (Handel-Mazzetti) H. W. Li, J. Arnold Arbor. 69: 323. 1988.

近无毛变种 jin wu mao bian zhong

Plectranthus calcicolus Handel-Mazzetti var. *subcalvus* Handel-Mazzetti, Acta Horti Gothob. 13: 378. 1939.

Leaf blade white tomentulose on elevated vein meshes abaxially otherwise densely papillose glandular hairy. Corolla white or rose.

• Grassy hills; 2600–3000 m. Yunnan.

23. *Isodon walkeri* (Arnott) H. Hara, J. Jap. Bot. 26: 237. 1985.

长叶香茶菜 chang ye xiang cha cai

Plectranthus walkeri Arnott, Pug. Pl. Ind. Or. 36. 1836; *Isodon stracheyi* (Bentham ex J. D. Hooker) Kudô; *P. brandisii* Prain; *P. stracheyi* Bentham ex J. D. Hooker; *P. veronicifolius* Hance; *Rabdosia stracheyi* (Bentham ex J. D. Hooker) H. Hara.

Herbs perennial. Stems 40–60 cm tall, repent at base, ascending, unbranched or branched, puberulent or scaly pilose. Stem leaves opposite; petiole 2–12 mm; leaf blade narrowly lanceolate or lanceolate to elliptic-lanceolate, 2.4–7.5 × 0.6–2.1 cm, papery, adaxially olive green, glabrous, scaly hispidulous on veins, abaxially greenish, subglabrous, sparsely brown glandular, base narrowly cuneate, margin ± remotely serrate above middle, apex acuminate. Panicles terminal, 4–30 × 2.5–6 cm; cymes 3–15-flowered, pedunculate, scaly pilose; floral leaves bractlike, ovate to lanceolate; bracteoles minute, linear, ca. 1 mm. Calyx campanulate, ca. 2 × 1.6 mm, conspicuously 10-veined, brown glandular, subglabrous or scaly pilose on veins, slightly 2-lipped; teeth ovate, lower 2 a little longer; fruiting calyx ca. 3 × 1.1 mm, lower lip much longer than upper. Corolla rose or white, 6–7 mm, tube 3–3.5 mm. Stamens and style much exserted. Nutlets ovoid, slightly compressed. Fl. Nov-Jan, fr. Dec-Jan.

Streambanks, wet areas in forests; 300–1300 m. Guangdong, Guangxi, Yunnan [India, Laos, Myanmar, Sri Lanka].

24. *Isodon yunnanensis* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 237. 1985.

不育红 bu yu hong

Plectranthus yunnanensis Handel-Mazzetti, Symb. Sin. 7: 943. 1936.

Herbs perennial. Rhizomes tuberous, with red buds. Stems 30–70 cm tall, mostly unbranched, whitish puberulent, villous. Stem leaves opposite, sessile; leaf blade narrowly to broadly ovate, 2.5–6 × 1.4–3.8 cm, adaxially olive green, strigose, abaxially greenish, densely purplish glandular, scaly hirsute especially on veins, base cuneate to attenuate, margin crenate, apex acute, occasionally obtuse. Panicles terminal or axillary, 7–34 cm; cymes 5–15-flowered, divaricate, pedunculate, papillose velutinous; floral leaves bractlike except basal leaves, triangular to lanceolate, 2–3 mm, entire; bracteoles minute, narrowly lanceolate to linear, 1–2 mm. Calyx campanulate, ca. 2.8 mm, ca. 2.8 mm in diam. at mouth, puberulent outside, red glandular; teeth slightly shorter than calyx tube, broadly ovate, lower 2 larger; fruiting calyx to 5 mm, nodding, recurved at throat, teeth much shorter than calyx tube. Corolla yellowish or whitish, dark or red-purple on upper lip, with purple spots on lower lip, 4–5 mm, tube a slightly longer than calyx. Stamens exserted. Style exserted. Nutlets dark brown, compressed ovoid, ca. 1.2 × 0.8 mm, glabrous. Fl. and fr. Aug-Oct.

• Grasslands, pine forests; 1800–3000 m. Sichuan, Yunnan.

Used medicinally.

25. *Isodon hispidus* (Bentham) Murata, Acta Phytotax. Geobot. 24: 82. 1969.

刚毛香茶菜 gang mao xiang cha cai

Plectranthus hispidus Benth, Pl. Asiat. Rar. 2: 17. 1831; *Isodon nigropunctata* Murata; *P. chienii* Sun ex C. H. Hu; *Rabdosia hispida* (Benth) H. Hara; *R. shimizuana* Murata.

Herbs perennial. Stems repent-ascending, 33–100 cm tall, densely brownish villous. Stem leaves opposite, sessile or subsessile; leaf blade ovate to elliptic, 3–11.5 × 1.5–5.5 cm, papery, adaxially olive green, hispidous, abaxially greenish, sparsely dark brown glandular, densely patent villous on veins, base cuneate or rounded, decurrent-attenuate, margin serrate, apex acute to acuminate. Panicles terminal and axillary, 4.5–11 × 2.5–4 cm; cymes densely brownish villous; floral leaves and bracts ovate, 7–14 mm; bracteoles ovate, much shorter than pedicels. Pedicel 3–6 mm. Calyx campanulate, ca. 2 mm, ca. 2 mm wide at mouth, densely villous outside, with reddish brown glands, 2-lipped; teeth broadly triangular, ca. 1/2 as long as calyx, lower 2 slightly larger; fruiting calyx dilated, ca. 3 × 1.5–1.8 mm. Corolla white or pink-lavender, sometimes with purple spots on upper lip, 5.5–6 mm, sparsely pubescent outside; tube 3.2 mm, straight; upper lip ca. 1.5 mm, lower lip ca. 3.2 mm. Stamens and style much exerted. Nutlets compressed ovoid, minutely punctate. Fl. and fr. Oct–Nov.

Open areas, woods; 1300–2000 m. Yunnan [India, Laos, Myanmar, Thailand].

26. *Isodon lophanthoides* (Buchanan-Hamilton ex D. Don) H. Hara, J. Jap. Bot. 60: 235. 1985.

线纹香茶菜 xian wen xiang cha cai

Herbs perennial, repent at base, with underground globose root tubers. Stems 0.5–1.5 m tall, erect to ascending, puberulent or pilose, many leafed at base. Stem leaves opposite; petiole equal to or longer than blade; leaf blade broadly lanceolate to ovate, 1.5–20 × 0.5–8.5 cm, papery, minutely hirsute, adaxially olive green, abaxially greenish, sparsely brown glandular, base cuneate to rounded, rarely shallow cordate, margin crenate, apex obtuse to acuminate. Panicles terminal and axillary, 7–20 × 3–6 cm; cymes helicoid, 11–13-flowered, pedunculate; floral leaves bractlike, ovate; bracteoles linear, 3–5 mm, slightly longer than pedicels. Calyx campanulate, ca. 2 mm, ca. 1.7 mm wide at mouth, base sparsely villous outside, sparsely red-brown glandular, 2-lipped to 2/3 its length; teeth ovate-triangular, lower 2 longer; fruiting calyx elongated, 4.5–5 mm. Corolla white or rose, with purple spots on limb, 2–7 mm; tube 3.7–5 mm, straight; upper lip 1.6–2 mm, lower lip slightly longer. Stamens and style much exerted. Nutlets brown, compressed ovoid, ca. 1 × 0.75 mm, glabrous, smooth. Fl. and fr. Aug–Dec.

Hills, forests, ravines, thickets, rice paddies, streamsides; 400–3000 m. Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang [India (Sikkim), Laos, Myanmar, Nepal, Thailand, Vietnam].

- 1a. Plants to 1.5 m tall; leaf apices acuminate.
2a. Leaves ovate, to 20 × 8.5 cm 26b. var. *gerardianus*
2b. Leaves ovate-lanceolate to lanceolate, 5–8.5 × 1.5–3.5 cm 26c. var. *graciliflorus*
1b. Plants 0.5–1 m tall; leaf apices obtuse.
3a. Corolla 6–7 mm 26a. var. *lophanthoides*
3b. Corolla 2–3 mm 26d. var. *micranthus*

26a. *Isodon lophanthoides* var. *lophanthoides*

线纹香茶菜 xian wen xiang cha cai

Hyssopus lophanthoides Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 110. 1825; *Isodon striatus* (Benth) Kudô; *Orthosiphon bodinieri* Vaniot; *O. glabrescens* Vaniot; *Plectranthus esquirolii* H. Léveillé; *P. fangii* Sun; *P. stocksii* J. D. Hooker; *P. striatus* Benth; *P. volkensianus* Muschler; *Rabdosia fangii* (Sun) H. Hara; *R. lophanthoides* (Buchanan-Hamilton ex D. Don) H. Hara.

Plants 50–100 cm tall. Leaf apices obtuse. Corolla 6–7 mm.

Wet hills, forests, ravines; 500–3000 m. Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan, Zhejiang [India (Sikkim), Myanmar, Nepal, Thailand, Vietnam].

Used medicinally.

26b. *Isodon lophanthoides* var. *gerardianus* (Benth) H. Hara, J. Jap. Bot. 60: 235. 1985.

狭基变种 xia ji bian zhong

Plectranthus gerardianus Benth, Pl. Asiat. Rar. 2: 17. 1830; *P. striatus* Benth var. *gerardianus* (Benth) Handel-Mazzetti; *P. tatei* Hemsley; *Rabdosia lophanthoides* (Buchanan-Hamilton ex D. Don) H. Hara var. *gerardiana* (Benth) H. Hara.

Plants 30–150 cm tall. Leaves ovate, to 20 × 8.5 cm, base cuneate, apex acuminate.

Forests, thickets; 400–2900 m. Gansu, Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Xizang, Yunnan [India (Sikkim), Laos, Myanmar, Nepal, Thailand, Vietnam].

Used medicinally.

26c. *Isodon lophanthoides* var. *graciliflorus* (Benth) H. Hara, J. Jap. Bot. 60: 235. 1985.

细花变种 xi hua bian zhong

Plectranthus graciliflorus Benth, Prodr. 12: 56. 1848; *P. gerardianus* Benth var. *graciliflorus* (Benth) J. D. Hooker; *P. striatus* Benth var. *graciliflorus* (Benth) Handel-Mazzetti; *Rabdosia lophanthoides* (Buchanan-Hamilton ex D. Don) H. Hara var. *graciliflora* (Benth) H. Hara.

Plants 40–100 cm tall. Leaves ovate-lanceolate to lanceolate, 5–8.5 × 1.5–3.5 cm, scabrous on veins, sparsely brown glandular, adaxially slightly scabrous, subglabrous, abaxially reddish brown when dry, base cuneate, apex acuminate.

Rice paddies, ravines. Fujian, Guangdong, Jiangxi [India (Sikkim), Myanmar, Nepal, Vietnam].

26d. *Isodon lophanthoides* var. *micranthus* (C. Y. Wu) H. W. Li, J. Arnold Arbor. 69: 336. 1988.

小花变种 xiao hua bian zhong

Rabdosia lophanthoides (Buchanan-Hamilton ex D. Don) H. Hara var. *micrantha* C. Y. Wu, Fl. Yunnan. 1: 775. 1977.

Leaves sparsely hirtellous, abaxially purplish. Corolla 2–3 mm.

• Streamsides, forests; 1100–1900 m. Guizhou, Yunnan.

27. *Isodon leucophyllus* (Dunn) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 122. 1929.

白叶香茶菜 bai ye xiang cha cai

Plectranthus leucophyllus Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 157. 1913; *P. pachythyrus* Handel-Mazzetti; *P. thiothyrus* Handel-Mazzetti; *Rabdosia leucophylla* (Dunn) H. Hara; *R. pachythyrus* (Handel-Mazzetti) H. Hara; *R. thiothyrus* (Handel-Mazzetti) H. Hara.

Shrubs erect, 50–120 cm tall, much branched, densely gray scaly stellate tomentose or lanate except on corolla; branchlets densely hairy when young, glabrescent. Stem leaves opposite; petiole 0.5–1.5 cm, densely hairy; leaf blade ovate to triangular-ovate, 2–6 × 1.3–4 cm, papery, rugose, adaxially ± densely hairy, abaxially gray, densely hairy, with a brown gland at tooth apex, base obtuse to rounded-cuneate, margin crenate, apex obtuse to slightly acute; lateral veins 3- or 4-paired, oblique, immersed adaxially, elevated abaxially. Cymes 3–9-flowered, remote or compact, in pyramidal panicles 10–24 cm; floral leaves and bracts longer or shorter than cymes; bracteoles minute, linear, ca. 1 mm. Calyx tubular-campanulate, straight or slightly curved, 2.5–3(–4) mm, 10-veined, densely hairy outside; teeth triangular-lanceolate, ca. 1/4 as long as calyx, subequal; fruiting calyx slightly dilated, tubular, base urceolate, slightly curved, glabrescent. Corolla rose, purple, to dark purple-blue, 3–5(–7) mm, puberulent on limb outside; upper lip as long as lower lip, ca. 1.5 mm. Stamens included. Style included. Nutlets yellow-brown, ovoid, ca. 1.5 mm, glabrous. Fl. Jul–Oct, fr. Oct–Nov.

- Thickets on dry slopes; 1400–2900 m. Sichuan, Yunnan.

28. *Isodon adenolomus* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 233. 1985.

腺叶香茶菜 xian ye xiang cha cai

Plectranthus adenoloma Handel-Mazzetti, Symb. Sin. 7: 938. 1936; *Rabdosia adenoloma* (Handel-Mazzetti) H. Hara.

Shrubs. Stems ca. 90 cm tall, erect, much branched; branches densely whitish stellate tomentose, glabrescent. Stem leaves opposite; petiole 0.5–1 cm, densely gray stellate tomentose; leaf blade narrowly ovate to orbicular-ovate, 2–3.5 × 1.2–1.7 cm, papery, adaxially densely gray stellate tomentose, with immersed veins, abaxially densely fulvous stellate tomentose, with elevated veins, base broadly cuneate, margin crenate with a brown gland at tooth apex abaxially, entire along basal 1/3, apex obtuse to rounded. Panicles terminal, 3–5 cm; cymes 3–5-flowered, densely stellate tomentose; floral leaves and bracts longer than cymes. Pedicel 2–4 mm. Calyx campanulate, ca. 2 mm, densely fulvous stellate tomentose outside; teeth equal, triangular, ca. 1/3 as long as calyx. Corolla purple-red, ca. 7 mm, sparsely pilose outside, tube slightly exerted, limb 2-lipped. Stamens included. Style nearly included. Nutlets unknown. Fl. Jul.

- Open stony hills; 2300–3300 m. Sichuan, Yunnan.

29. *Isodon rugosus* (Wallich ex Benth) Codd, Taxon 17: 239. 1968.

皱叶香茶菜 zhou ye xiang cha cai

Plectranthus rugosus Wallich ex Benth, Pl. Asiat. Rar. 2: 17. 1830; *Isodon plectranthoides* Schrader ex Benth; *I. rugosus* (Wallich ex Benth) Murata.

Shrubs erect, much branched, to 1.5 m tall; branchlets slender, densely stellate tomentose. Stem leaves opposite; petiole 2–10 mm, densely tomentose; leaf blade ovate to elliptic, 1–3.5 × 0.5–1.8 cm, papery, rugose, adaxially olive green, densely stellate tomentose, abaxially gray tomentose, base broadly cuneate to rounded, margin crenulate, apex obtuse; lateral veins 4- or 5-paired, immersed adaxially, elevated abaxially. Cymes axillary, pedunculate, in stellate tomentose panicles, basal cymes long branched to 21- or more flowered, apical cymes 3–5-flowered; floral leaves slightly longer than cymes, upper ones much shorter, subsessile, ovate. Pedicel 2–3 mm. Calyx campanulate, ca. 2 mm, densely stellate tomentose outside; teeth broadly triangular, subequal, minute, ca. 1/3 as long as calyx tube; fruiting calyx slightly dilated, tubular-campanulate, slightly curved, ca. 3 mm, conspicuously 10-veined. Corolla white, tinged rose, or dark lilac on upper lip, ca. 7 mm, sparsely stellate tomentose outside, glandular, tube ca. 3 mm. Stamens included. Style included. Nutlets dark brown, triquetrous, oblong, ca. 1.5 mm, glabrous. Fl. Jul–Sep, fr. Aug–Oct.

Thickets on hills, valleys; 1800–2700 m. Xizang [Afghanistan, Bangladesh, Bhutan, India (Sikkim), Nepal, Pakistan].

30. *Isodon grandifolius* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 234. 1985.

大叶香茶菜 da ye xiang cha cai

Shrubs much branched, 1.2–1.8 m tall. Branches densely stellate tomentose, glabrescent. Stem leaves opposite; petiole 1–2.5 cm, densely yellow stellate tomentose; leaf blade triangular-ovate to oblong, rarely obovate, 3–8 × 1–2.5 cm, papery, rugulose, adaxially olive green, densely stellate pilose, abaxially densely stellate tomentose, base rounded to truncate-rounded, margin crenulate, apex acute to subobtuse. Panicles terminal or axillary, pyramidal, very compact; cymes sessile or pedunculate. Pedicel 1–2 mm, tomentose. Calyx campanulate, ca. 2.5 mm; teeth subequal, ca. 1/2 as long as calyx, triangular, apex acuminate. Corolla pale blue, 6–7 mm, straight, limb sparsely stellate pilose outside. Stamens exerted. Style exerted. Nutlets unknown. Fl. Sep.

- Thickets, meadows, along water courses; 2700–3300 m. Sichuan, Yunnan.

- 1a. Leaves ovate-lanceolate, rarely obovate; cymes sessile 30a. var. *grandifolius*
- 1b. Leaves triangular-ovate to oblong; cymes ± pedunculate 30b. var. *atuntzeensis*

30a. *Isodon grandifolius* var. *grandifolius*

大叶香茶菜 da ye xiang cha cai

Plectranthus grandifolius Handel-Mazzetti, Acta Horti Gothob. 13: 371. 1939; *Rabdosia grandifolia* (Handel-Mazzetti) H. Hara.

Leaves ovate-lanceolate, rarely obovate. Cymes sessile.

- Thickets, along water courses; 3000–3300 m. Yunnan.

30b. *Isodon grandifolius* var. *atuntzeensis* (C. Y. Wu) H. W. Li, J. Arnold Arbor. 69: 342. 1988.

德钦变种 de qin bian zhong

Rabdosia grandifolia (Handel-Mazzetti) H. Hara var. *atuntzeensis* C. Y. Wu, Fl. Yunnan. 1: 783. 1977.

Leaves ovate, triangular-ovate, to oblong. Cymes ± pedunculate.

- Hillside meadows; 2700 m. Sichuan, Yunnan.

31. *Isodon oresbius* (W. Smith) Kudô, Mem. Fac. Sci. Agr. Taihoku 2: 120. 1929.

山地香茶菜 shan di xiang cha cai

Plectranthus oresbius W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 118. 1916; *Rabdosia oresbia* (W. Smith) H. Hara.

Shrubs to 60 cm, much branched. Branches subglabrous, bark peeling, branchlets densely gray stellate tomentulose. Petiole ca. 3 mm; leaf blade ovate, 0.7–1.5 cm × 5–13 mm, papery, corrugate, adaxially stellate villous, simple hairy, abaxially gray stellate tomentulose, base rounded to shallowly cordate, margin crenate, apex obtuse, lateral veins 3- or 4-paired. Panicles terminal, densely gray stellate tomentulose; cymes few, pedunculate, 3–5-flowered; floral leaves similar to stem leaves, reduced apically, margin entire; bracteoles linear, to 2 mm. Calyx campanulate, ca. 4 × 3.5–4 mm, whitish stellate villous, simple tomentose mainly on tube; teeth subequal, narrowly triangular, ca. 2 mm, ca. 1 mm wide at base. Corolla purplish or purple-blue, stellate pilose, tube slightly exerted, limb 2-lipped; upper lip almost as long as lower, ca. 3.5 mm. Stamens included. Style included. Nutlets unknown. Fl. Jul-Sep.

- Open dry rocky areas, thickets; 2100–3400 m. Sichuan, Yunnan.

Used medicinally.

32. *Isodon dawoensis* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 233. 1985.

道孚香茶菜 dao fu xiang cha cai

Plectranthus dawoensis Handel-Mazzetti, Acta Horti Gothob. 13: 371. 1939; *Rabdosia dawoensis* (Handel-Mazzetti) H. Hara.

Shrubs to 25 cm, branched. Branchlets gray stellate tomentulose. Petiole 2–8 mm; leaf blade ovate to ovate-triangular, 1–2.5 × 0.6–1.7 cm, papery, adaxially corrugate, densely scaly-pilose, abaxially densely stellate tomentulose, base cuneate to truncate-cuneate, margin coarsely crenate except at base, with an obscure gland at tooth apex, apex acute to obtuse, lateral veins 3- or 4-paired. Panicles spikelike, 2–7 cm, whitish or greenish stellate, minutely tomentulose; cymes 3–5-flowered; bracts sessile, ovate-lanceolate to lanceolate, basally leaflike; bracteoles minute, linear. Pedicel 1–2 mm. Calyx funnelform, ca. 2 mm, whitish stellate tomentose; teeth equal, triangular, ca. 1/2 as long as calyx, apex acute. Corolla white, 7–9 mm, pilose, tube ca. 3 mm. Stamens included. Style included. Nutlets unknown. Fl. Sep.

- Hilly loess; 3000 m. Sichuan.

33. *Isodon lihsienensis* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 235. 1985.

理县香茶菜 li xian xiang cha cai

Rabdosia lihsienensis C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 586. 1977.

Shrubs ca. 1 m. Branches yellowish gray; branchlets yellow brownish, pubescent. Petiole 5–13 mm, pubescent;

leaf blade ovate, 1.5–3.5 × 1–2.8 cm, papery, adaxially dusty pubescent, abaxially densely whitish floccose-tomentulose, base broadly cuneate to truncate-cuneate, margin crenate, apex obtuse. Panicles terminal, 1.4–4.5 cm, puberulent; cymes 1–4-flowered; lower floral leaves similar to stem leaves, margin entire; upper floral leaves bractlike, ovate to rhombic, 4–6 × 2.5–4 mm; bracteoles linear, less than 1 mm. Calyx campanulate, ca. 3.5 × 4 mm, minutely glandular hairy, floccose-puberulent especially at base and margins, 2-lipped; teeth slightly longer than calyx tube, triangular-lanceolate, apex acuminate. Corolla purplish with purple spots, ca. 9 mm, sparsely puberulent outside, tube ca. 4.5 mm, limb 2-lipped; upper lip almost as long as lower, ca. 4.5 mm. Stamens included. Style included. Nutlets unknown. Fl. Jul-Sep.

- Forests; 2500 m. Sichuan.

34. *Isodon wikstroemioides* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 237. 1985.

尧花香茶菜 rao hua xiang cha cai

Plectranthus wikstroemioides Handel-Mazzetti, Acta Horti Gothob. 13: 369. 1939; *Rabdosia wikstroemioides* (Handel-Mazzetti) H. Hara.

Shrubs 0.6–1.5 m, much branched. Branches grayish brown, glabrescent; branchlets brown, densely glandular tomentulose. Petiole 1–4 mm, densely tomentulose, glandular; leaf blade lanceolate to oblanceolate, 0.8–1.5 cm × 5–7 mm, papery, adaxially densely tomentulose, papillate glandular, abaxially gray, densely floccose-tomentose, yellowish glandular, base broadly cuneate to ± truncate, abruptly attenuate, margin entire to obscurely few dentate above middle, apex acute to rounded, lateral veins 3–5-paired. Cymes axillary, shorter than floral leaves, pedunculate, 3–5-flowered; peduncle densely glandular, tomentulose; upper floral leaves gradually smaller, narrower. Pedicel 1–3 mm, densely glandular, tomentulose. Calyx campanulate, ca. 4 mm, densely glandular tomentose, 10-veined; teeth subequal, narrowly triangular, ca. 1/3 as long as calyx, apex acute; fruiting calyx tubular-campanulate, ca. 6 mm, conspicuously veined. Corolla purplish or yellowish white, ca. 7 mm, whitish puberulent outside; tube straight, ca. 3 mm. Stamens included. Style included. Nutlets dark brown, triquetrous, oblong, to 1.5 mm, glabrous. Fl. and fr. Aug-Oct.

- Hills, valleys, thickets; 2300–3200 m. Sichuan, Xizang, Yunnan.

35. *Isodon smithianus* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 237. 1985.

马尔康香茶菜 ma er kang xiang cha cai

Plectranthus smithianus Handel-Mazzetti, Acta Horti Gothob. 9: 93. 1934; *Rabdosia smithiana* (Handel-Mazzetti) H. Hara.

Shrubs 50–100 cm. Branchlets yellow-brown, sparsely minutely pubescent or glabrescent. Petiole 0.3–2.4 cm; leaf blade rhombic-ovate to ovate, 2.5–4 × 0.9–2 cm, thin papery, adaxially papillate, glandular, sparsely hirtellous especially along margin, abaxially puberulent, base cuneate to truncate, margin sparsely coarse crenate to crenate-dentate, apex obtuse, lateral veins 3- or 4-paired. Panicles terminal, racemose; cymes pedunculate, 1–7-flowered; floral leaves and bracts entire; bracteoles linear, ca. 1 mm. Pedicel 2–6

mm. Calyx campanulate, ca. 3 × 3 mm, gray tomentulose, 2-lipped nearly to middle; teeth subequal, ovate-triangular; fruiting calyx ca. 5 mm, slightly curved, conspicuously veined. Corolla white on upper lip, purple-red on lower, 7–9 mm, pubescent outside, limb 2-lipped; upper lip as long as lower lip, ca. 4 mm. Stamens and style slightly exerted. Nutlets yellow-brown, triquetrous, ovoid, ca. 1.5 mm, glabrous. Fl. Jul-Sep.

- Thickets; 2600–3500 m. Sichuan, Xizang.

36. *Isodon parvifolius* (Batalin) H. Hara, J. Jap. Bot. 60: 236. 1985.

小叶香茶菜 xi ye xiang cha cai

Caryopteris parvifolia Batalin, Trudy Imp. S. Peterburgsk. Bot. Sada 13: 98. 1893; *Isodon discolor* (Dunn) Kudô; *Plectranthus discolor* Dunn; *P. parvifolius* (Batalin) P'ei; *Rabdosia parvifolia* (Batalin) H. Hara.

Shrubs 50–100 cm, much branched. Branches slender, yellowish gray, glabrescent, branchlets appressed whitish tomentulose. Petiole 2–12 mm; leaf blade oblong-ovate to broadly ovate, 4–15 × 4–14 mm, papery, adaxially minutely glandular pubescent, abaxially densely appressed gray tomentulose, base short truncate-attenuate, margin entire or coarsely crenate, apex rounded, lateral veins 3- or 4-paired. Cymes axillary, widely spaced, 1–7-flowered, 0.8–2.3 cm, pedunculate; peduncle 2–12 mm. Calyx campanulate, ca. 3 × 3 mm, densely whitish tomentulose, slightly 2-lipped; teeth ovate-triangular, subequal, slightly longer than calyx tube, lower 2 slightly longer; fruiting calyx dilated. Corolla purplish, ca. 9 mm, pilose, tube ca. 4 mm. Stamens and style slightly exerted. Nutlets brown, glabrous. Fl. Jun-Oct, fr. Jul-Nov.

- Dry thickets; 1600–2800 m. Gansu, Shaanxi, Sichuan, Xizang.

37. *Isodon tenuifolius* (W. Smith) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 119. 1929.

细叶香茶菜 xi ye xiang cha cai

Plectranthus tenuifolius W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 118. 1916; *Rabdosia tenuifolia* (W. Smith) H. Hara.

Shrubs to 1 m, much branched. Branchlets densely minutely gray tomentose. Petiole 3–5 mm; leaf blade lanceolate to ovate-lanceolate, 0.8–2 cm × 5–10 mm, papery, adaxially densely pilose, abaxially very densely minutely gray tomentose, base cuneate to rounded, margin remotely crenulate-serrulate above middle to entire, apex acute or slightly acute; lateral veins 3- or 4-paired, yellowish white adaxially. Cymes axillary, pedunculate, 5–7-flowered, shorter than subtending leaves, in terminal panicles to 20 cm; upper floral leaves reduced, ± equal to cymes, margin entire; bracteoles linear, ca. 1 mm, densely gray tomentulose. Calyx campanulate, to 3 mm, densely gray tomentulose outside; teeth subequal, triangular, ca. 1/3 as long as calyx, apex acute. Corolla whitish purplish, whitish rose, or purplish, ca. 7 mm, pilose; tube ca. 3 mm, straight. Stamens included. Style included. Nutlets unknown. Fl. Sep.

- Thickets; 1900–3000 m. Sichuan, Yunnan.

38. *Isodon hirtellus* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 234. 1985.

细毛香茶菜 xi mao xiang cha cai

Plectranthus hirtellus Handel-Mazzetti, Acta Horti Gothob. 13: 370. 1939; *Rabdosia hirtella* (Handel-Mazzetti) H. Hara.

Shrubs or subshrubs 1–1.5 m. Stems erect, much branched; branches yellow brownish, glabrous; branchlets densely spreading hirtellous. Petiole to 1 cm; leaf blade ovate to broadly ovate, 1–3 × 0.7–2.5 cm, papery, adaxially densely hirtellous, abaxially densely gray tomentulose or hirtellous, glandular, sometimes glabrescent, base truncate to broadly cuneate-attenuate, margin crenulate-serrulate above base, apex acute to obtuse. Panicles narrow, terminal or axillary, 7–15 cm, densely gray hirtellous; cymes sessile or short pedunculate, 3–5-flowered; floral leaves subcircular, 4–15 mm wide, gradually reduced, upper floral leaves bractlike; bracteoles linear, ca. 1 mm. Calyx campanulate, ca. 3 mm, densely hirtellous, subequally 5-toothed to slightly 2-lipped; teeth triangular, ca. 1/2 as long as calyx, apex acute; fruiting calyx tubular-campanulate, ca. 4 mm, conspicuously veined. Corolla whitish purplish or bluish purple, to 5 mm, densely pilose, tube ca. 2.5 mm; upper lip ca. 1.5 mm, lower lip ca. 2.5 mm. Stamens included. Style slightly exerted. Nutlets unknown. Fl. Jun-Oct.

- Sunny slopes; 800–1300 m. Sichuan, Yunnan.

39. *Isodon rubescens* (Hemsley) H. Hara, J. Jap. Bot. 60: 236. 1985.

碎米桫 sui mi ya

Plectranthus rubescens Hemsley, J. Linn. Soc., Bot. 26: 273. 1890; *Isodon henryi* (Hemsley) Kudô var. *dichromophyllus* (Diels) Kudô; *I. ricinispermus* (Pampanini) Kudô; *P. dichromophyllus* Diels; *P. ricinispermus* Pampanini; *Rabdosia dichromophylla* (Diels) H. Hara; *R. ricinisperma* (Pampanini) H. Hara; *R. rubescens* (Hemsley) H. Hara.

Shrubs (30–)50–100(–120) cm. Stems numerous, erect, brownish gray, glabrous, much branched apically; branchlets reddish, densely tomentose. Petiole 1–3.5 cm; leaf blade ovate to rhombic-ovate, 2–6 × 1.3–3 cm, membranous to papery, adaxially sparsely pilose, glandular, or subglabrous, abaxially densely gray tomentulose to subglabrous, base broadly cuneate, margin coarsely crenate-serrate, apex acute to acuminate; lateral veins 3- or 4-paired, reddish. Panicles terminal, narrow, 6–15 cm, densely pubescent; cymes pedunculate, 3–5(–7)-flowered; floral leaves gradually reduced toward apex, mostly shorter than cymes, margin remotely serrate or subentire; bracteoles subulate-linear to linear, to 1.5 mm, pubescent. Calyx campanulate, 2.5–3 mm, densely gray pubescent, glandular, conspicuously reddish, 10-veined, slightly 2-lipped; teeth ovate-triangular, ca. 1/2 as long as calyx; fruiting calyx dilated, 4–5 mm, tubular-campanulate, slightly curved. Corolla 7(–12) mm, sometimes ca. 5 mm in pistillate flowers, pubescent, glandular, tube 3.5–5 mm. Stamens exerted. Style exerted. Nutlets brownish, triquetrous, ovoid, ca. 1.3 mm, glabrous. Fl. Jul-Oct, fr. Aug-Nov.

- Thickets, forests, stony slopes, dry areas; 100–2800 m. Anhui, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Shanxi, Sichuan, Zhejiang.

40. *Isodon loxothyrsus* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 235. 1985.

弯锥香茶菜 wan zhui xiang cha cai

Plectranthus loxothyrsus Handel-Mazzetti, Acta Horti Gothob. 13: 372. 1939; *Rabdosia loxothyrsa* (Handel-Mazzetti) H. Hara.

Shrubs 1–1.6 m tall, much branched. Branches glabrescent, branchlets gray tomentulose. Petiole 1–2.5 cm, sometimes narrowly winged; leaf blade ovate-lanceolate, 3.5–6(–10) × 1.5–2.5(–4) cm, papery, adaxially rugulose, gray tomentulose on veins, abaxially ± tomentulose or pubescent, base cuneate to rounded-cuneate and abruptly attenuate, margin crenate-dentate above base, apex acuminate, lateral veins 3-paired. Panicles narrow, terminal and axillary, 3–15 cm, gray tomentulose; cymes 5–7-flowered; bracts ovate-lanceolate, 5–10 mm, margin entire. Calyx campanulate, 2–2.5 mm, densely gray tomentulose, slightly 2-lipped; teeth ovate-triangular, slightly shorter than calyx tube, apex obtuse to acute; fruiting calyx tubular-campanulate, 4–5 mm, slightly incurved. Corolla pink, yellowish, to white, 6–10 mm, pilose, glandular, tube 3–5 mm. Stamens included or slightly exerted. Style very exerted. Nutlets brown, ovoid, ca. 1 mm, glabrous. Fl. Jul-Oct, fr. Aug-Nov.

• Thickets, forests, grassy hills, streamsides; 1400–3300 m. Sichuan, Xizang, Yunnan.

41. *Isodon xerophilus* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 237. 1985.

旱生香茶菜 han sheng xiang cha cai

Rabdosia xerophila C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 787. 1977.

Shrubs ca. 1 m. Stems much branched; branches wandlike, gray-brown, glabrescent; branchlets dull yellow, ± purplish, densely antrorse dull yellow velutinous. Petiole 1–3 mm, purplish; leaf blade ovate-oblong, 1–2.5 × 0.5–1.5 cm, papery, adaxially rugulose and pubescent, abaxially gray, purplish along veins, very densely velvety-pubescent, base rounded, margin crenulate above base, apex acute, lateral veins ca. 4-paired. Panicles narrow, 3.5–10 cm, terminal and axillary, antrorse hairy; cymes pedunculate, 3–5-flowered; floral leaves shorter than cymes, ovate, margin serrulate, apex acuminate. Pedicel 3–4 mm. Calyx campanulate, ca. 3 mm, densely pubescent, slightly 2-lipped; teeth subequal, broadly triangular, ca. 1/3 as long as calyx, lower 2 slightly larger, apex acute; fruiting calyx ca. 4 mm, tubular-campanulate, horizontal or slightly upwardly curved, purplish. Corolla to 8 mm, pubescent, tube ca. 3 mm, upper lip ca. 3 mm, lower lip ca. 5 mm. Stamens included or slightly exerted. Style included. Nutlets yellowish brown, ovoid, ca. 1 mm, glabrous. Fl. Oct-Nov, fr. Nov-Dec.

• Sunny slopes; 1000–1300 m. Yunnan (Shiping Xian).

42. *Isodon rugosiformis* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 236. 1985.

类皱叶香茶菜 lei zhou ye xiang cha cai

Plectranthus rugosiformis Handel-Mazzetti, Kaiserl. Akad. Wiss. Wien. Math.-Naturwiss. Kl., Anz. 62: 237. 1925; *Rabdosia rugosiformis* (Handel-Mazzetti) H. Hara.

Subshrubs 0.8–1.2 m. Stems wandlike, much branched; branches ± glabrescent; branchlets yellowish brown, densely

gray tomentulose. Petiole 3–15 mm; leaf blade rhombic to triangular-ovate, 1.5–4 × 1–2.5 cm, thin papery, glandular, adaxially dark green, densely gray puberulent mainly on veins, abaxially densely gray tomentulose, base broadly cuneate to truncate, margin crenate, apex acute to short caudate-acuminate; lateral veins ca. 4-paired. Panicles spikelike, terminal, densely gray tomentulose; cymes contiguous, pedunculate, sometimes compact, 3–5-flowered; floral leaves ovate-lanceolate, 0.5–1.5 cm, margin subentire. Pedicel 2–3 mm. Calyx campanulate, to ca. 3 mm, gray tomentulose outside, slightly 2-lipped; teeth ovate-triangular, subequal, ca. 1/2 long as calyx, lower 2 slightly longer; fruiting calyx slightly dilated. Corolla purple or purplish blue, ca. 7 mm, puberulent, upper lip ca. 2 mm, lower lip ca. 4 mm. Stamens (at least upper) slightly exerted. Style exerted. Nutlets brown, triquetrous, ellipsoid, ca. 1.3 mm, glabrous. Fl. and fr. Sep-Oct.

• Thickets on hilly slopes, valleys, rocky areas; 1900–2500 m. Yunnan.

43. *Isodon flexicaulis* (C. Y. Wu & H. W. Li.) H. Hara, J. Jap. Bot. 60: 234. 1985.

柔茎香茶菜 rou jing xiang cha cai

Rabdosia flexicaulis C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 587. 1977.

Shrubs to 1 m. Stems slender, ascending, yellowish brown, densely glandular, pubescent and pilose, much branched, branches and branchlets flexuous. Leaves opposite; petiole slender, 1.5–3 cm; leaf blade triangular-ovate, 2–4 × 1.3–2.8 cm, ± membranous, adaxially sparsely pilose, yellowish glandular, abaxially sparingly glandular, pilose on veins, base broadly truncate to ± truncate, margin dentate, apex acute, lateral veins 4-paired. Panicles terminal, ca. 10 cm, densely pubescent; cymes pedunculate, 3–5-flowered, glandular; floral leaves and bracts acute, margin crenate or subentire. Calyx campanulate, ca. 3 mm, pubescent, glandular, slightly 2-lipped; teeth ovate-triangular, ca. 1.5 mm, lower 2 slightly longer, apex acute, ciliolate; fruiting calyx tubular-campanulate, dilated to 7 mm, upwardly curved. Corolla white or pink, to 1.1 cm, sparsely pubescent, glandular, tube ca. 5 mm, upper lip ca. 4 mm, lower lip ca. 6 mm. Stamens included. Style included. Nutlets triquetrous, ellipsoid, ca. 2 mm, yellowish, with yellowish white marks. Fl. and fr. Sep.

• Thickets, valleys; 2100–2400 m. Sichuan, Yunnan.

44. *Isodon glutinosus* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 234. 1985.

胶粘香茶菜 jiao zhan xiang cha cai

Rabdosia glutinosa C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 788. 1977.

Shrubs 0.7–1.5 m. Stems and branches gray, subglabrous; branchlets purplish, densely puberulent, glandular. Petiole 2.5–14 mm; leaf blade truncate-ovate to subcircular, 0.7–2 × 0.6–2.1 cm, papery, glandular puberulent, base rounded, margin crenate-serrate, apex obtuse to acute. Racemes terminal on upper branchlets, forming a complex panicle, puberulent, glandular; cymes lax, many flowered; floral leaves sessile, gradually reduced upward, margin entire. Pedicel 3–5 mm. Calyx campanulate, ca. 3 × 3.5 mm, densely glandular puberulent, glandular,

slightly 2-lipped; teeth subequal, ovate, ca. 1/2 as long as calyx; fruiting calyx dilated to ca. 5 mm. Corolla purplish, ca. 7 mm, tube ca. as long as calyx, upper and lower lips ca. 4 mm. Stamens included. Style much exerted. Nutlets unknown.

- Grassy slopes; 2000–2300 m. Sichuan, Yunnan.

45. *Isodon medilungensis* (C. Y. Wu & H. W. Li) H. Hara, *J. Jap. Bot.* 60: 235. 1985.

麦地龙香茶菜 mai di long xiang cha cai

Rabdosia medilungensis C. Y. Wu & H. W. Li, *Fl. Reipubl. Popularis Sin.* 66: 587. 1977.

Shrubs ca. 60 cm, much branched. Branches brown, glabrescent; branchlets slender, densely gray puberulent. Petiole 3–10 mm; leaf blade ovate to subrhomboid-ovate, 1–3 × 0.6–1.4 cm, papery, adaxially rugulose, base broadly cuneate, margin crenate-serrate or entire, apex acute, puberulent, glandular, lateral veins 4- or 5-paired. Cymes axillary, 3–5-flowered, densely puberulent; peduncle ca. 2 mm; floral leaves reduced toward apex, subsessile, margin subentire. Pedicel 1–2 mm. Calyx campanulate, ca. 4 mm, densely puberulent on teeth; teeth subequal, lanceolate, to ca. 2.5 mm, apex spiny acute, densely white pilose inside. Corolla white, ca. 6 mm, pilose, tube 2.5 mm. Stamens included. Style slightly exerted. Nutlets unknown. Fl. Jun–Jul.

- Thickets; 2000 m. Sichuan (Muli Xian).

46. *Isodon pharicus* (Prain) Murata, *Acta Phytotax. Geobot.* 16: 15. 1955.

川藏香茶菜 chuan zang xiang cha cai

Plectranthus pharicus Prain, *J. Asiat. Soc. Bengal*, Pt. 2, *Nat. Hist.* 59: 297. 1891; *Rabdosia pseudoirrorata* C. Y. Wu; *R. pseudoirrorata* var. *centellaefolia* C. Y. Wu; *R. sinuolata* C. Y. Wu & H. W. Li.

Shrubs tufted, much branched, 30–50 cm. Branchlets brownish gray, appressed puberulent. Leaves opposite; petiole 1–4 mm; leaf blade oblong-lanceolate, ovate, to broadly ovate, 0.7–2.5 × 0.6–2.2 cm, papery, densely appressed puberulent, glandular, base cuneate-attenuate, margin 4–6-toothed, apex obtuse, lateral veins 3- or 4-paired. Racemes poorly defined; cymes 3–7-flowered, appressed puberulent; peduncle 3–15 mm; upper floral leaves gradually reduced. Pedicel 2–3 mm. Calyx campanulate, ca. 3 × 3.2 mm, puberulent, glandular, limb slightly shorter than calyx tube, slightly 2-lipped; teeth ovate, lower 2 slightly longer, apex mucronate. Corolla purplish, ca. 9 mm, puberulent outside, middle pubescent inside, tube ca. 4 mm, upper lip ca. 3 mm, lower lip to 5 mm. Stamens included. Style included or slightly exerted. Nutlets gray, ovoid-oblong, ca. 1.6 × 1.1 mm. Fl. and fr. Jul–Sep.

- Thickets, rocky dry open slopes, forest margins; 2300–4300(–5400) m. Sichuan, Xizang.

47. *Isodon mucronatus* (C. Y. Wu & H. W. Li) H. Hara, *J. Jap. Bot.* 60: 235. 1985.

突尖香茶菜 tu jian xiang cha cai

Rabdosia mucronata C. Y. Wu & H. W. Li, *Fl. Reipubl. Popularis Sin.* 66: 588. 1977.

Shrubs or perennial herbs, ca. 1 m tall. Stems erect, much branched; branches gray-brown, glabrescent; branchlets yellowish, densely glandular pubescent. Petiole 0.5–1.5 cm, densely glandular pubescent; leaf blade ovate to circular-ovate, 3–5.5 × 2.5–3.5 cm, papery, adaxially densely hirtellous, abaxially scattered yellowish glandular, hirtellous on veins, base broadly cuneate to shallowly cordate, margin crenate-serrate, apex acute; lateral veins 4-paired, yellowish white abaxially. Panicles narrow, terminal, 6–12 cm; cymes pedunculate, 5–7-flowered, densely glandular pubescent; floral leaves gradually reduced toward apex. Calyx campanulate, ca. 4 mm, glandular pubescent, slightly 2-lipped; teeth triangular, ca. 1.5 mm, apex mucronate. Corolla tube ca. 3.5 mm, upper lip ca. 3 mm, lower lip ca. 4.5 mm. Stamens included. Style slightly exerted. Nutlets brown, triquetrous, ellipsoid, ca. 2 mm, glabrous. Fl. and fr. Sep–Oct.

- Sunny, grassy slopes; 2100 m. Sichuan (Muli Xian).

48. *Isodon silvaticus* (C. Y. Wu & H. W. Li) H. W. Li, *J. Arnold Arbor.* 69: 358. 1988.

林生香茶菜 lin sheng xiang cha cai

Rabdosia silvatica C. Y. Wu & H. W. Li, *Fl. Reipubl. Popularis Sin.* 66: 588. 1977.

Subshrubs. Stems erect, yellow-brown, densely gray pubescent. Leaves opposite; petiole 5–10 mm; leaf blade ovate, 3–5 × 1–3 cm, papery, adaxially sparsely hirtellous, abaxially yellowish glandular, sparsely pubescent on veins, base broadly cuneate to rounded, margin coarsely crenate-serrate, apex acuminate, lateral veins 4-paired. Panicles terminal and axillary, 5–9 cm, densely pubescent; cymes pedunculate, 3-flowered; floral leaves ovate, margin crenate, serrate, or subentire. Pedicel ca. 2 mm. Calyx campanulate, ca. 4 × 3 mm, densely pubescent, glandular, slightly 2-lipped; teeth ca. 2 mm, ovate-triangular, apex acute; fruiting calyx tubular-campanulate, dilated to 6.5 mm, slightly curved. Corolla ca. 7 mm, pubescent, tube ca. 3.5 mm, upper lip ca. 2.5 mm, lower lip ca. 3.5 mm. Stamens included. Style exerted. Nutlets yellow-brown, triquetrous, oblong, ca. 1.8 mm, glabrous. Fl. and fr. Aug–Sep.

- Forests; 4000 m. Xizang.

49. *Isodon pleiophyllus* (Diels) Kudô, *Mem. Fac. Sci. Taihoku Imp. Univ.* 2: 121. 1929.

多叶香茶菜 duo ye xiang cha cai

Shrubs 1–1.5 m. Stems erect, much branched; branches gray-brown, glabrescent; branchlets brownish, densely glandular pubescent. Leaves opposite; petiole 1–3 mm; leaf blade ovate to subcircular, 1.5–4.5 × 1.5–3 cm, sparsely minutely glandular pubescent, yellowish glandular, base broadly cuneate to rounded, margin serrate, apex acute or obtuse to rounded and mucronate, lateral veins 4- or 5-paired. Panicles terminal, ca. 10 cm, densely glandular pubescent; cymes long pedunculate, 3–7(–11)-flowered; floral leaves and bracts subcircular, margin entire or remotely serrate, apex apiculate. Calyx broadly campanulate, ca. 4–5 × to 4 mm, purplish, glandular pubescent, 2-lipped; teeth narrowly triangular to ovate-triangular, ca. 1.5–2.5 mm, lower 2 slightly longer, apex acute; fruiting calyx tubular-campanulate, curved, dilated to 6 mm. Corolla 8–10 mm, bluish, blue-purple, or dark blue, limb slightly pubescent

outside, tube ca. 4 mm, upper lip ca. 2.5 mm, lower lip ca. 4 mm. Stamens included. Style included. Nutlets brownish, triquetrous, ellipsoid, ca. 1.2 mm, glabrous. Fl. Jun-Aug, fr. Sep.

- Thickets, forests; 2800–3500 m. Yunnan.

- 1a. Calyx ca. 4 mm; teeth ovate-triangular, less than 2 mm; corolla ca. 8 mm 49a. var. *pleiophyllus*
1b. Calyx to 5 mm; teeth narrowly triangular, ca. 2.5 mm; corolla to 10 mm 49b. var. *dolichodens*

49a. *Isodon pleiophyllus* var. *pleiophyllus*

多叶香茶菜 duo ye xiang cha cai

Plectranthus pleiophyllus Diels, Notes Roy. Bot. Gard. Edinburgh 5: 228. 1912; *Rabdosia pleiophylla* (Diels) C. Y. Wu & H. W. Li.

Calyx ca. 4 mm, teeth ovate-triangular, less than 2 mm. Corolla ca. 8 mm.

- Thickets on slopes, pine forests; 2800–3500 m. Yunnan.

49b. *Isodon pleiophyllus* var. *dolichodens* (C. Y. Wu & H. W. Li) H. W. Li, J. Arnold Arbor. 69: 360. 1988.

长齿变种 chang chi bian zhong

Rabdosia pleiophylla (Diels) H. Hara var. *dolichodens* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 790. 1977.

Calyx to 5 mm, teeth narrowly triangular, ca. 2.5 mm. Corolla to 1 cm.

- Thickets on limestone mountains; 2900–3200 m. Yunnan (Lijiang Xian).

50. *Isodon interruptus* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 234. 1985.

间断香茶菜 jian duan xiang cha cai

Rabdosia interrupta C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 775. 1977; *Isodon kunmingensis* (C. Y. Wu & H. W. Li) H. Hara; *R. kunmingensis* C. Y. Wu & H. W. Li.

Shrubs erect, ca. 1.3 m. Branchlets brown, densely retrorse whitish pilose. Leaves opposite; petiole 2–10 mm; leaf blade ovate-oblong, broadly obovate, to subcircular, (2.5–)5.5–7.5 × (1.2–)4.5–5 cm, papery, adaxially sparsely puberulent, glandular, abaxially white pilose along veins, base cuneate to broadly cuneate, margin irregularly coarsely crenate, apex acute to emarginate and mucronate; lateral veins 2- or 3(–5)-paired, sometimes radiate ca. 1/3 from base. Panicles spikelike, (4–)10–30 cm, interrupted, densely pilose; cymes pedunculate, 4–16-flowered; floral leaves gradually reduced toward apex, ovate to ovate-lanceolate, usually longer than cymes, margin entire. Pedicel 2–3 mm. Calyx tubular-campanulate, ca. 2.5 × less than 2 mm, densely pubescent; teeth subequal, ovate-lanceolate, divided to below middle. Corolla yellowish white, ca. 5 mm, puberulent outside, upper lip erect, lower lip to 3 mm. Stamens included. Style included. Nutlets unknown. Fl. Aug–Sep.

- Streamsides in alder forests; 2200 m. Yunnan.

51. *Isodon barbeyanus* (H. Léveillé) H. W. Li, J. Arnold Arbor. 69: 362. 1988.

线齿香茶菜 xian chi xiang cha cai

Leucas barbeyana H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 247. 1911; *Plectranthus drogotschiensis* Handel-Mazzetti; *Rabdosia drogotschiensis* (Handel-Mazzetti) H. Hara.

Subshrubs to 1.5 m. Stems erect, much branched, branches brown; branchlets slender, ± densely gray stellate tomentulose. Petiole 5–14 mm; leaf blade rhombic to triangular-ovate, 1.5–3(–6) × 1–2.5(–4.5) cm, papery, adaxially corrugate, sparsely pilose, abaxially ± densely gray stellate tomentulose, base subtruncate to broadly cuneate or rarely attenuate, margin crenate to dentate, apex acute to subobtusate, lateral veins 3- or 4-paired. Panicles terminal or axillary, 4–18 cm, interrupted toward base; cymes pedunculate, 3–5(–7)-flowered; floral leaves subsessile, longer than cymes basally, broadly ovate-triangular, margin crenate; upper floral leaves ca. as long as cymes, ± lanceolate, margin entire. Pedicel 2–3.5 mm. Calyx campanulate, ca. 3 mm, densely gray tomentulose; teeth narrowly lanceolate, ca. 1/2 as long as calyx, apex filiform-acuminate; fruiting calyx broadly campanulate, dilated to 5 mm, subglabrous. Corolla purplish, 5–6 mm, densely pilose, sparsely glandular, tube ca. 3 mm. Stamens and style included or slightly exerted. Nutlets yellow-brown, ovoid, ca. 1.5 mm, glabrous. Fl. Jul–Sep, fr. Sep–Oct.

- Thickets on sunny slopes; 2500–3200 m. Sichuan.

52. *Isodon scoparius* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 236. 1985.

帚状香茶菜 zhou zhuang xiang cha cai

Rabdosia scoparia C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 777. 1977.

Shrubs 40–100 cm. Branches slender, erect, gray-brown; branchlets reddish brown, densely glandular pubescent. Leaves subsessile, subcircular to ovate-oblong, 1.2–1.8 × 0.6–1.8 cm, ± leathery, glabrous, sparingly yellowish glandular, strongly netted, base rounded, margin serrate, apex obtuse to acute. Cymes on upper half of branchlets, 3–5-flowered, pedunculate, glandular pubescent; floral leaves ovate, margin entire, slightly longer than cymes, gradually reduced toward apex. Pedicel 1.5–3 mm. Calyx broadly campanulate, ca. 3.5 × 5 mm, densely glandular pubescent, slightly 2-lipped; teeth linear-lanceolate, 2.5–3 mm, lower 2 slightly longer; fruiting calyx slightly dilated. Corolla purplish, ca. 8 mm, sparsely pubescent outside, tube ca. 3 mm, upper lip ca. 3 mm, lower lip ca. 5 mm. Stamens exerted. Style exerted. Nutlets unknown. Fl. Jul–Aug.

- Pine forests on limestone mountains; 2300–2900 m. Yunnan (Zhongdian Xian).

53. *Isodon muliensis* (W. Smith) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 122. 1929.

木里香茶菜 mu li xiang cha cai

Plectranthus muliensis W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 218. 1920; *Rabdosia brachythyrsa* C. Y. Wu & H. W. Li; *R. chionantha* C. Y. Wu; *R. muliensis* (W. Smith) H. Hara.

Shrubs 1.5–3 m, much branched. Branches sub-cylindric, brown, sparsely gray, pubescent; branchlets dark brown, densely gray pubescent. Petiole 1–5.5 cm; leaf blade ovate to ovate-lanceolate, 5–11 × 2–6 cm, papery, adaxially rugulose, glabrous, gray pubescent on veins, abaxially sparsely yellowish glandular, gray tomentulose especially on veins,

base broadly cuneate, abruptly attenuate, margin crenate-dentate, apex ± acuminate, lateral veins 5-paired. Panicles spikelike, terminal and axillary, 2.5–7 cm, densely gray pubescent; cymes (3)–6–8(–11)-flowered; floral leaves bractlike, very conspicuous, lower ones larger, obovate, apex mucronate; upper floral leaves narrower, acuminate, ca. 1 cm. Calyx campanulate, 2–2.5 mm, densely pilose; teeth ovate-triangular, ca. 1/2 as long as calyx, white ciliate, apex acute; fruiting calyx campanulate-tubular, dilated to 4.5 mm, slightly curved. Corolla yellow-white tinged red, or white bluish, to 8 mm, sparsely pubescent, tube slightly longer than to as long as limb. Stamens included. Style included. Nutlets unknown. Fl. Aug-Sep, fr. Oct.

• Thickets on hilly slopes, thicket margins, forests, streamsides; 2300–3300 m. Sichuan (Muli Xian).

54. *Isodon setschwanensis* (Handel-Mazzetti) H. Hara, J. Jap. Bot. 60: 236. 1985.

四川香茶菜 si chuan xiang cha cai

Plectranthus setschwanensis Handel-Mazzetti, Symb. Sin. 7: 939. 1936; *Rabdosia setschwanensis* (Handel-Mazzetti) H. Hara; *R. setschwanensis* var. *yunghengensis* C. Y. Wu & H. W. Li; *R. taliensis* C. Y. Wu.

Shrubs 1–1.5 m. Branches slender, upright, gray; branchlets reddish brown, pubescent. Leaves opposite, narrowly rhombic-ovate, lanceolate, obovate, or ovate, 2.5–10 × 1–3.5 cm, papery, adaxially sparsely puberulent, glandular, abaxially greenish brown, yellowish glandular, base cuneate to attenuate, margin serrate or subcrenate-dentate, apex acute to short acuminate, lateral veins 3- or 4-paired. Panicles terminal, 1.5–13 cm, racemose, minutely appressed puberulent; cymes slightly crowded, 3–5(–11)-flowered; peduncle 2–5(–9) mm; floral leaves subsessile, lanceolate, lower ones ovate, margin entire, apex long acuminate, equal to or longer than cymes. Pedicel 2–5 mm. Calyx campanulate, 3–3.5 × 3.5–4 mm, sparsely glandular, appressed pilose; teeth narrowly lanceolate, subequal, ca. 1/2 as long as calyx, apex subulate; fruiting calyx dilated to 6 mm, pendulous, slightly curved. Corolla white with purple spots, 8–9 mm, pilose, sparsely glandular, tube ca. 5 mm. Stamens and style nearly included. Nutlets dark brown, ovoid, ca. 1.5 mm, smooth. Fl. Sep, fr. Oct.

• Forests, hills; 2100–3500 m. Sichuan, Yunnan.

55. *Isodon angustifolius* (Dunn) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 137. 1929.

狭叶香茶菜 xia ye xiang cha cai

Herbs perennial, 85–100 cm or more. Stems tufted, puberulent or glabrescent. Leaves opposite; petiole 1–3 mm, puberulent; leaf blade linear-oblong to lanceolate or oblanceolate, 2.2–9.5 × 1–2.4 cm, papery, base narrowly cuneate, margin serrate to subentire, apex acute to obtuse. Panicles terminal or axillary, spreading, to 20(–34) × ca. 10 cm, glandular puberulent; cymes 3–15(–23)-flowered; peduncle 0.4–2.5(–4.8) cm; lower floral leaves ovate-lanceolate to lanceolate, upper ones linear-lanceolate to linear. Calyx campanulate, ca. 4 × 3.5 mm, dull yellow hirtellous, sparsely yellow glandular; teeth ca. 2 mm; fruiting calyx tubular-campanulate, dilated to ca. 7 mm, slightly 2-lipped. Corolla blue, ca. 1.1 cm; upper lip as long as lower, ca. 4.5 mm. Stamens included. Style included. Nutlets purplish

brown, compressed to subglobose, ca. 1.8 mm in diam. Fl. Sep-Oct, fr. Oct-Nov.

• Slopes, forests; 1200–3300 m. Yunnan.

- 1a. Stem puberulent; leaves subglabrous or puberulent especially on midrib, sparsely yellow glandular; calyx teeth lanceolate-triangular 55a. var. *angustifolius*
- 1b. Stem glabrescent, purplish; leaves elliptic to oblong, glabrous, abaxially densely yellow glandular; calyx teeth ovate-triangular 55b. var. *glabrescens*

55a. *Isodon angustifolius* var. *angustifolius*

狭叶香茶菜 xia ye xiang cha cai

Plectranthus angustifolius Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 154. 1913; *Rabdosia angustifolia* (Dunn) H. Hara; *R. stenodonta* C. Y. Wu & H. W. Li.

Stems puberulent. Leaves puberulent especially on midvein or subglabrous, sparsely yellow glandular.

• Grassy slopes, pine forests; 1200–2600 m. Yunnan.

55b. *Isodon angustifolius* var. *glabrescens* (C. Y. Wu & H. W. Li) H. W. Li, J. Arnold Arbor. 69: 366. 1988.

无毛变种 wu mao bian zhong

Rabdosia angustifolia (Dunn) H. Hara var. *glabrescens* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 780. 1977.

Stems purplish, glabrescent. Leaves elliptic to oblong, glabrous with dense yellow glands abaxially. Calyx teeth ovate-triangular.

• Sparse pine forests, grassy slopes; 2800–3300 m. Yunnan.

56. *Isodon coetsa* (Buchanan-Hamilton ex D. Don) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 131. 1929.

细锥香茶菜 xi zhui xiang cha cai

Plants perennial herbs or subshrubs. Stems erect, 0.5–2 m tall, much branched. Stem leaves opposite; petiole 1–5.5 cm; leaf blade ovate, 3–9 × 1.5–6 cm, glandular, densely minutely hispid on veins, base broadly cuneate, margin crenate, apex acuminate, lateral veins 3-paired. Panicles 5–15 cm, narrow, terminal or axillary, pubescent; cymes pedunculate, 3–5-flowered; lower floral leaves sessile, ovate, upper floral leaves bractlike, ovate-lanceolate, shorter than pedicels. Pedicel 1–3 mm. Calyx campanulate, ca. 1.5 × 1.5 mm, pubescent outside, glandular, slightly 2-lipped; teeth ovate-triangular, ca. 1/3 as long as calyx, apex acute; fruiting calyx tubular-campanulate, dilated to ca. 4 mm, slightly curved, netted at apex. Corolla purple to purple-blue, ca. 6 mm, pubescent, tube ca. 2.5 mm, upper lip ca. 2.5 mm; lower lip broadly ovate, ca. 3.5 mm. Stamens included. Style included or slightly exerted. Nutlets brown, obovoid, ca. 1 mm wide, glabrous. Fl. and fr. Oct-Feb.

Slopes, streamsides, riverbanks, forest margins, thickets, forests; 600–2800 m. Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Xizang, Yunnan [Bangladesh, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

- 1a. Stem retrorse pubescent to subglabrous; leaves sparsely strigose to subglabrous, midrib and veins densely minutely hispid 56a. var. *coetsa*

1b. Stem densely puberulent; leaves densely pilose
adaxially, floccose-pilose abaxially
..... 56b. var. *cavaleriei*

56a. *Isodon coetsa* var. *coetsa*

细锥香茶菜 xi zhui xiang cha cai

Plectranthus coetsa Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 117. 1825; *Ocimum coetsa* (Buchanan-Hamilton ex D. Don) Sprengel; *P. leptobotrys* Diels; *P. maddenii* Benthham ex J. D. Hooker; *P. menthoides* Benthham; *P. polystachys* Sun ex C. H. Hu; *Rabdosia anisochila* C. Y. Wu; *R. coetsa* (Buchanan-Hamilton ex D. Don) H. Hara; *R. coetsoides* C. Y. Wu; *R. megathyrsoides* H. W. Li; *R. pluriflora* C. Y. Wu & H. W. Li; *R. polystachys* (Sun ex C. H. Hu) C. Y. Wu & H. W. Li; *R. polystachys* var. *phylloides* C. Y. Wu.

Stems retrorse pubescent or subglabrous. Leaves densely hispidulous along midvein and veins otherwise sparsely strigose or subglabrous.

Grassy slopes, streamsides, riverbanks, forest margins, thickets, pine forests, evergreen broad-leaved forests; 600–2800 m. Guangdong, Guangxi, Guizhou, Hunan, Sichuan, Xizang, Yunnan [Bangladesh, India (Sikkim), Laos, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam].

56b. *Isodon coetsa* var. *cavaleriei* (H. Léveillé) H. W. Li, J. Arnold Arbor. 69: 371. 1988.

多毛变种 duo mao bian zhong

Plectranthus cavaleriei H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 247. 1911; *Isodon cavaleriei* (H. Léveillé) Kudô; *P. coetsa* Buchanan-Hamilton ex D. Don var. *cavaleriei* (H. Léveillé) McKean; *P. macreei* Benthham; *P. mairei* H. Léveillé; *Rabdosia coetsa* (Buchanan-Hamilton ex D. Don) H. Hara var. *cavaleriei* (H. Léveillé) C. Y. Wu & H. W. Li.

Stems densely puberulent. Leaves densely-pilose adaxially, floccose-pilose abaxially.

Grassy slopes, streamsides, forest margins, forests, thickets; 1600–2300 m. Yunnan [India, Sri Lanka].

57. *Isodon phyllopodus* (Diels) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 135. 1929.

叶柄香茶菜 ye bing xiang cha cai

Plectranthus phyllopodus Diels, Notes Roy. Bot. Gard. Edinburgh 5: 227. 1912; *P. chenmui* Sun ex C. H. Hu; *P. leucanthus* Diels; *Rabdosia phyllopoda* (Diels) H. Hara.

Herbs perennial, 30–50 cm. Stems pubescent, leafless at base. Leaves triangular- to rhombic-ovate, 4–6 × 3–4 cm, thin papery, densely gray pilose, abaxially sparsely red glandular, base cuneate-decurrent, margin crenulate, apex obtuse, lateral veins 3-paired. Panicles terminal, lax, 5–20 cm, glandular puberulent; cymes pedunculate, 3–7-flowered; upper floral leaves bractlike, narrowly ovate to ovate-lanceolate, longer than peduncles, margin entire. Pedicel 2–3 mm. Calyx campanulate, ca. 4 mm, glandular pubescent, sparsely dark brown glandular, slightly 2-lipped; teeth ovate-triangular, lower 2 slightly longer, apex obtuse; fruiting calyx slightly dilated, conspicuously 2-lipped. Corolla white, with purple spots or bluish on upper lip, sparsely pubescent, red-brown

glandular, tube ca. 4 mm, upper lip ca. 3 mm, lower lip ca. 3.5 mm. Stamens and style slightly exerted. Nutlets yellowish white, ovoid, ca. 1.3 × 0.8 mm. Fl. Jun-Sep, fr. Aug-Oct.

• Thickets, waste areas, forest margins; 2100–3000 m. Guizhou, Sichuan, Xizang, Yunnan.

58. *Isodon secundiflorus* (C. Y. Wu) H. Hara, J. Jap. Bot. 60: 236. 1985.

侧花香茶菜 ce hua xiang cha cai

Rabdosia secundiflora C. Y. Wu, Fl. Reipubl. Popularis Sin. 66: 589. 1977.

Shrubs. Stems erect, whitish glandular pubescent. Petiole 4.5–5.5 cm, densely glandular pubescent; leaf blade cordate, 6.5–10.5 × 5.5–8 cm, papery, adaxially pubescent, minutely white hispid on veins, abaxially pubescent, base cordate, margin crenate, apex acute; lateral veins 4-paired. Panicles terminal and axillary, to 25–30 cm, densely glandular pubescent; cymes secund, 3-flowered; lower floral leaves subsessile, circular-cordate, ca. 2 cm in diam., base cordate, margin obscurely crenate, apex mucronate; upper floral leaves circular, less than 4 mm. Pedicel 1–2 mm. Calyx campanulate, ca. 2 × 2 mm, glandular pubescent, slightly 2-lipped; teeth ovate-triangular, ca. 1 mm, lower 2 slightly longer; fruiting calyx tubular-campanulate, dilated to 5 mm. Corolla pink, ca. 6.5 mm, pubescent, upper lip ca. 2 mm, lower lip ca. 3 mm. Stamens included. Style included. Nutlets brown, triquetrous, oblong, ca. 1.2 mm, glabrous. Fl. and fr. Sep-Oct.

• Slopes; 2000–2300 m. Sichuan.

59. *Isodon sculponeatus* (Vaniot) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 132. 1929.

黄花香茶菜 huang hua xiang cha cai

Plectranthus sculponeatus Vaniot, Bull. Acad. Int. Géogr. Bot. 14: 167. 1904; *I. alborubrus* (C. Y. Wu) H. Hara; *Rabdosia alborubra* C. Y. Wu; *R. sculponeata* (Vaniot) H. Hara; *Stachys mairei* H. Léveillé.

Herbs erect, perennial. Stems tufted, 0.5–2 m, branched, sparsely spreading strigose, densely puberulent. Petiole 1.5–7(–11.5) cm; leaf blade ovate-cordate, 3.5–10.5(–19) × 3–9 (–15) cm, thin papery, adaxially whitish floccose-pilose, abaxially spreading villous, sparsely yellow glandular, base cordate, margin crenate or dentate to entire, apex acute to acuminate, lateral veins 4- or 5-paired. Panicles terminal, spreading, ca. 2–5 cm wide, strigose and puberulent; cymes pedunculate, 9–11-flowered; floral leaves subsessile, similar to stem leaves, upper bractlike. Pedicel slender, to 5 mm. Calyx campanulate, ca. 3 × 2.5 mm, sparsely white strigose; teeth subequal, triangular-ovate, ca. 1/2 as long as calyx; fruiting calyx tubular-campanulate, base saccate-dilated, ± curved, ca. 5 × 3–3.5 mm, conspicuously 2-lipped. Corolla yellow, purple spotted on upper lip, rarely reddish, ca. 6 mm, puberulent, glandular, tube ca. 3 mm, upper and lower lips ca. 3 mm. Stamens included. Style included. Nutlets chestnut brown, triquetrous, ovoid, ca. 1.8 × 1.2 mm, obscurely rusty verruculose. Fl. Aug-Oct, fr. Oct-Nov.

Open grasslands, thickets, sparse forests; 500–2800 m. Guangxi, Guizhou, Shaanxi, Sichuan, Xizang, Yunnan [India (Sikkim), Nepal].

Used medicinally for dysentery.

60. *Isodon megathyrsus* (Diels) H. W. Li, J. Arnold Arbor. 69: 374. 1988.

大锥香茶菜 da zhui xiang cha cai

Herbs erect, perennial. Petiole 0.5–5 cm; leaf blade broadly ovate, 3.5–7.5 × 2–4.5 cm, papery, pilose, base abruptly attenuate, margin crenate-dentate, apex acute, lateral veins 4-paired. Panicles terminal, to 30 × 20 cm, densely glandular pubescent, pilose; cymes pedunculate, 5–11-flowered; floral leaves ovate. Calyx broadly campanulate, 2.5–3 × to 4 mm, 2-lipped, densely glandular pubescent, veins and margin pilose; teeth ca. 1/2 as long as calyx, narrowly triangular, apex acuminate. Corolla, blue or bluish purple, to 9 mm, puberulent, glandular, tube ca. 5 mm, upper lip ca. 3 mm, lower lip ca. 4 mm. Stamens included. Style included. Nutlets yellow-brown, ovoid, ca. 1.2 mm, glabrous. Fl. Aug-Sep, fr. Oct.

• Forests; 2300–3500 m. Sichuan, Yunnan.

- 1a. Plants ± densely pilose, sometimes intermixed with glandular pubescent or puberulent hairs
..... 60a. var. *megathyrsus*
1b. Plants very densely gray or dull yellow strigose
..... 60b. var. *strigosissimus*

60a. *Isodon megathyrsus* var. *megathyrsus*

大锥香茶菜 da zhui xiang cha cai

Plectranthus megathyrsus Diels, Notes Roy. Bot. Gard. Edinburgh 5: 230. 1912; *Isodon forrestii* (Diels) Kudô var. *megathyrsus* (Diels) Kudô; *Rabdosia megathyrsa* (Diels) H. Hara.

Plants ± densely pilose, sometimes intermixed with glandular pubescent or puberulent hairs.

• Fir forests, pine-oak valley forests; 2300–3500 m. Sichuan, Yunnan.

60b. *Isodon megathyrsus* var. *strigosissimus* (C. Y. Wu & H. W. Li) H. W. Li, J. Arnold Arbor. 69: 375. 1988.

多毛变种 duo mao bian zhong

Rabdosia megathyrsa (Diels) H. Hara var. *strigosissima* C. Y. Wu & H. W. Li, Fl. Yunnan. 1: 799. 1977.

Plants very densely gray or dull yellow strigose.

• Forests. Yunnan (Weixi Xian).

61. *Isodon henryi* (Hemsley) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 123. 1929.

鄂西香茶菜 e xi xiang cha cai

Plectranthus henryi Hemsley, J. Linn. Soc., Bot. 26: 271. 1890; *Rabdosia henryi* (Hemsley) H. Hara.

Perennial herbs. Stems erect, (30–)50–100(–150) cm, base glabrescent, angles sparsely pubescent, much branched at apex, branches slender. Petiole to 4 cm; leaf blade rhombic-ovate to lanceolate, mid stem leaves ca. 6 × 4 cm, upper and lower stem leaves smaller, papery, adaxially densely strigillose, abaxially glabrous, sparsely strigillose on veins, abruptly contracted from middle of blades, margin crenate-serrate, apex acuminate, lateral veins 3- or 4-paired. Panicles terminal, narrow, 6–10(–15) × ca. 2.5 cm, glandular pubescent; cymes pedunculate, 3–5-flowered; floral leaves similar to stem leaves. Calyx broadly campanulate, ca. 3 mm,

puberulent, purplish, 2-lipped; teeth subequal, ca. 1/2 as long as calyx, upper 3 slightly smaller; fruiting calyx ca. 6 mm, obviously veined, subglabrous, glandular, slightly curved. Corolla white or purplish with purple marks, ca. 7 mm, puberulent, glandular, tube ca. 3.5 mm, upper lip ca. 3 mm, lower lip ca. 3.5 mm. Stamens included. Style included. Nutlets brown, compressed, oblong, ca. 1.3 mm, glabrous, verruculose. Fl. Aug-Sep, fr. Sep-Oct.

• Valleys, hills, forest margins, streamsides; 300–2600 m. Gansu, Hebei, Henan, Hubei, Shaanxi, Shanxi, Sichuan.

62. *Isodon racemosus* (Hemsley) H. W. Li, J. Arnold Arbor. 69: 377. 1988.

总序香茶菜 zong xu xiang cha cai

Plectranthus racemosus Hemsley, J. Linn. Soc., Bot. 26: 273. 1890; *Amethystanthus racemosus* (Hemsley) Nakai; *Isodon excisus* (Maximowicz) Kudô var. *racemosus* (Hemsley) Kudô; *P. excisus* Maximowicz var. *racemosus* (Hemsley) Dunn; *Rabdosia racemosa* (Hemsley) H. Hara.

Herbs perennial. Stems erect, 60–100 cm, purplish red, slightly pubescent. Petiole 2–10 mm, puberulent; leaf blade rhombic-ovate, 3–11 × 1.2–4(–4.5) cm, papery or ± membranous, adaxially sparsely minutely hispid to glabrescent, sparsely puberulent on veins, abaxially glabrous, sparsely yellowish glandular, base cuneate-decurrent, margin coarsely dentate to serrate-dentate, apex acuminate; lateral veins 3-paired, slightly elevated. Racemes terminal and axillary, slender, 8–20 cm, pubescent. Flowers mostly in verticillasters, in 3-flowered cymes basally. Pedicel 2–3 mm. Calyx campanulate, to 2.5 mm, pubescent, glandular; teeth spinescent, upper 3 ovate-triangular, lower 2 slightly larger and narrowly triangular; fruiting calyx dilated to 7 mm, slightly curved. Corolla white or reddish, to 1 cm, sparsely puberulent, glandular, tube to 5.5 mm, upper lip to 3.5 mm, lower lip ca. 4.5 mm. Stamens and style slightly exerted. Nutlets yellowish brown, obovoid, ca. 1.5 mm, glabrous. Fl. Aug-Sep, fr. Sep-Oct.

• Grasslands, forests; 700–1500 m. Hubei, Sichuan.

63. *Isodon excisoides* (Sun ex C. H. Hu) H. Hara, J. Jap. Bot. 60: 234. 1985.

拟缺香茶菜 ni que xiang cha cai

Plectranthus excisoides Sun ex C. H. Hu, Acta Phytotax. Sin. 11: 53. 1966; *Rabdosia excisoides* (Sun ex C. H. Hu) C. Y. Wu & H. W. Li.

Herbs perennial. Stems numerous, erect, (30–)50–100 (–150) cm, puberulent. Leaves opposite; petiole 1–5 cm; leaf blade broadly elliptic to circular-ovate, (2.5–)5–7 × (2–)3.5–5.5 cm, papery, adaxially sparsely strigose-hispidulous, pubescent on veins, abaxially glabrous, sparsely puberulent on veins, base abruptly attenuate-decurrent, margin irregularly serrate-dentate, apex long acuminate, sometimes ± excised. Panicles terminal or axillary, 6–15 cm, densely pubescent; cymes pedunculate, 3–5-flowered; floral leaves subsessile; bracts linear. Pedicel 2–6 mm. Calyx campanulate, to 3.5 mm, puberulent; teeth spinescent, upper 3 triangular, lower 2 narrowly triangular; fruiting calyx dilated to 7 mm. Corolla white, reddish, or purplish to purple-blue, ca. 1 cm, sparsely puberulent, glandular, tube ca. 6 mm, upper lip ca. 3 mm, lower lip ca. 4 mm. Stamens included. Style included or slightly exerted. Nutlets brown, ± globose, ca. 1.5 mm in diam., glabrous. Fl. Jul-Sep, fr. Aug-Oct.

• Grasslands, waste areas, streambanks, sparse forests; 700-3000 m. Hubei, Sichuan, Yunnan.

64. *Isodon albopilosus* (C. Y. Wu & H. W. Li) H. Hara, *J. Jap. Bot.* 60: 233. 1985.

白柔毛香茶菜 bai rou mao xiang cha cai

Rabdosia albopilosa C. Y. Wu & H. W. Li, *Fl. Reipubl. Popularis Sin.* 66: 590. 1977.

Herbs perennial. Stems erect, 60–100 cm, densely white pilose, branched at apex. Petiole 0.5–4 cm; leaf blade circular-ovate to triangular-ovate, 4.5–9 × 3–6 cm, papery, white pilose, adaxially densely pilose on veins, abaxially sparsely yellowish glandular, base broadly cuneate to subtruncate, margin dentate-serrate, apex acuminate, apical tooth lanceolate, lateral veins 4-paired. Panicles terminal, to 15 cm, densely white pilose, glandular; cymes pedunculate, 3-flowered; floral leaves sessile, bractlike, ovate to ovate-lanceolate, margin entire, ciliate; lower floral leaves foliaceous. Pedicel 5(–8) mm. Calyx broadly campanulate, ca. 3.5 mm, densely white pilose, glandular, 2-lipped; teeth ca. 1/2 as long as calyx. Corolla purplish or reddish, 8–9 mm, pilose, upper lip ca. 3 mm, lower lip nearly as long. Stamens included. Style included. Nutlets yellow-brown, ovoid, ca. 1.2 mm, glabrous. Fl. Jul-Sep, fr. Aug-Oct.

• Hills, forest margins, valleys; 2400–3200 m. Sichuan.

65. *Isodon grosseserratus* (Dunn) Kudô, *Mem. Fac. Sci. Taihoku Imp. Univ.* 2: 124. 1929.

粗齿香茶菜 cu chi xiang cha cai

Plectranthus grosseserratus Dunn, *Notes Roy. Bot. Gard. Edinburgh* 8: 156. 1913; *Rabdosia grosseserrata* (Dunn) H. Hara.

Herbs perennial. Stems erect, 50–80 cm, much branched, branches and stem sparingly retrorse white puberulent. Petiole 2–10 mm; leaf blade broadly ovate, 5.5–12 × 3.5–6.5 cm, papery, adaxially minutely hispid, sparsely pilose on veins, abaxially sparsely golden glandular, sparsely pilose on veins, base abruptly attenuate-decurrent, margin coarsely serrate, apex acuminate, apical tooth lanceolate, lateral veins 3- or 4-paired. Panicles narrow, terminal and axillary, to 20 cm, pubescent; cymes widely spaced, pedunculate, 3-flowered; lower floral leaves sessile, margin remotely serrate or entire, longer than cymes; upper floral leaves bractlike, shorter than cymes. Pedicel ca. 5 mm. Calyx broadly campanulate, ca. 4 mm, pubescent, glandular, obviously 2-lipped; teeth acuminate, upper 3 triangular-lanceolate, lower 2 lanceolate; fruiting calyx to 8 mm. Corolla blue or pink, to 1 cm, sparsely pubescent, glandular, tube ca. 5 mm, upper lip ca. 4 mm, lower lip ca. 5 mm. Stamens included. Style included. Nutlets yellowish brown, ovoid, ca. 1.2 mm, glabrous. Fl. Jul-Oct, fr. Sep-Oct.

• Grassy slopes, forest margins, valleys; 1600–2600 m. Sichuan.

66. *Isodon rosthornii* (Diels) Kudô, *Mem. Fac. Sci. Taihoku Imp. Univ.* 2: 135. 1929.

瘦花香茶菜 ying hua xiang cha cai

Plectranthus rosthornii Diels, *Bot. Jahrb. Syst.* 29: 562. 1900; *Rabdosia rosthornii* (Diels) H. Hara.

Herbs perennial. Stems 60–120 cm, purplish, densely puberulent. Leaves opposite; petiole 0.5–5 cm; leaf blade broadly ovate to subcircular, 4–11 × 2.5–7 cm, ± membranous, adaxially sparsely fine setulose, sparsely glandular, veins densely puberulent, base abruptly decurrent, margin crenate-serrate, apex acuminate, veins 4- or 5-paired. Panicles narrow, terminal and axillary, 5–15 cm; cymes widely spaced, pedunculate, 3(–5)-flowered. Pedicel 2–5 mm. Calyx broadly campanulate, to 2.5 × 3 mm, scattered glandular, veins and margins sparsely pubescent, obviously 2-lipped to middle or below; upper lip teeth short triangular, lower lip teeth narrowly triangular; fruiting calyx dilated to 6 mm. Corolla purplish white to purple-blue, to 5.5 mm, sparsely puberulent, glandular, tube ca. 2 mm, upper lip ca. 2 mm, lower lip ca. 3.5 mm. Stamens and style included or slightly exerted. Nutlets yellowish brown, ovoid, ca. 1.3 mm, glabrous, glandular. Fl. Aug-Sep, fr. Sep-Oct.

• Open slopes; 500–2300 m. Guizhou, Sichuan, Yunnan.

67. *Isodon liangshanicus* (C. Y. Wu & H. W. Li) H. Hara, *J. Jap. Bot.* 60: 235. 1985.

凉山香茶菜 liang shan xiang cha cai

Rabdosia liangshanica C. Y. Wu & H. W. Li, *Fl. Reipubl. Popularis Sin.* 66: 590. 1977.

Herbs perennial. Stems erect, 50–80 cm, yellowish brown, angles densely retrorse puberulent. Petiole 1–3 cm; leaf blade elliptic to oblong, 6–15 × 2.5–4.5 cm, thin papery, adaxially sparsely pilose, densely so on veins, abaxially sparsely yellowish glandular, sparsely pubescent on veins, base abruptly attenuate, margin crenate-serrate, apex acuminate, lateral veins 4- or 5-paired. Panicles terminal and axillary, 10–20 cm, densely gray puberulent; cymes pedunculate, 3–5-flowered; lower floral leaves sessile, upper bractlike, linear, to 5 mm. Calyx campanulate, to 4 mm, pubescent, 2-lipped to middle or below; upper teeth triangular-acuminate, lower teeth narrowly triangular; fruiting calyx dilated to ca. 6 mm. Corolla gray or reddish, to 1 cm, puberulent, tube ca. 5 mm, upper lip ca. 3 mm, lower lip ca. 5 mm. Stamens slightly exerted. Style exerted. Nutlets brown, ovoid, ca. 1.5 mm, glabrous. Fl. and fr. Aug.

• Sunny grassy slopes; 2500 m. Sichuan.

68. *Isodon macrocalyx* (Dunn) Kudô, *Mem. Fac. Sci. Taihoku Imp. Univ.* 2: 138. 1929.

大萼香茶菜 da e xiang cha cai

Plectranthus macrocalyx Dunn, *Notes Roy. Bot. Gard. Edinburgh* 8: 157. 1913; *Amethystanthus taiwanensis* Masamune; *Isodon bifidocalyx* (Dunn) H. Hara; *P. bifidocalyx* Dunn; *P. drosocarpus* Handel-Mazzetti; *Rabdosia bifidocalyx* (Dunn) H. Hara; *R. macrocalyx* (Dunn) H. Hara; *R. taiwanensis* (Masamune) H. Hara.

Herbs perennial. Stems numerous, erect, 40–100(–150) cm, appressed pubescent. Petiole (0.5–)2–3(–6.5) cm; leaf blade ovate, (5–)7–10(–15) × (2–)2.5–5(–8.5) cm, papery, subglabrous, appressed pubescent on veins, base attenuate-decurrent, margin crenate-serrate, apex long acuminate. Racemes terminal and axillary, narrow, 6–10(–15) × ca. 2.5 cm; cymes pedunculate, (1–)3–5-flowered, together forming a pointed panicle; floral leaves subsessile, ovate. Pedicel 2–4 mm. Calyx broadly campanulate, ca. 2.7 × to 3 mm, pubescent, 2-lipped; teeth triangular, lower 2 slightly larger, apex acute; fruiting calyx dilated to 6 mm, obviously

2-lipped. Corolla purplish to purple-red, ca. 8 mm, sparsely puberulent, glandular, tube ca. 4 mm, upper lip ca. 2 mm, lower lip ca. 4 mm. Stamens and style slightly exerted. Nutlets brown, ovoid, ca. 1.5 mm, glabrous. Fl. Jul-Aug, fr. Sep-Oct.

• Thickets and forests on slopes; 600–1700 m. Anhui, Fujian, Guangdong, Guangxi, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang.

69. *Isodon scrophularioides* (Wallich ex Benth) Murata, Acta Phytotax. Geobot. 22: 21. 1966.

宽花香茶菜 kuan hua xiang cha cai

Plectranthus scrophularioides Wallich ex Benth, Pl. Asiat. Rar. 2: 16. 1830; *Isodon latiflorus* (C. Y. Wu & H. W. Li) H. Hara; *Rabdosia latiflora* C. Y. Wu & H. W. Li; *R. scrophularioides* (Wallich ex Benth) H. Hara.

Herbs perennial. Stems to 60 cm or more, erect, subglabrous, angles pilose, branched. Petiole (1–)3.5–10 cm; leaf blade circular-ovate to broadly ovate, (3.2–)5.5–14 × (2–)4–10 cm, thin papery, adaxially sparsely pilose, densely puberulent on veins, abaxially sparsely red glandular, sparsely pilose on veins, base shallowly cordate to ± cuneate, margin crenate to crenate-dentate, apex acute to short acuminate, lateral veins 4- or 5-paired. Panicles terminal and axillary, 8.5–20 × 5.5–6 cm, glandular puberulent; cymes pedunculate, 3–11-flowered; lower floral leaves sessile, upper floral leaves bractlike, ovate, 1–3 mm. Pedicel 3–5(–7) mm. Calyx broadly campanulate, ca. 3.5 × to 5 mm, glandular pubescent, obviously 2-lipped; teeth broadly triangular, upper 3 ca. 1.5 mm, lower 2 ca. 1 mm, apex acute; fruiting calyx dilated to ca. 6.5 × 6 mm. Corolla whitish, pale yellow, or yellow, tip tinged reddish purple, ca. 9 mm; tube ca. 5 mm, subglabrous; upper lip ca. 1.5 mm, lower lip ca. 4 mm. Stamens and style long exerted. Nutlets yellow, ovoid, ca. 1.5 × 1.1 mm, glabrous. Fl. Jul-Oct, fr. Sep-Oct.

Damp grassy banks, shady woods, secondary shrubby growth, forest margins; 2000–3500 m. Yunnan [Bangladesh, Bhutan, India (Sikkim), Nepal].

70. *Isodon flabelliformis* (C. Y. Wu) H. Hara, J. Jap. Bot. 60: 234. 1985.

扇脉香茶菜 shan mai xiang cha cai

Rabdosia flabelliformis C. Y. Wu, Fl. Yunnan. 1: 801. 1977; *Isodon kangtingensis* (C. Y. Wu & H. W. Li) H. Hara; *R. kangtingensis* C. Y. Wu & H. W. Li.

Herbs perennial. Stems ca. 1 m, densely glandular puberulent. Leaves opposite; petiole 1.7–5.7 cm, glandular puberulent; leaf blade broadly ovate to ovate, 3.7–13 × 3–10.5 cm, thin papery, adaxially densely puberulent, pilose or densely pilose, abaxially puberulent, spreading pilose on veins, base ± shallowly cordate to cuneate, margin mucronate crenate or crenate-serrate, apex acute to acuminate, lateral veins 1–4-paired. Panicles terminal and axillary, 15–50 × 6–12 cm, glandular puberulent; cymes pedunculate, 7–15-flowered; lower floral leaves sessile or sessile, upper bractlike, obovate to broadly ovate, 5–12 × 2.5–12 mm, apex acuminate. Pedicel 6–12 mm. Calyx campanulate, ca. 4.5 × 4 mm, purplish, densely minutely glandular pubescent, 2-lipped; teeth subequal, acuminate, 2/3–3/4 as long as calyx, upper 3 lanceolate-triangular, lower 2 narrowly triangular. Corolla blue, ca. 1.1 cm, tube 5–6 mm, upper lip as long as

lower lip. Stamens exerted. Style exerted. Nutlets yellowish, ovoid-oblong, ca. 1.6 × 1 mm. Fl. and fr. Sep-Oct.

• Broad-leaved forests, rocky slopes, forest margins; 2600–3100 m. Sichuan, Yunnan.

71. *Isodon latifolius* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 235. 1985.

宽叶香茶菜 kuan ye xiang cha cai

Rabdosia latifolia C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 591. 1977.

Herbs perennial. Stems erect, to 1 m, densely retrorse puberulent, purplish, nodes slightly thickened. Petiole 1.5–3 cm; leaf blade broadly ovate to obovate, thin papery, adaxially sparsely minutely hispid, densely pubescent on veins, abaxially sometimes purplish red, densely puberulent, sparsely yellowish glandular, base abruptly attenuate-decurrent, margin crenate-serrate, apex rounded to acuminate, apical tooth lanceolate, lateral veins 3- or 4-paired. Racemes terminal and axillary, in a panicles to 20 cm, densely glandular pubescent; cymes pedunculate, widely spaced, 1–3-flowered; lower floral leaves sessile, small; bracts ovate to linear. Calyx broadly campanulate, to 4.5 × 4 mm, densely pubescent, glandular, conspicuously 2-lipped; teeth triangular, apex acute, upper teeth ca. 2 mm, narrow, lower ca. 2.5 mm; fruiting calyx dilated to 6 mm. Corolla reddish purple or white, ca. 7.5 mm, sparsely puberulent, glandular, tube ca. 4 mm, lower lip longer than upper. Stamens included. Style included. Nutlets yellowish brown, ovoid, ca. 1.2 mm, glabrous. Fl. and fr. Aug-Sep.

• Grasslands; 1400–2000 m. Sichuan (Chengkou Xian).

72. *Isodon weisiensis* (C. Y. Wu) H. Hara, J. Jap. Bot. 60: 237. 1985.

维西香茶菜 wei xi xiang cha cai

Rabdosia weisiensis C. Y. Wu, Fl. Yunnan. 1: 802. 1977.

Herbs perennial. Stems erect, glabrous, sparsely glandular, angles puberulent. Petiole 1–6 cm, narrowly winged; leaf blade broadly ovate to subcircular, 4.5–11.5 × 8 cm, herbaceous or ± membranous, adaxially sparsely strigose-hispidulous, densely puberulent on veins, abaxially sparsely puberulent, base abruptly attenuate-decurrent, margin coarsely or double serrate, apex acuminate, lateral veins 4- or 5-paired. Panicles narrow, terminal, to 15 cm, densely glandular pubescent; cymes pedunculate, widely spaced, 1–5-flowered; lower floral leaves short petiolate, ovate, 1.5–2 cm, margin coarsely dentate. Calyx broadly campanulate, ca. 2 × to 3 mm, pubescent, glandular, conspicuously 2-lipped to below middle, teeth acuminate; fruiting calyx dilated to 8 × 8 mm. Corolla white, ca. 7.5 mm, sparsely pilose, tube ca. 4 mm, upper lip ca. 2.5 mm, lower lip ca. 3.5 mm. Stamens included. Style included. Nutlets yellowish brown, ± globose, ca. 1.5 mm in diam., glabrous. Fl. Aug-Sep, fr. Sep-Oct.

• Valleys; 2600 m. Yunnan.

73. *Isodon gibbosus* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 234. 1985.

囊花香茶菜 nang hua xiang cha cai

Rabdosia gibbosus C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 592. 1977.

Herbs perennial. Stems erect-ascending, ca. 40 cm, densely gray puberulent. Petiole 0.5–1.5 cm; leaf blade narrowly lanceolate to oblong, gradually smaller and margin entire upward, 3–7 × 0.8–2.2 cm, papery, adaxially sparsely minutely hispid, densely pubescent on veins, abaxially scattered yellowish glandular, sparsely minutely hispid on veins, base narrowly cuneate, margin crenate-serrate, apex acuminate, lateral veins ca. 4-paired. Cymes axillary, 0.8–2 cm, dichotomous, each branch 1- or 2(-4)-flowered; peduncle 1–3 mm, densely puberulent. Pedicel 1–3 mm, densely puberulent. Calyx campanulate, ca. 2.5 × to 2.5 mm, veins and margins puberulent, conspicuously 2-lipped; upper teeth ovate, apex acute; lower teeth narrowly triangular; fruiting calyx broadly campanulate, slightly curved, dilated to 4.5 mm. Corolla to 8 mm, sparsely puberulent, glandular, tube conspicuously pouched on upper side near base, ca. 2 mm in diam., abruptly recurved above base, slightly constricted, throat ca. 1.2 mm wide, upper lip ca. 3.5 mm, lower lip ca. 4 mm. Stamens included. Style included. Nutlets brown, subglobose, ca. 1.5 mm in diam., glabrous.

- Hills. Guizhou, Sichuan.

74. *Isodon lungshengensis* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 235. 1985.

龙胜香茶菜 long sheng xiang cha cai

Rabdosia lungshengensis C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 592. 1977.

Herbs perennial. Stems erect-ascending, 20–50 cm, straw colored, very densely puberulent. Petiole 5–8 mm; leaf blade narrowly lanceolate to oblong, 5.5–7.5 × 1.5–2 cm, papery, adaxially sparsely minutely hispid, densely puberulent on veins, abaxially minutely yellowish glandular, sparsely minutely hispid on veins, base narrowly cuneate, margin coarsely serrate above middle, apex long acuminate, lateral veins 3- or 4-paired. Racemes terminal and axillary, densely pubescent, in panicles 2.5–10 × 2–5 cm; cymes pedunculate, 1–3-flowered; floral leaves narrowly lanceolate, 1–2 cm × 3–4 mm, margin shallowly serrate to subentire. Calyx purplish green, campanulate, ca. 2 mm, pubescent, glandular, 2-lipped, teeth acute; fruiting calyx urceolate-campanulate, dilated to ca. 4 mm. Corolla purplish, ca. 7 mm, sparsely pubescent, tube ca. 3.5 mm, pouched on upper side near base, upper lip ca. 3 mm, lower lip ca. 3.5 mm. Stamens included. Style included. Nutlets yellowish brown, ovoid, ca. 1.3 mm, glabrous. Fl. and fr. Nov.

- Shady streamsides in sparse forests; 400–700 m. Guangxi (Longsheng Xian).

75. *Isodon melissoides* (Benth) H. Hara, J. Jap. Bot. 60: 235. 1985.

苞叶香茶菜 bao ye xiang cha cai

Plectranthus melissoides Benth, Labiat. Gen. Spec. 39. 1832; *Isodon melissiformis* (C. Y. Wu) H. Hara; *Rabdosia melissiformis* C. Y. Wu; *R. melissoides* (Benth) H. Hara.

Herbs perennial. Stems densely retrorse gray pubescent, papillate strigose. Petiole less than 5 mm; leaf blade ovate-triangular to broadly ovate-rhombic, 2–3 × 1–2.5 cm, reduced upward, papery, adaxially sparsely minutely hispid, abaxially glabrous, sparsely minutely hispid on veins, base broadly

cuneate-decurrent, margin remotely coarse crenate to crenate-serrate, apex acute to short acuminate, lateral veins 3- or 4-paired. Cymes axillary, 3–5-flowered, pubescent; peduncle to 5 mm; bracteoles ovate-lanceolate, to 5 mm. Pedicel 1.5–2 mm. Calyx campanulate, pubescent, ca. 3 mm, 2-lipped to below middle, teeth ± acute, fruiting calyx dilated to 5 mm. Corolla nearly white, ca. 1 cm, sparsely pubescent; tube ca. 5 mm, abruptly pouched near base, declinate, slightly constricted at throat; upper lip ca. 3.5 mm, lower lip ca. 5 mm. Stamens included. Style included. Nutlets brown, ovoid, ca. 1.5 mm, glabrous. Fl. and fr. Aug-Sep.

- Hills; 1300–2000 m. Yunnan [Bangladesh, India].

76. *Isodon brevicealcaratus* (C. Y. Wu & H. W. Li) H. Hara, J. Jap. Bot. 60: 233. 1985.

短距香茶菜 duan ju xiang cha cai

Rabdosia brevicealcarata C. Y. Wu & H. W. Li, Fl. Reipubl. Popularis Sin. 66: 591. 1977.

Herbs perennial. Stems erect, ca. 90 cm, much branched, angles densely retrorse gray pubescent. Petiole of mid stem leaves to 4.5 cm; leaf blade ovate, ca. 4 × 2 cm, ± membranous, adaxially dark green, sparsely minutely hispid, minutely pubescent on veins, abaxially tinged purplish, sparsely minutely white hispid, base abruptly attenuate, margin crenate, apex short acuminate to acute. Panicles terminal, 6–8 cm, densely pubescent; cymes pedunculate, widely spaced, 1–3-flowered; upper floral leaves bractlike, much shorter than calyces. Pedicel ca. 3 mm. Calyx campanulate, ca. 3 mm, slightly pubescent, glandular, slightly 2-lipped; teeth less than 1/2 as long as calyx, ovate-triangular, acute, lower 2 slightly longer. Corolla purplish blue, to 1.1 cm, pilose outside, yellowish glandular; tube ca. 5 mm, base ca. 1 mm in diam., upper side with an exerted spur ca. 3 mm, throat ca. 1.5 mm wide, upper lip ca. 4 mm, lower lip to 6 mm. Stamens and style nearly included. Nutlets unknown. Fl. Oct.

- Sparse montane forests; 600 m. Guangdong (Lian Xian).

77. *Isodon adenanthus* (Diels) Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 123. 1929.

腺花香茶菜 xian hua xiang cha cai

Plectranthus adenanthus Diels, Notes Roy. Bot. Gard. Edinburgh 5: 228. 1912; *P. wui* Sun ex C. H. Hu; *Rabdosia adenantha* (Diels) H. Hara.

Herbs perennial. Stems numerous, ascending, 15–40 cm, few branched, densely retrorse gray pubescent. Petiole of mid stem leaves 2–10 mm; leaf blades largest, rhombic-ovate to ovate-lanceolate, (1.5–)2.5–3.5(–6.5) × (1–)1.5–2.5 cm, thin papery, scattered and yellowish glandular, abaxially white pilose, densely white pubescent on veins, base broadly cuneate-decurrent, apex obtuse. Cymes pedunculate, 3–5-flowered, in terminal spikelike panicles 10–20 cm, densely pubescent; floral leaves mostly bractlike, lanceolate, ± entire. Calyx purple, broadly campanulate, 2–3 mm, scattered yellowish glandular, pilose on veins, 2-lipped; teeth ovate-lanceolate, 1–1.5 cm, apiculate at apex, lower 2 slightly larger; fruiting calyx projected, conspicuously 2-lipped, dilated to 4 mm. Corolla blue, purple, pink, or white, densely pubescent except for upper side near base, yellowish glandular, tube ca. 4 mm, upper lip ca. 4 mm, lower lip to

6 mm. Stamens included. Style included. Nutlets brown, ovoid, ca. 1.5 mm in diam. Fl. Jul-Aug, fr. Jul-Sep.

• Pine forests, grasslands; 1100–3400 m. Guizhou, Sichuan, Yunnan.

Used medicinally for dysentery and enterogastritis.

87. CERATANTHUS F. Mueller ex G. Taylor, J. Bot. 74: 35. 1936.

角花属 jiao hua shu

Herbs perennial. Leaves petiolate, dentate. Verticillasters 4–10-flowered, in terminal racemes; bracts ovate. Pedicel slender. Calyx broadly funnellform, 2-lipped, very open in flower; upper lip 3-lobed, middle lobe circular, decurrent into tube at margin, lateral lobes much smaller; lower lip trapeziform, emarginate. Corolla tube narrow, glabrous inside, base with long slender spur, limb 2-lipped; upper lip reflexed, subequally 4-lobed; lower lip slightly longer, navicular, slightly concave. Stamens 4, didynamous; posterior 2 hairy at base, inserted at base of corolla tube, somewhat shorter than corolla limb; anterior 2 glabrous, inserted at throat, nearly as long as limb; filaments free; anthers 1-locellate. Style as long as posterior stamens, apex subequally 2-cleft. Nutlets subglobose, glabrous, minutely pitted.

About eight species: Asia, Australia; one species in China.

1. Ceratanthus calcaratus (Hemsley) G. Taylor, J. Bot. 74: 40. 1936.

角花 jiao hua

Plectranthus calcaratus Hemsley, Hooker's Icon. Pl. 27: t. 2671. 1900; *Hemslea calcarata* (Hemsley) Kudô.

Herbs perennial, mostly sparsely rust colored, moniliform glandular villous. Stems ascending, ca. 25 cm tall, much branched, base trailing; branches and stem slender, purple-red. Petiole 4–9 mm; leaf blade ovate to ovate-oblong, 1.4–5 × 0.7–2.6 cm, papery, sometimes subglabrous, adaxially appressed minutely hispid, abaxially appressed minutely hispid on veins, base cuneate-decurrent, margin crenate, apex acuminate to acute. Verticillasters in loose

terminal racemes; bracts ca. 3.5 × 3 mm, apex abruptly acute. Pedicel 3–5 mm. Calyx broadly funnellform, ca. 2 × 4.5 mm, villous, golden glandular, glabrous inside; middle lobe of upper lip ca. 1.6 mm wide, lateral lobes obliquely triangular-orbicular; lower lip ca. 1.6 × 1.2 mm, apex emarginate. Corolla blue, ca. 1.8 cm, glandular villous, spur ca. 1/2 as long as corolla, throat ca. 4 mm wide; upper lip ca. 5 mm, lobes triangular-ovate, middle lobe somewhat larger than lateral lobes; lower lip slightly longer, ca. 1.6 mm wide, slightly concave. Anthers blue. Style capitate. Nutlets gray-brown, ca. 1.2 mm in diam. Fl. Sep-Oct, fr. Oct-Nov.

Valleys, dense or sparse forests, streamsides; 800–1600 m. Guangxi, Yunnan [Myanmar].

88. COLEUS Loureiro, Fl. Cochinch. 2: 372. 1790.

鞘蕊花属 qiao rui hua shu

Herbs or shrubs. Leaves petiolate, dentate. Verticillasters 6- to many flowered, in racemes or panicles; bracts early deciduous or absent. Flowers pedicellate. Calyx ovoid-campanulate to campanulate, 5-toothed or conspicuously 2-lipped, posterior tooth larger; fruiting calyx dilated, declinate or recurved, throat glabrous or villous. Corolla much exserted, erect or recurved, 2-lipped; upper lip (3- or) 4-lobed, strongly reflexed; lower lip entire, elongated, navicular, narrowed at base. Stamens 4, declinate, included within lower lip; filaments connate or free, rarely adnate to corolla tube; anther cells apex confluent. Style apex equally 2-cleft. Nutlets ovoid to globose, smooth, tuberculate or not.

About 90(–150) species: tropics of E hemisphere, Australia; six species in China.

Many workers believe that the type species of *Coleus* is congeneric with *Plectranthus* s. str., a large predominantly African genus, but some of the Asian species have never been formally transferred to that genus. There is much less agreement on the status of other segregate genera.

- 1a. Fruiting calyx recurved, throat closed by villous hairs; verticillasters 6–10-flowered 1. *C. forskohlii*
- 1b. Fruiting calyx declinate, throat glabrous; verticillasters lax, many flowered.
 - 2a. Calyx conspicuously 2-lipped, teeth unequal.
 - 3a. Lower calyx lip narrow, oblong, lobes highly connate; plants puberulent; leaves mostly with brilliant color; corolla purplish to purple or blue 6. *C. scutellarioides*
 - 3b. Lower lip of calyx not oblong, lobes not highly connate, lanceolate; plants densely tawny tomentose; leaves without brilliant color; corolla yellow 5. *C. xanthanthus*
 - 2b. Calyx not 2-lipped, lateral and anterior teeth equal or subequal, posterior tooth wider.
 - 4a. Calyx densely glandular puberulent outside, red glandular; leaves succulent 4. *C. carnosifolius*
 - 4b. Calyx subglabrous or without glands and puberulent outside; leaves not succulent.
 - 5a. Calyx 3–4 mm in flower, subglabrous or puberulent outside; posterior tooth ovate, acute 3. *C. bracteatus*
 - 5b. Calyx 2.5 mm in flower, densely puberulent outside; posterior tooth only slightly wider, acuminate 2. *C. esquirolii*

1. Coleus forskohlii (Willdenow) Briquet, Nat. Pflanzenfam., div. 4, 3a: 359. 1897.

毛喉鞘蕊花 mao hou qiao rui hua

Plectranthus forskohlii Willdenow, Sp. Pl. 3: 169. 1800; *Coleus barbatus* (Andrews) Bentham; *P. barbatus* Andrews.

Herbs erect or ascending. Stems robust, ca. 40 cm, branched, spreading villous, densely so at apex. Petiole ca. 1.5 cm or less; leaf blade ovate, 7.5–13 × 4.5–7 cm, densely tomentose-villous, base abruptly attenuate, margin crenate, ± succulent, apex obtuse to acute. Racemes to 11 cm, verticillasters 6-flowered; bracts sessile, broadly ovate, membranous, margin ciliate, apex caudate-acute, sparsely glandular and puberulent outside, deciduous in flower. Calyx campanulate, ca. 6 mm, densely villous, throat closed by villous hairs in fruit; teeth subulate-lanceolate, posterior tooth cordate, apex acute, lateral teeth shorter. Corolla purple-blue, 1.2–1.5 cm, sparsely glandular outside, recurved, throat dilated, upper lip unequally 4-lobed; lower lip oblong, concave. Stamens nearly exerted or included; filaments connate forming a sheath for ca. 1/2 its length. Nutlets globose, flattened. Fl. Sep.

Slopes; 2300 m. Yunnan (Dongchuan) [Bhutan, India, Nepal, Sri Lanka; Africa].

2. *Coleus esquirolii* (H. Léveillé) Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 158. 1913.

毛萼鞘蕊花 mao e qiao rui hua

Calamintha esquirolii H. Léveillé, Repert. Spec. Nov. Regni Veg. 8: 450. 1910; *Coleus mucosus* Hayata.

Herbs erect or ascending, roots tuberlike. Stems 15–45 cm, woody at base, branched. Petiole 1–2.5 cm; leaf blade ovate to subcordate, 2–3.5(–5) × 1–3(–4) cm, ± succulent, puberulent, base shallowly cordate or rarely rounded, margin coarsely crenate, apex obtuse to sometimes acute. Racemes or panicles terminal, to 15 cm, densely puberulent, verticillasters many flowered; peduncle ca. 2 mm, robust. Pedicel slender, 2–4 mm. Calyx ovoid-campanulate, ca. 2.5 mm, to 5–6 mm in fruit, densely puberulent outside, glabrous inside; teeth subequal, triangular, apex acute, posterior tooth wider than others. Corolla purple to purple-blue, ca. 1.5 cm, recurved, sparsely puberulent, glandular; tube gradually dilated, 2.5–3 mm wide at throat; upper lip 4-lobed, reflexed; lower lip to 6 mm, concave. Stamens included; filaments ± connate at base. Nutlets black, subglobose. Fl. Sep-Nov.

• Rocky areas, grassy hills; 1100–1800 m. Guangxi, Guizhou, Taiwan, Yunnan.

3. *Coleus bracteatus* Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 158. 1913.

光萼鞘蕊花 guang e qiao rui hua

Herbs. Stems erect, to 90 cm, ± succulent, puberulent or subglabrous. Petiole slender, 2.5–5 cm; leaf blade ovate, 4.5–14.5 × 3–7 cm, membranous, puberulent or subglabrous, base broadly cuneate to shallowly cordate, margin crenate, apex acuminate. Panicles lax, terminal, to 42 cm, pubescent, verticillasters many flowered; peduncle 1–3 mm; bracts early deciduous. Pedicel 4–6 mm. Calyx campanulate, 3–4 mm in flower, to 8.5 mm in fruit, subglabrous or puberulent, densely rust colored glandular; teeth subequal, posterior 1 ovate, apex acute, reflexed in fruit; lateral and anterior teeth lanceolate, apex acuminate, straight. Corolla purple to reddish, puberulent, rust colored glandular, 1.6–1.8 cm; tube much

exserted, abruptly reflexed beyond calyx, throat to 2 mm wide; limb 1/8–1/6 as long as tube, upper lip erect; lower lip slightly elongated, concave. Nutlets ovoid-globose. Fl. Sep.

• Forest margins, open areas, fields, rocky areas, wet forests; 1000–2200 m. Yunnan.

4. *Coleus carnosifolius* (Hemsley) Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 158. 1913.

肉叶鞘蕊花 rou ye qiao rui hua

Plectranthus carnosifolius Hemsley, J. Linn. Soc., Bot. 26: 270. 1890.

Herbs perennial, succulent. Stems rather robust, erect, ca. 30 cm, much branched, pubescent, subglabrescent, brownish. Petiole shorter than to as long as blade, ± winged; leaf blade succulent, broadly ovate to subcircular, 1.2–3.5 cm wide, sparsely hairy, red brown glandular, base truncate to rounded rarely cuneate, margin remotely crenate to undulate-crenate, apex obtuse to rounded, purplish. Panicles terminal, to 18 cm, densely puberulent; verticillasters many flowered, 3–4 cm in diam. in fruit, short pedunculate; bracts ± deciduous, obovate, ca. 4 × 3 mm, acute. Pedicel 3–6 mm. Calyx ovoid-campanulate, ca. 2.5 mm, densely glandular puberulent, red-brown glandular, glabrous inside; teeth subequal, oblong-lanceolate, apex acuminate, posterior 1 triangular-ovate reflexed in fruit; fruiting calyx tubular-campanulate, conspicuously declinate, slightly curved. Corolla purplish, puberulent, ca. 1.2 cm; tube abruptly recurved beyond calyx, throat to 2.5 mm wide; filaments ± connate at base. Nutlets dark brown or black, ovoid-globose. Fl. Sep-Oct, fr. Oct-Nov.

• Rocks, forests, mountainous rocky areas. Guangdong, Guangxi, Hunan.

5. *Coleus xanthanthus* C. Y. Wu & Y. C. Huang, Acta Phytotax. Sin. 10: 241. 1965.

黄鞘蕊花 huang qiao rui hua

Shrubs ca. 50 cm tall. Stem basally gray, glabrous, tuberculate-lenticellate, apex brown and densely yellow-brown tomentose. Petiole 4–10 mm; leaf blade narrowly ovate, 3–5 × 1.5–2.4 cm, densely villous, base rounded, margin crenate, apex short acuminate. Panicles terminal and axillary; floral leaves reduced, very short petiolete; bracts ovate, ca. 4 × 2 mm, short caudate, sparsely pubescent, glandular, ciliate. Pedicel 1–2 mm. Calyx campanulate, ca. 2.5 mm in flower, to 5 mm in fruit, yellow-brown tomentose, puberulent inside upper lip; limb 2-lipped, 3-lobed, middle tooth of upper lip broadly ovate; lateral teeth ovate, ca. 1/2 as long as middle tooth; lower teeth lanceolate, nearly as long as lateral lobes. Corolla yellow, ca. 1 cm, sparsely pubescent; tube abruptly recurved beyond calyx, throat to 2 mm wide; upper lip equally 4-lobed, lower lip elliptic. Nutlets brown, ovoid. Fl. Sep.

• Limestone mountains; 1400 m. Yunnan.

6. *Coleus scutellarioides* (Linnaeus) Bentham, Edward's Bot. Reg. 15: t. 1300. 1830.

五彩苏 wu cai su

Herbs erect or ascending. Stems usually purple, puberulent, branched. Petiole 1–5 cm; leaf blade ovate, 4–12.5 × 2.5–9 cm, membranous, yellow, dark red, purple, or green, puberulent, sparsely red-brown glandular abaxially, base broadly cuneate to rounded, margin crenate-serrate or crenate, apex obtuse to short acuminate. Panicles 5–10(–25) × 3–5(–8) cm, puberulent; verticillasters many flowered, ca. 1.5 cm in diam.; bracts deciduous, broadly ovate, 2–3 mm, caudate, glandular. Pedicel ca. 2 mm. Calyx campanulate, 2–3 mm in flower, to 7 mm in fruit, 10-veined, minutely hispid, glandular; middle lobe of upper lip broadly ovate, reflexed in fruit; lateral lobes ovate, ca. 1/2 as long as middle lobe; lower lip rhombic, longer than upper lip, lobes narrowly triangular. Corolla purple to blue, 0.8–1.3 cm, puberulent, tube abruptly recurved, throat to 2.5 mm wide, upper lip erect. Nutlets brown, broadly ovoid or globose, 1–1.2 mm, flattened, shiny. Fl. Jul.

Streamsides, open areas, hills, fields, forests. Fujian, Guangdong, Guangxi, Taiwan, cultivated in all provinces [India, Indonesia, Malaysia, Philippines; Pacific Islands].

- 1a. Middle lobe of upper calyx lip as long as to longer than lobes of lower lip 6a. var. *scutellarioides*
 1b. Middle lobe of upper calyx lip shorter than lobes of lower lip 6b. var. *crispipilus*

89. NOSEMA Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 20. 1904.

龙船草属 long chuan cao shu

Herbs. Leaves entire or serrulate. Verticillasters many flowered, approximate, in terminal capitula or spikes; bracts shorter than verticillasters. Calyx ovoid in flower, tubular in fruit, 10-veined, 2-lipped; upper lip wide, oblong, margin entire or sometimes indistinctly minutely 1-dentate on each side; lower lip subcircular, margin entire, 1/4–1/3 as long as upper lip. Corolla tube dilated at throat, limb 2-lipped, upper lip short 3-lobed; lower lip oblong, margin entire, navicular. Stamens 4, exerted; filaments free, posterior 2 1-dentate at base; anthers 1-locellate. Style apex unequally 2-cleft. Nutlets oblong or ovoid, smooth.

About six species: mainly SE Asia, one species in China.

1. *Nosema cochinchinensis* (Loureiro) Merrill, Trans. Amer. Philos. Soc. 24: 343. 1935.

龙船草 long chuan cao

Dracocephalum cochinchinensis Loureiro, Fl. Cochinch. 2: 371. 1790; *Anisochilus sinensis* Hance; *Geniosporum holocheilum* Hance; *Mesona prunnelloides* Hemsley; *Nosema holocheilum* (Hance) Kudô; *N. prunnelloides* (Hemsley) C. B. Clarke ex Prain.

Herbs. Stems erect or suberect, 8–80 cm, densely appressed or ± patent villous. Petiole less than 1 cm; leaf blade oblong, elliptic to ovate-oblong, 1.5–7 × 0.8–2.5 cm, densely appressed villous, base rounded to cuneate, margin

6a. *Coleus scutellarioides* var. *scutellarioides*

五彩苏 wu cai su

Ocimum scutellarioides Linnaeus, Sp. Pl., ed. 2, 2: 834. 1763; *Coleus acuminatus* Benthams; *C. blumei* Benthams; *Plectranthus scutellarioides* (Linnaeus) R. Brown.

Middle lobe of upper calyx lip as long as to longer than lobes of lower lip.

Fujian, Guangdong, Guangxi, Taiwan, cultivated in all provinces [India, Indonesia, Malaysia, Philippines; Pacific Islands].

Widely grown as an ornamental foliage plant.

6b. *Coleus scutellarioides* var. *crispipilus* (Merrill) H. Keng, Gard. Bull. Straits. Settle. 24: 56. 1969.

小五彩苏 xiao wu cai su

Coleus macranthus Merrill var. *crispipilus* Merrill, Philipp. J. Sci. 1: suppl. 235. 1906; *C. crispipilus* (Merrill) Merrill; *C. formosanus* Hayata; *C. pumilus* Blanco.

Middle lobe of upper calyx lip shorter than lobes of lower lip.

Streamsides, open areas, hills, fields, forests. Fujian, Guangdong, Guangxi, Taiwan [Philippines].

obscurly serrulate or crenulate to subentire, apex obtuse to acute. Verticillasters in dense, terminal, villous capitula or spikes 1–10(–18) cm; bracts sessile, broadly ovate or subrhombic-ovate, shorter than all but basal verticillasters. Calyx 3–3.5 mm in flower, to 6.5 mm in fruit, densely brownish lanate, upper lip broadly oblong. Corolla blue, purple, or reddish, villous, throat sparsely puberulent, tube dilated, lower lip narrow. Anterior stamens longer; filaments bearded. Nutlets dark brown, oblong, smooth. Fl. Oct-Feb.

Hills, valleys; 100–1000 m. Guangdong, Guangxi, Hainan [Indonesia, Thailand, Vietnam].

Used medicinally.

90. MESONA Blume, Bijdr. 838. 1826.

凉粉草属 liang fen cao shu

Herbs. Leaves petiolate, dentate. Verticillasters in terminal racemes; bracts sessile, circular, ovate to lanceolate, apex caudate-mucronate, sometimes brightly colored. Pedicel slender, hairy. Calyx campanulate in flower, tubular or urceolate-tubular in fruit, 10-veined, transversely many veined, pitted in fruit, 2-lipped; upper lip 3-toothed, middle tooth very large; lower lip entire, occasionally emarginate. Corolla white or reddish; throat very wide, not hairy annulate inside; limb 2-lipped, upper lip truncate or 4-lobed; lower lip longer than upper lip, margin entire, navicular. Stamens 4, exerted; filaments free, posterior 2 1-dentate at base; anthers 1-locellate. Style longer than stamens, apex unequally 2-cleft, lobes subulate. Nutlets oblong or ovoid, smooth or inconspicuously tuberculate.

About 8–10 species: Asia, two species in China.

- 1a. Leaves narrowly or broadly ovate to subcircular, apex acute to obtuse, base cuneate to sometimes rounded 1. *M. chinensis*
 1b. Leaves narrowly elliptic or ovate-lanceolate, apex short acuminate, base attenuate 2. *M. parviflora*

1. *Mesona chinensis* Benth. Fl. Hongk. 274. 1861.

凉粉草 liang fen cao

Mesona elegans Hayata; *M. procumbens* Hemsley.

Stems 15–100 cm; branches and stems pilose or finely bristly, glabrescent. Petiole 2–15 mm; leaf blade narrowly ovate to subcircular, 2–5 × 0.8–2.8 cm, finely bristly, villous, or glabrescent or abaxially hairy along veins, base cuneate to sometimes rounded, margin serrate, apex acute to obtuse. Verticillasters in pedunculate, terminal, erect or upwardly oblique panicles 2–10(–13) cm; bracts circular to rhombic-ovate, sublanceolate, apex caudate-mucronate, shorter to slightly longer than flowers, bright colored. Pedicel 3–4(–5) mm, short hairy. Calyx 2–2.5 mm, densely white pilose, middle lobe of upper lip acute to obtuse, lower lip sometimes emarginate; fruiting calyx 3–5 mm, subglabrous or hairy on veins. Corolla white or reddish, ca. 3 mm, puberulent, throat very dilated; upper lip 4-lobed, lateral 2 lobes distinct, longer than middle lobes, or upper lip subentire. Anterior stamens longer than basally hirsute posterior pair. Nutlets black, oblong. Fl. and fr. Jul–Oct.

• Ravines, grassy, dry, and sandy areas. Guangdong, Guangxi, Jiangxi, Taiwan, Zhejiang.

A decoction of dried plants mixed with rice water is used as a cooling drink in Guangdong and Guangxi provinces.

2. *Mesona parviflora* (Benth.) Briquet, Nat. Pflanzenfam., div. 4, 3a: 365. 1897.

小花凉粉草 xiao hua liang fen cao

Geniosporum parviflorum Benth. Pl. Asiat. Rar. 2: 18. 1830; *Mesona wallichiana* Benth.

Herbs erect. Stems to 35 cm tall, unbranched, fine bristly, glabrescent. Petiole 2–5 mm; leaf blade narrowly elliptic to ovate-lanceolate, 2–3.5 × to 1.5 cm, fine bristly, base attenuate, margin serrate, apex short acuminate. Verticillasters in terminal pedunculate racemes 6–10 cm; peduncle 1.5–2.5 cm; bracts sessile, ovate, apex caudate-acuminate. Fruiting pedicels subequal to calyx. Fruiting calyx 4–5 mm, veins finely bristly or subglabrous declinate; upper lip 3-lobed, middle lobe very dilated, apex acute; lower lip entire, apex truncate. Nutlets unknown.

Yunnan [India].

91. ACROCEPHALUS Benth. Edward's Bot. Reg. 15: t. 1282. 1829.

尖头花属 jian tou hua shu

Herbs annual, slightly rigid. Leaves short petiolate, dentate. Verticillasters in terminal or rarely axillary, globose or cylindrical capitula; floral leaves 2 or 4, bright colored; bracts numerous, overlapping, conspicuous. Flowers pedicellate. Calyx ovoid in flower, tubular, saccate at base in fruit, slightly constricted at glabrous throat, limb 2-lipped, upper lip entire or dentate; lower lip entire, apex emarginate or 4-toothed. Corolla bluish or purplish, rarely white, throat dilated, limb 2-lipped, upper lip short 4-lobed; lower lip entire, slightly longer than upper, sometimes lobes subequal. Stamens 4, declinate; filaments free, edentate, inserted on throat; anthers ovoid. Style apex equally 2-cleft. Nutlets ovoid or oblong, smooth.

About five or six species: Asia, one species in China.

African plants formerly included in this genus are now placed in *Haumaniastrum*.

1. *Acrocephalus indicus* (N. Burman) Kuntze, Revis. Gen. Pl. 2: 511. 1891.

尖头花 jian tou hua

Prunella indica N. Burman, Fl. Indica 130. 1768; *Acrocephalus capitatus* (Roth) Benth.; *Ocymum capitatum* Roth.

Herbs or sometimes shrubs, to 1 m. Stems base sometimes prostrate, ± woody, much branched; branches slender, ascending, glabrous or sparsely villous on 2 sides. Petiole 2–7 mm; leaf blade lanceolate to ovate, 1.2–5 cm × 5–12 mm, herbaceous, adaxially subglabrous, abaxially sparsely glandular, sparsely minutely hispid on veins, base

attenuate-decurrent, margin remotely serrate, apex obtuse. Verticillasters many flowered, overlapping, in globose or ellipsoid capitula; bracts sessile, rhombic-flabellate, ca. 3 mm, acute, concave, base densely villous outside, glabrous inside. Calyx ca. 1.5 mm, pilose; upper lip entire, long; lower lip 4-toothed, teeth subulate, ciliate; fruiting calyx dilated, tubular, to 3 mm. Corolla white to purple-red, ca. 2 mm, slightly exserted. Stamens included, anterior 2 longer. Nutlets dark brown, ovoid, ca. 1 mm. Fl. Sep–Oct, fr. Nov.

Rice paddies, forest margins, streamsides, bamboo forests; 100–1800 m. Guizhou, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam].

92. GENIOSPORUM Wallich ex Benth. Edward's Bot. Reg. 15: t. 1300. 1830.

网萼木属 wang e mu shu

Plants erect or prostrate herbs, sometimes shrubby. Verticillasters many flowered, widely spaced, in terminal or axillary racemes or panicles; bracts softly bony at base, bright colored. Flowers sometimes pedicellate. Calyx ovoid in flower, suberect or declinate; teeth 5, posterior 1 widest, lateral teeth separate or adnate to posterior tooth forming upper lip; anterior teeth 2, separate or connate, forming lower lip; fruiting calyx tubular, veins elevated, teeth bright colored. Corolla tube campanulate; limb 2-

lipped, upper lip short 4-lobed; lower lip longer, declinate, margin entire, \pm flat. Stamens 4, declinate, exserted; filaments free, edentate; anthers 1-locellate, flat. Style apex 2-cleft, lobes flat. Nutlets ovoid to oblong, smooth or minutely dotted-reticulate.

About 25 species: Africa, Asia; one species in China.

1. *Geniosporum coloratum* (D. Don) Kuntze, Revis. Gen. Pl. 2: 517. 1891.

网萼木 wang e mu

Plectranthus coloratus D. Don, Prodr. Fl. Nepal. 116. 1825, non E. Meyer; *Geniosporum strobiliferum* Wallich.

Shrubs ca. 2 m. Stems erect, scaly puberulent. Petiole less than 1 cm; leaf blade ovate-lanceolate to lanceolate, 5–8 \times 2–3 cm, scaly puberulent, base cuneate, margin serrate, apex acuminate. Bracts ovate, less than 1 cm. Calyx ca. 2 \times 1 mm,

pubescent, constricted at throat. Corolla white with purple spots, ca. 5 mm, sparsely pubescent, throat campanulate dilated, densely pubescent, tube ca. 4 mm, limb nearly 2 lipped; upper lip 4-lobed, middle 2 lobes somewhat smaller than outer lobes; lower lip narrowly lanceolate. Anterior stamens longer; filaments base slightly dilated, sparsely puberulent; anthers ovoid. Nutlets dark brown, ovoid, apex finely bristly. Fl. Sep-Oct, fr. Oct-Nov.

Shady valleys, thickets; 1100–1600 m. Yunnan [Bhutan, India, Laos, Myanmar, Nepal].

93. BASILICUM Moench, Suppl. Meth. 143. 1802.

小冠薰属 xiao guan xun shu

Herbs annual or perennial. Verticillasters 6–10-flowered, in terminal secund thyrses or panicles; bracts small, deciduous. Calyx ovoid-campanulate to campanulate, declined in fruit, somewhat elongated, slightly constricted at throat; teeth 5, posterior 1 or 3 larger; tube hairy outside, throat glabrous inside. Corolla tube included or slightly exserted, campanulate, dilated at throat, limb 2-lipped; upper lip 3-lobed, middle lobe larger, entire or apex sometimes emarginate; lower lip slightly longer, margin entire, flat, somewhat concave. Stamens 4, anterior 2 longer, declined; filaments separate, edentate; anthers subglobose, 1-locellate. Style clavate-capitate, 2-cleft at apex; lobes subulate, subequal. Disc ringlike or swollen as a finger in front. Nutlets obovoid, dorsiventrally flattened, smooth.

About six or seven species: Africa, Asia, Australia; one species in China.

1. *Basilicum polystachyon* (Linnaeus) Moench, Suppl. Meth. 143. 1802.

小冠薰 xiao guan xun

Ocimum polystachyon Linnaeus, Mant. Pl., ed. 2, 567. 1771; *Moschosma polystachya* (Linnaeus) Bentham; *O. tenuiflorum* N. Burman; *Plectranthus parviflorum* R. Brown.

Herbs erect. Stems to 1 m tall, glandular, scabrid on angles, puberulent on nodes. Petiole 1–5 cm; leaf blade lanceolate- to triangular-ovate, 2–7 \times 1.2–5.5 cm, membranous, subglabrous, densely golden glandular, base broadly cuneate to rounded, margin crenate above base, apex slightly acute; lateral veins 3- or 4-paired. Thyrses numerous, 3–6 cm, pedunculate, puberulent, glandular; bracts obovate-

rhombic, ca. 1.5 mm. Calyx ca. 1.5 mm, ovoid-campanulate, minutely hispid near base, glabrous toward apex, sparsely golden glandular; posterior tooth broadly ovate, apex obtuse; lateral teeth smaller, triangular, apex acute; anterior teeth narrow, lanceolate, apex spinescent; fruiting calyx 2–2.5 mm, ovoid, slightly constricted at throat, declined, posterior tooth margin somewhat decurrent, \pm conspicuously 10-veined. Corolla white to reddish, straight, cylindrical, ca. 2.5 mm, sparsely puberulent, lips glandular, sparsely puberulent at throat just below upper lip inside, tube ca. 2 mm; upper lip lobes ovate, middle lobe longer; lower lip oblong, margin entire, flat, nearly as long as upper lip. Nutlets brown, ovoid, ca. 1 mm. Fl. and fr. Aug.

Waste areas, streamside thickets, valleys; 0–800 m. Hainan, Taiwan [Japan; Africa, Australia].

94. OCIMUM Linnaeus, Sp. Pl. 2: 597. 1753.

罗勒属 luo le shu

Herbs, subshrubs, or shrubs, aromatic. Leaves petiolate, dentate. Verticillasters 6(–10)-flowered, in terminal, pedunculate thyrses or panicles; bracts early deciduous, petiolate, margin entire, rarely longer than flowers. Flowers white; pedicel straight, apex recurved. Calyx ovoid to campanulate, declined in fruit, glandular outside, glabrous or occasionally villous at throat inside, limb 2-lipped; upper lip 3-toothed, middle tooth circular to obovate, margin winged, decurrent, lateral teeth shorter; lower lip 2-toothed, teeth narrower, apex acuminate to spinescent, sometimes approximate. Corolla tube slightly shorter than calyx or rarely exserted, not hairy annulate inside, dilated, obliquely campanulate at throat; limb 2-lipped, upper lip subequally (3- or) 4-lobed; lower lip somewhat elongated or not, declined, margin entire, flat or slightly concave. Stamens 4, exserted, declined on lower corolla lip, anterior 2 longer; filaments free or anterior 2 connate at base; anthers ovoid-reniform, 1-locellate. Style longer than stamens, 2-cleft at apex; lobes subequal, subulate or flat. Nutlets ovoid or subglobose, smooth or glandular foveolate, viscid when moist, with a white basal areola.

About 100–150 species: temperate regions worldwide, especially in Africa and South America; five species in China.

1a. Posterior filaments edentate at base.

2a. Posterior filaments villous tufted, pilose tufted, or subglabrous at base; stem spreading pilose; leaves oblong, 2.5–5.5 \times 1–3 cm, apex obtuse, base cuneate to rounded, puberulent, glandular; bracts cordate 4. *O. sanctum*

2b. Filaments glabrous; stems pubescent; upper leaves ovate, ca. 3 \times 2 cm, apex acute, base strongly attenuate,

- subglabrous; bracts ovate 5. *O. tashiroi*
- 1b. Posterior filaments dentate at base.
- 3a. Shrubs; fruiting calyx pendulous; posterior tooth broadly obovate, with narrow, slightly decurrent marginal wings; lateral teeth narrow, slightly wider than anterior teeth, approximate, forming a 2-spinescent lower lip 3. *O. gratissimum*
- 3b. Herbs; fruiting calyx appressed reflexed; posterior tooth circular, with marginal broad wings decurrent to middle of calyx; lateral teeth triangular to broadly obovate, apex acute; anterior teeth 2, narrow, nearly not approximate.
- 4a. Leaves narrowly ovate, 1–1.7 cm × 5–10 mm, adaxially green, abaxially gray-green; corolla 3–4 mm 1. *O. americanum*
- 4b. Leaves ovate to ovate-oblong, 2.5–5 × 1–2.5 cm, green; corolla ca. 6 mm 2. *O. basilicum*

1. *Ocimum americanum* Linnaeus, Cent. Pl. I, 15. 1755.

灰罗勒 hui luo le

Ocimum africanum Loureiro; *O. canum* Sims.

Herbs annual, 20–30(–60) cm tall. Stems erect, retrorse puberulent, nodes bristly, much branched from stem base. Petiole 5–12 mm, puberulent and pilose; leaf blade ovate, 1–1.7 cm × 5–10 mm, puberulent, glandular, base cuneate, margin serrulate to subentire, ciliate, apex acute, lateral veins 4- or 5-paired. Racemes numerous, crowded, erect, 10–14 cm, pedunculate, retrorse puberulent; verticillasters separate, 6-flowered; bracts oblong, ca. 4 mm, base attenuate, margin bristly, apex attenuate. Pedicel ca. 1.5 mm, conspicuously recurved in fruit. Calyx campanulate, ca. 2 × 1 mm, puberulent near base, throat densely puberulent, tube ca. 1.5 mm; middle tooth of upper lip circular, lateral teeth shorter, triangular; lower lip teeth ovate-lanceolate, apex awned, longer than upper lip, ciliate; fruiting calyx ca. 4 mm, conspicuously 10-veined. Corolla straight, 1.5–2 × as long as calyx, limb sparsely puberulent, glabrous inside; tube conspicuously exserted, obconical; lower lip oblong, concave, margin entire. Stamens free, ca. 2 × as long as corolla. Nutlets black, ovoid, ca. 1.5 × 0.6 mm, finely dotted.

Yunnan [India, Indonesia, Malaysia, Myanmar, Philippines, Sri Lanka; Africa, SW Asia].

Leaves are made into a paste which is used for skin diseases.

2. *Ocimum basilicum* Linnaeus, Sp. Pl. 2: 597. 1753.

罗勒 luo le

Herbs annual. Stems erect, 20–80 cm tall, apex retrorse puberulent, base glabrous, tinged red, much branched. Petiole ca. 1.5 cm, ± narrowly winged apically; leaf blade ovate to oblong, 2.5–5 × 1–2.5 cm, subglabrous, abaxially glandular, base attenuate, margin irregularly dentate or subentire, apex subobtusate to acute; lateral veins 3- or 4-paired. Thyrses 10–20 cm, puberulent; verticillasters puberulent or densely pilose, approximate apically; bracts sessile, oblanceolate, 5–8 mm, base attenuate, margin ciliate, apex acute, colored. Pedicel ca. 3 mm in flower, to 5 mm in fruit. Calyx campanulate, ca. 4 × 3.5 mm, pubescent outside, pilose at throat inside, tube ca. 2 mm; middle tooth of upper lip widest, ca. 2 × 1 mm, subcircular, concave, apex mucronate; lateral teeth broadly ovate, ca. 1.5 mm, apex acute; lower lip teeth lanceolate, ca. 2 mm, apex spinescent, ciliate; fruiting calyx persistent, conspicuously veined. Corolla purplish or with upper lip white, limb puberulent outside; tube ca. 3 mm, throat ± dilated; upper lip wide, ca. 3 × 4.5 mm, 4-lobed, ± flat; lower lip purple, ca. 6 mm. Stamens free, slightly exserted, posterior 2 dentate, base puberulent. Nutlets dark brown, ovoid, ca. 2.5 × 1 mm, glandular foveolate. Fl. Jul-Sep, fr. Sep-Dec.

Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Africa, Asia].

- 1a. Leaves ovate to ovate-oblong; petioles and verticillasters puberulent 2a. var. *basilicum*
- 1b. Leaves oblong; petioles and verticillasters densely pilose 2b. var. *pilosum*

2a. *Ocimum basilicum* var. *basilicum*

罗勒 luo le

Ocimum basilicum Linnaeus var. *majus* Benth.

Petiole puberulent; leaf blade ovate to ovate-oblong. Verticillasters puberulent.

Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Africa, Asia].

Mostly cultivated as aromatic herbs, sometimes wild. Source of an essential oil. Herb used as a condiment, also used in cosmetics and perfumes.

2b. *Ocimum basilicum* var. *pilosum* (Willdenow) Benth., Prodr. 12: 33. 1848.

疏柔毛变种 shu rou mao bian zhong

Ocimum pilosum Willdenow, Enum. Pl. 629. 1809.

Petiole densely pilose; leaf blade oblong. Verticillasters densely pilose.

Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Africa, Asia].

Mostly cultivated as an aromatic herb, sometimes wild.

3. *Ocimum gratissimum* Linnaeus var. *suave* (Willdenow) J. D. Hooker, Fl. Brit. India 4: 609. 1885.

无毛丁香罗勒 wu mao ding xiang luo le

Ocimum suave Willdenow, Enum. Pl. 629. 1809.

Shrubs erect, 50–100 cm, much branched; branches and stems villous or subglabrous, red-brown when dry. Petiole 1–3.5 cm; leaf blade ovate-oblong to oblong, 5–12 × 1.5–6 cm, gradually reduced toward apex, slightly scabrid, densely villous-tomentose, golden glandular, base cuneate to long attenuate, margin remotely crenate, apex long acuminate. Verticillasters 6-flowered, in erect, pedunculate, terminal and axillary thyrses or panicles 10–15 cm; lower floral leaves subsessile, oblong, 2–2.5 cm; peduncle 1.5–2.5 cm; bracts sessile, ovate-rhombic to lanceolate, 3–4 mm, long acuminate. Pedicel ca. 1.5 cm. Calyx campanulate, to 4 mm, throat villous, tube ca. 2 mm; middle tooth of upper lip ovate, ca. 2 × 1.5 mm, margin ± reflexed, apex acute; lateral teeth

spinescent, slightly wider than connate lower lip teeth; fruiting calyx enlarged, to 5 mm, conspicuously 10-veined, posterior tooth reflexed. Corolla yellowish to white, ca. 4.5 mm, slightly exerted, puberulent, limb glandular, tube obconical, upper lip 4-lobed; lower lip slightly longer, oblong, ca. 1.5 mm. Stamens free, subequal; posterior 2 dentate at base, glabrous. Nutlets brown, subglobose, ca. 1 mm in diam., corrugate, glandular foveolate. Fl. Oct, fr. Nov.

Cultivated in Fujian, Guangdong, Guangxi, Jiangsu, Taiwan, Yunnan, Zhejiang [Sri Lanka; Africa].

Ocimum gratissimum var. *gratissimum* is subglabrous; not currently cultivated in China.

4. *Ocimum sanctum* Linnaeus, Mant. I, 85. 1767.

圣罗勒 sheng luo le

Subshrubs to 1 m tall, much branched. Stems erect, base woody, spreading pilose. Petiole 1–2.5 cm; leaf blade oblong, 2.5–5.5 × 1–3 cm, puberulent, glandular, pilose on veins, base cuneate to rounded, margin shallowly undulate-serrate, apex obtuse. Verticillasters 6-flowered, in pedunculate, terminal thyrses or panicles 6–8 cm; bracts sessile, cordate, ca. 1.5 × 1.5 mm, apex acute; peduncle 1–1.5 cm. Pedicel ca. 2.5 mm. Calyx campanulate, ca. 2.5 mm, villous, tube ca. 1.5 mm; middle tooth of upper lip broadly obovate, abruptly acute; lateral teeth broadly triangular, shorter than lower lip teeth, spinescent; lower lip teeth lanceolate, apex spinescent; fruiting calyx to 6 × 4 mm, conspicuously veined. Corolla white to reddish, ca. 3 mm, slightly exerted, sparsely puberulent; tube ca. 2 mm, dilated at throat; upper lip less

95. *ORTHOSIPHON* Bentham, Edward's Bot. Reg. 15: t. 1300. 1830.

鸡角参属 ji jiao shen shu

Plants perennial herbs or subshrubs. Roots often thickened, woody. Leaves dentate. Verticillasters (4–)6-flowered, separate, in long thyrses; bracts shorter than pedicels, circular to obovate, margin entire. Calyx tubular to broadly tubular, tinged with brilliant colors, 2-lipped; upper lip ovate to obovate, scarious, decurrent into tube, margin reflexed; lower lip 4-toothed, teeth awned to needlelike, anterior teeth longer than lateral ones; fruiting calyx enlarged, conspicuously 10-veined. Corolla white or reddish to purple, 2-lipped; tube exerted, straight or incurved, obconical; upper lip 3- or 4-lobed; lower lip entire, concave. Stamens 4, anterior 2 longer, declined, included or slightly exerted; filaments separate, edentate; anthers 1-locellate. Style globose, apex entire or 2-cleft. Disc produced, fingerlike in front. Nutlets ovoid or subglobose, minutely tuberculate, glabrous.

About 45 species: Africa, Asia, Australia; three species in China.

- 1a. Corolla reddish to purple; leaves mostly basal (or on stem and 1–3-paired in var. *foliosus*) 1. *O. wulfenioides*
 1b. Corolla white; leaves on stem.
 2a. Leaves ovate to broadly ovate, 2–5 × 1.2–3.8 cm, apex subacute, base cuneate to broadly cuneate 2. *O. marmoritis*
 2b. Leaves oblong-lanceolate, 2–8.5 × 0.5–2.3 cm, apex obtuse to acuminate, base attenuate-cuneate 3. *O. rubicundus*

1. *Orthosiphon wulfenioides* (Diels) Handel-Mazzetti, Acta Horti Gothob. 9: 98. 1934.

鸡脚参 ji jiao shen

Herbs perennial. Stems tufted, 10–30 cm tall, erect, branched from base; branches and stems purplish red, densely villous, glandular pubescent. Leaves sessile, ovate to obovate or ligulate, 4.5–13 × 2.2–6.5 cm, papery, adaxially hairy to subglabrous, densely dark glandular, slightly bullate, abaxially pilose, base broadly cuneate, margin crenate-serrate, subentire near base, apex obtuse to rounded, lateral veins 5–7-paired. Thyrses terminal, rachis tawny villous; bracts ovate, 4–5 × 2.5–3 mm, margin ciliate, apex mucronate to short acuminate. Pedicel ca. 3 mm, tawny villous. Calyx purple-red, broadly tubular, 7–8 × 4.5–5 mm, sparsely villous; upper lip obovate, ca. 3 × 4 mm; anterior teeth of lower lip

than 1 × 2.5 mm, lobes ovate; lower lip oblong, ca. 1 × 0.6 mm, flat. Stamens slightly exerted, free; posterior filaments puberulent at base. Nutlets brown, ovoid, ca. 1 × 0.7 mm, glandular-foveolate. Fl. Feb–Jun, fr. Mar–Aug.

Dry sandy areas. Hainan, Sichuan, Taiwan [Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam; Africa, SW Asia, Australia].

Leaves used as a condiment in salads and other foods, and as substitute for tea.

5. *Ocimum tashiroi* Hayata, Icon. Pl. Formos. 9: 86. 1920.

台湾罗勒 tai wan luo le

Stems erect; branches slender, pubescent. Lower stem leaves not seen. Petiole of upper stem leaves ca. 2 cm; leaf blade ovate, ca. 3 × 2 cm, membranous, subglabrous, base strongly attenuate, margin serrate except for apex, apex triangular-acuminate, acute. Verticillasters 6–8-flowered, in decussate terminal thyrses or panicles 5–6 cm; bracts ovate, ca. 1 × 1 mm, apex palmately serrate, hirsute. Pedicel ca. 1 mm, hirsute. Calyx tubular-campanulate, ca. 1.5 × 1 mm, spreading hirsute outside, densely glandular; middle tooth of upper lip subcircular, apex acute, ca. 0.6 mm; lateral teeth linear, ca. 1 mm, ciliate; anterior teeth 2, linear, ca. 1 mm, ciliolate. Corolla tube ca. 2 mm, glabrous, ca. 0.6 mm wide; middle lobe of upper lip hirsute abaxially, circular, lateral lobes circular; lower lip oblong, ca. 1 mm, obtuse, glabrous. Filaments to 0.6 mm. Nutlets ovoid, glabrous.

- Taiwan.

awned, slightly longer than upper lip, margin ciliolate; fruiting calyx conspicuously reflexed. Corolla reddish to purple, 1.8–1.9 cm, sparsely pubescent; tube straight, ca. 1.4 cm, ca. 2 mm wide at base, ca. 4 mm wide at mouth; upper lip ca. 6 × 8 mm, 4-lobed; lower lip ca. 6 × 5 mm. Stamens included. Nutlets brownish, globose, ca. 2 mm in diam. Fl. Mar–Oct, fr. Jun–Nov.

• Forests, hills; 800–2900 m. Guangxi, Guizhou, Sichuan, Yunnan.

- 1a. Leaves mostly basal, rosettelike, pilose 1a. var. *wulfenioides*
 1b. Leaves 1–3-paired on middle of stem; basal stem leaves separate, rarely rosettelike, puberulent to subglabrous 1b. var. *foliosus*

1a. *Orthosiphon wulfenioides* var. *wulfenioides*

鸡脚参 *ji jiao shen*

Coleus wulfenoides Diels, Notes Roy. Bot. Gard. Edinburgh 5: 231. 1912; *Orthosiphon mairei* H. Léveillé; *O. pseudorubicundus* Lingelsheim & Borza.

Leaves mostly basal, rosettelike, pilose.

• Pine forests, grassy hills; 1200–2900 m. Guizhou, Sichuan, Yunnan.

Root used medicinally for anorexia and ascariasis.

1b. *Orthosiphon wulfenoides* var. *foliosus* E. Peter, Bull. Fan Mem. Inst. Biol. 8: 54. 1937.

茎叶变种 *jing ye bian zhong*

Leaves 1–3-paired on mid stem, puberulent to subglabrous, basal stem leaves separate and rarely rosettelike.

• Sparse forests, hills; 800–2300 m. Guangxi, Guizhou, Sichuan, Yunnan.

2. *Orthosiphon marmoritis* (Hance) Dunn, Notes Roy. Bot. Gard. Edinburgh 8: 154. 1913.

石生鸡脚参 *shi sheng ji jiao shen*

Plectranthus marmoritis Hance, J. Bot. 12: 53. 1874; *Orthosiphon sinensis* Hemsley.

Herbs perennial. Stems erect, glandular hispidulous, branches slender, internodes short. Petiole 1.8–2.8 cm; leaf blade ovate to broadly ovate, 2–5 × 1.2–3.8 cm, papery, minutely hispid, golden glandular, base cuneate, margin crenate-serrate, entire near base, apex subacute. Thyrses lax, slender; bracts ovate, ca. 2.5 × 1.5 mm, margin ciliolate, apex short acuminate. Pedicel 2.5–3 mm in flower, to 5 mm in fruit. Calyx rose, broadly tubular, ca. 6.5 × 1.5 mm, minutely hispid; upper lip circular, teeth spinescent; anterior teeth subulate, ca. 2 × as long as triangular lateral teeth; fruiting calyx ca. 1 cm, slightly curved upward, rigid, conspicuously

veined, upper lip reflexed. Corolla white, ca. 1.5 cm, puberulent, glandular; tube narrow, slightly curved, base less than 1 mm wide, gradually dilated above middle, to 2.5 mm wide at throat; upper lip ca. 1.5 mm, 4-lobed; lower lip obovate-spatulate, ca. 3 × 2.5 mm. Stamens slightly exerted, anterior 2 slightly longer. Nutlets subtriquetrous, ovoid, rust colored. Fl. Jul-Aug, fr. Aug-Sep.

• Rocky shady areas. Guangdong, Guangxi.

3. *Orthosiphon rubicundus* (D. Don) Benth var. *hainanensis* Sun ex C. Y. Wu, Acta Phytotax. Sin. 10: 241. 1965.

海南深红鸡脚参 *hai nan shen hong ji jiao shen*

Orthosiphon lanceolatus Sun ex C. H. Hu.

Herbs perennial. Roots sometimes fusiform. Stems erect, to 50 cm tall, base woody, apex semiwoody, branched, appressed minutely hispid, internodes longer than leaves. Petiole short or obsolete; leaf blade oblong-lanceolate, 2–8.5 × 0.5–2.3 cm, papery, scabrid, appressed minutely hispid, base attenuate-cuneate, margin coarsely serrate except at base, apex obtuse to acuminate, lateral veins 5–7-paired. Thyrses terminal, lax; rachis minutely hispid; bracts subcircular, ca. 2 mm wide, margin ciliolate, apex mucronate. Pedicel 3–5 mm, minutely hispid. Calyx tubular, ca. 5.5 × 2 mm, finely pilose, purple-red; upper lip circular, ca. 2 mm wide, apex mucronate; teeth of lower lip subulate, needlelike, anterior teeth longer. Corolla white, ca. 1.1 cm, sparsely puberulent; tube ca. 8 mm, ca. 1.8 mm in diam. at base, slightly wider at throat, sparsely puberulent inside; upper lip ca. 4 × 4 mm; lower lip oblong, ca. 3.5 × 3 mm. Stamens slightly exerted from throat. Nutlets brown, subglobose, ca. 1.7 mm in diam., minutely dotted. Fl. Aug.

• Waste areas. Hainan.

96. CLERODENDRANTHUS Kudô, Mem. Fac. Sci. Taihoku Imp. Univ. 2: 117. 1929.

肾茶属 *shen cha shu*

Herbs perennial, sometimes subshrubby, branched. Leaves petiolate, dentate. Verticillasters 6–10-flowered, in terminal thyrses; bracts circular-ovate, margin entire, apex cuspidate. Pedicel distinct. Calyx ovoid, hairy outside, glandular, glabrous inside, 2-lipped, enlarged after anthesis, 10-veined; upper lip circular, margin decurrent into tube; lower lip 4-toothed, anterior teeth longer. Corolla purplish or white, 2-lipped, hairy outside, not hairy annulate inside; tube narrowly cylindrical, much exerted, straight, not oblique at throat; upper lip reflexed, 3-lobed, middle lobe larger, apex emarginate; lower lip erect, narrow, slightly concave. Stamens 4, declined, much exerted, anterior 2 longer. Style slightly longer than stamens, apex clavate, 2-cleft. Nutlets ovoid to oblong, corrugate.

About five species: SE Asia, Australia; one species in China.

Differing from *Orthosiphon* only by the long anthers and included by many authors in that genus.

1. *Clerodendranthus spicatus* (Thunberg) C. Y. Wu ex H. W. Li, Acta Phytotax. Sin. 12: 233. 1974.

肾茶 *shen cha*

Clerodendron spicatum Thunberg, Fl. Jav. 22. 1825; *Clerodendranthus stamineus* (Benth) Kudô; *Ocimum aristatum* Blume; *Orthosiphon aristatus* (Blume) Miquel; *Orthosiphon spicatus* (Thunberg) Backer, Bakhuizen van der Brink, & Steenis 1950, non Benth, 1848; *Orthosiphon stamineus* Benth.

Herbs perennial. Stems erect, 1–1.5 m tall, retrorse pubescent. Petiole (3–)5–15 mm; leaf blade rhombic- to oblong-ovate, (1.2–)2–5.5 × (0.8–)1.3–3.5 cm, papery pubescent, sparsely impressed glandular, base broadly cuneate to truncate-cuneate, margin coarsely mucronate, dentate to remotely mucronate-crenate, apex acute, lateral veins 4- or 5-paired. Verticillasters 6-flowered, in pedunculate thyrses 8–12 cm; rachis densely pubescent; bracts ca. 3.5 × 3 mm, longitudinally parallel veined. Pedicel to 5 mm, densely pubescent. Calyx 5–6 × ca. 2.5 mm, rust colored glandular

outside; upper lip ca. 2.5×2.5 mm; teeth of lower lip triangular, awned, margin ciliolate, anterior teeth ca. $2 \times$ as long as lateral teeth; fruiting calyx to $1.1 \text{ cm} \times 5$ mm, upper lip conspicuously reflexed, lower lip projected. Corolla purplish or white, sparsely rust colored glandular on upper lip; tube 0.9–1.9 cm, $\times 1$ mm, basally sparsely puberulent inside; lower lip oblong, ca. 5 mm; filaments edentate. Nutlets dark brown, ovoid, ca. 2×1.6 mm, corrugate. Fl. and fr. May–Nov.

• Wet forests and plains, mainly cultivated; 0–1500 m. Fujian, Guangxi, Hainan, Taiwan, Yunnan [India, Indonesia, Malaysia, Myanmar, Philippines; Australia].

Used medicinally for nephritis, urolithiasis and rheumatic arthralgia.

The correct name in *Orthosiphon* is *O. aristatus* (Blume) Miquel.