

OROBANCHACEAE

列当科 lie dang ke

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Herbs annual, biennial, or perennial parasites, without chlorophyll. Stems unbranched or sometimes branched. Leaves scalelike, spirally or subimbricately arranged. Inflorescences racemose, spicate, or subcapitate, rarely 1-flowered; bract 1, usually similar to leaves; bractlets 2, adnate to base of calyx or pedicel. Flowers bisexual, subsessile or pedicelled. Calyx tubular, cupular, or campanulate, (3 or)4–6-lobed, 2–6-parted, 6-toothed, or spathe-like, sometimes absent or of 3 free sepals. Corolla bilabiate, usually curved, sometimes tubular-campanulate or funnelliform with 5 subequal lobes; upper lip entire, emarginate, or 2-lobed; lower lip 3-lobed. Stamens 4, didynamous, inserted at base of corolla tube; filaments slender; anthers 2-celled, dehiscing longitudinally, sometimes 1 cell fertile and another sterile or reduced to spur. Pistil 2- or 3-carpellate; ovary superior; placentas 2–4 or 6(–10), parietal or sometimes axile at ovary base; ovules 2–4 or numerous, anatropous. Style long; stigma inflated, discoid, peltate, or 2–4-lobed. Capsule usually dehiscing loculicidally by 2 or 3(or 4) valves. Seeds minute, testa pitted or reticulate.

About 15 genera and 150 species: North Temperate regions, less represented in Africa, America, Asia, and Australia; nine genera and 42 species (nine endemic) in China.

Genera 1–4 are assigned to the tribe Orobanchaeae (inflorescences racemose or spicate, rarely branched or flowers solitary, borne well above soil surface; mechanical tissue in 1 or 2 rings), whereas genera 5–8 are placed in the tribe Gleadovieae Popov (inflorescences subcapitate or subcorymbose, borne near soil surface; mechanical tissue absent). Although *Lathraea* has traditionally been placed in the Orobanchaceae (see Beck in Engler, Pflanzenr. IV. 261(Heft 96): 1–348. 1930), more recent authors (e.g., Tzvelev, Fl. URSS 23: 19–117. 1958; Webb, Fl. Europ. 3: 281. 1972; Teryokhin et al., Determinator of broomrapes of the USSR Flora. 1993; Yamazaki, Fl. Japan 3a: 373. 1993) exclude the genus from the Orobanchaceae and place it in the Scrophulariaceae. In fact, one of us, N. N. Tzvelev, believes that *Lathraea* should be placed near *Tozzia* Linnaeus of the Scrophulariaceae. The genus is tentatively placed here as a link with the Scrophulariaceae.

Zhang Zhiyun. 1990. Orobanchaceae. In: Wang Wentsai, ed., Fl. Reipubl. Popularis Sin. 69: 69–124.

- 1a. Calyx spathe-like, entire; flowers solitary or few, on pedicels 2–50 cm 4. *Aeginetia*
- 1b. Calyx not spathe-like, cupular, campanulate, tubular, or of 2 or 3 deciduous sepals, rarely absent; flowers in distinct inflorescences, sessile or on pedicels to 2 cm.
 - 2a. Inflorescences spicate or racemose, rarely branched, borne well above soil surface; stems aboveground, with 1 or 2 rings of mechanical tissue.
 - 3a. Stamens exerted from corolla; calyx cupular, irregularly and obtusely 2–5-lobed or toothed, lobes or teeth deciduous 3. *Boschniakia*
 - 3b. Stamens included in corolla; calyx campanulate, if cupular then teeth acute and not deciduous.
 - 4a. Corolla tubular-campanulate to funnelliform, lobes subequal 1. *Cistanche*
 - 4b. Corolla bilabiate, lobes unequal.
 - 5a. Placentas 4; calyx cupular or rarely campanulate, 4- or 5-toothed, often divided into 2 lateral, entire or divided segments 2. *Orobanche*
 - 5b. Placentas 2; calyx campanulate, usually regularly 4-toothed 9. *Lathraea*
 - 2b. Inflorescences subcapitate or subcorymbose, borne near soil surface; stems usually underground, without a mechanical tissue.
 - 6a. Calyx segments 2(or 3), sometimes absent, soon deciduous; bractlets absent 8. *Phacellanthus*
 - 6b. Calyx lobes (4 or)5, persistent; bractlets usually present.
 - 7a. Anthers with 1 fertile cell, another cell absent, reduced, or modified to a spur 7. *Christisonia*
 - 7b. All anthers with 2 fertile cells.
 - 8a. Pedicel to 1 cm; parietal placentas 4 5. *Mannagettaea*
 - 8b. Pedicel 1–9 cm; parietal placentas 2 6. *Gleadovia*

1. CISTANCHE Hoffmannsegg & Link, Fl. Port. 1: 319. 1809.

肉苁蓉属 rou cong rong shu

Herbs perennial. Stems fleshy, usually unbranched, rarely 2- or 3-branched. Inflorescences spicate; bract 1; bractlets 2, rarely absent. Calyx tubular or campanulate, apex (4 or)5-lobed, rarely 5-parted, lobes usually equal. Corolla tubular-campanulate or funnelliform, apex 5-lobed; lobes subequal. Stamens 4, inserted in corolla tube; anthers 2-celled, all fertile, usually pubescent. Ovary 1-locular, parietal placentas 4, rarely 2 or 6. Style slender, persistent; stigma 2-lobed. Capsule ovoid-globose or globose, dehiscing by 2(or 3) valves. Seeds subglobose; testa reticulate.

About 20 species: Asia, Europe; five species in China.

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- 1a. Calyx campanulate, 4- or 5-parted, lobes linear or oblong-lanceolate, apex acuminate; corolla base villous adaxially.
 2a. Calyx 5-parted, lobes unequal; corolla lobes pale brown-yellow when dry 2. *C. lanzhouensis*
 2b. Calyx 4-parted, lobes subequal; corolla lobes dark blue when dry 1. *C. sinensis*
 1b. Calyx tubular or campanulate, 5-lobed, lobes ovate or subrounded, apex obtuse, rarely acuminate; corolla base glabrous adaxially.
 3a. Anther cells obtuse-rounded at base 3. *C. mongolica*
 3b. Anther cells acuminate at base.
 4a. Bracts subequalling corolla, linear-lanceolate or lanceolate; corolla brown when dry 4. *C. deserticola*
 4b. Bracts ca. 1/2 as long as corolla, ovate-lanceolate; corolla yellow-white when dry..... 5. *C. salsa*

1. *Cistanche sinensis* Beck in Engler, Pflanzenr. IV. 261 (Heft 96): 38. 1930.

沙苻蓉 sha cong rong

Plants 15–70 cm tall. Stems 2–4(–6)-branched or simple. Leaves ovate-triangular or ovate-lanceolate, 0.5–2 cm × 4–8 mm. Inflorescences spicate, 5–15 cm, 4–6 cm in diam.; bract ovate-lanceolate or linear-lanceolate, 1.6–2 cm × 3–7 mm, along with bractlets and calyx lobes villous at margin and abaxially; bractlets shorter than calyx. Calyx campanulate, 1.2–2.2 cm, 4-lobed; lobes linear or oblong-lanceolate, 1–1.2 cm, apex acuminate. Corolla pale yellow, becoming dark blue when dry, tubular-campanulate, 2.2–3 cm, villous at base adaxially, apex 5-lobed; lobes 6–8 × 6–12 mm, entire, glabrous abaxially. Filaments 1.4–1.6 cm, villous at base; anthers long ovoid, densely villous, base mucronate. Ovary 6–7 × ca. 3 mm. Style longer than filaments; stigma subglobose. Capsule ovoid-globose or oblong, 1–1.5 × ca. 1 cm. Seeds brown, oblong-globose, ca. 0.4 mm. Fl. May–Jun, fr. Jun–Aug.

• Grasslands, slopes; 1000–2400 m. Gansu, Nei Mongol, Ningxia, NE Xinjiang.

Parasitic on *Ammopiptanthus mongolicus* (Maximowicz) Cheng, *Caragana tibetica* Komarov, *Potania mongolica* Maximowicz, *Reaumuria soongarica* (Pallas) Maximowicz, *Salsola passerina* Bunge, *Tetraena mongolica* Maximowicz, and *Zygophyllum xanthoxylum* (Bunge) Maximowicz.

2. *Cistanche lanzhouensis* Z. Y. Zhang, Bull. Bot. Res., Harbin 4(4): 114. 1984.

兰州肉苻蓉 lan zhou rou cong rong

Cistanche ningxiaensis D. Z. Ma & J. A. Duan.

Plants to 60 cm tall. Stems usually 2- or 3-branched, ca. 35 cm underground. Leaves ovate, 0.5–1.5 cm × (3–)5–7 mm, glabrous on both sides. Inflorescences 9–16 cm; bract long ovate or ovate-lanceolate, ca. 1.5–2.5 cm × 4–8 mm, along with bractlets densely white villous abaxially; bractlets linear-lanceolate, (1.3–)1.5–2 cm. Pedicel very short to obsolete. Calyx campanulate, 1.8–2.5 cm, irregularly 5-parted; lobes unequal, acuminate. Corolla yellow, becoming pale brown-yellow when dry, tubular-campanulate, (2.5–)3.2–3.8 cm, apex 5-lobed; lobes 6–7 mm × 0.9–1.2 cm. Filaments 1.3–2 cm, along with corolla tube yellow villous adaxially; anthers ovoid, 3–3.5 mm, villous, base mucronate. Ovary

subglobose, 6–8 mm in diam. Style (1.2–)1.5–2 cm. Fruit and seeds unknown. Fl. May–Jun.

Slopes. Gansu, S Nei Mongol, Ningxia [S and E Mongolia].

3. *Cistanche mongolica* Beck in Engler, Pflanzenr. IV. 261 (Heft 96): 34. 1930.

管花肉苻蓉 guan hua rou cong rong

Plants 60–100 cm tall. Stems unbranched. Leaves triangular, 2–3 cm × ca. 5 mm. Inflorescences spicate, 12–18 cm, 5–6 cm in diam.; bract ovate-lanceolate, 2–2.7 cm × 5–7 mm, glabrous on both sides, margin pubescent; bractlets linear-lanceolate, 1.5–1.7 cm × ca. 3 mm. Corolla rose- or violet-white, tubular-funnelform, 3.5–4.5 cm, glabrous at base; lobes 5, subrounded, subequal, ca. 8 × 10 mm, glabrous. Filaments 1.5–1.7 cm, base densely yellow-white villous; anthers ovoid, 4–6 mm, densely villous, base obtuse-rounded. Ovary long ovoid. Style 2.2–2.5 cm; stigma compressed globose. Capsule oblong, 1–1.2 cm × ca. 7 mm. Seeds subglobose, dark brown. Fl. May–Jun, fr. Jul–Aug.

Sandy places; ca. 1200 m. S Xinjiang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

Records of *Cistanche tubulosa* (Schenk) Wight from China represent misidentifications of plants of *C. mongolica*. *Cistanche mongolica* differs by having rose- or violet-white corollas to 4.5 cm, whereas *C. tubulosa* has yellow corollas to 3.6 cm.

4. *Cistanche deserticola* Ma, Acta Sci. Nat. Univ. Intra-mongol. 1960(1): 63. 1960.

肉苻蓉 rou cong rong

Herbs 0.4–1.6 m tall. Stems unbranched or 2–4-branched, 2–10 cm in diam. Leaves on lower part of stem ovate or triangular-ovate, 0.5–1.5 × 1–2 cm; leaves on upper part lanceolate or linear-lanceolate, 2–4 cm × 5–10 mm, glabrous. Inflorescences spicate, 15–50 cm; bract subequalling corolla, ovate-lanceolate or lanceolate, along with bractlets and corolla sparsely pubescent abaxially; bractlets ovate-lanceolate or lanceolate, subequalling calyx. Calyx campanulate, 1–1.5 cm; lobes 5, ca. 2.5 × 3–5 mm. Corolla pale yellow-white or pale purple, becoming brown when dry, tubular-campanulate, 3–4 cm, apex 5-lobed; lobes 4–6 × 6–10 mm. Filaments 1.5–2.5 cm, base villous; anthers long ovoid, 3.5–4.5 mm, densely villous, base mucronate. Ovary ellipsoid, ca. 1 cm. Style glabrous,

usually persistent; stigma subglobose. Capsule ovoid-globose, 1.5–2.7 × 1.3–1.4 cm. Seeds ellipsoid or ovoid, 0.6–1 mm. Fl. May–Jun, fr. Jun–Aug. $2n = 40^*$.

Sandy places; 200–1200 m. Gansu, Nei Mongol, Ningxia, Xinjiang [Mongolia].

The stems are used medicinally for enriching the blood, invigorating the kidney and strengthening yang sexuality, and relaxing the bowels.

5. *Cistanche salsa* (C. A. Meyer) Beck in Engler and Prantl, Nat. Pflanzenfam. 4(3b): 129. 1895.

盐生肉苁蓉 *yan sheng rou cong rong*

Phelipaea salsa C. A. Meyer in Ledebour, Fl. Altaic. 2: 461. 1830; *Cistanche salsa* var. *albiflora* P. F. Tu & Z. C. Lou.

Herbs 10–45 cm tall. Stems unbranched, rarely 2- or 3-branched. Leaves ovate-oblong or ovate-lanceolate, 0.6–1.6 cm × 5–8 mm. Inflorescences 8–20 cm; bract ovate or oblong-lanceolate, 1–1.5(–2) cm, margin

densely yellow-white villous, sparsely pubescent abaxially; bractlets oblong-lanceolate, subequalling calyx. Calyx pale yellow or white, campanulate, ca. 1/3 as long as corolla; lobes 5, ovate or subrounded, 2.5–3 × 3–3.5 mm. Corolla tubular-campanulate, 2.5–4 cm; tube white or yellow-white; lobes 5, pale purple or purple, subrounded, 5–7 × 5–7 mm. Filaments 1.2–1.4 cm; anthers long ovoid, ca. 2.5 mm, base mucronate, along with filament base densely white villous. Ovary ovoid. Style 1.6–2 cm, glabrous, persistent; stigma subglobose. Capsule ovoid or oblong, 1–1.4 cm × 8–9 mm. Seeds subglobose, ca. 0.5 mm in diam. Fl. May–Jun, fr. Jun–Sep.

Slopes; 700–2700 m. Gansu, Nei Mongol, Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

Parasitic on species of the Chenopodiaceae.

2. OROBANCHE Linnaeus, Sp. Pl. 2: 632. 1753.

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Phelipanche Pomel.

Herbs annual, biennial, or perennial, usually tomentose, villous, or glandular pubescent, rarely glabrous. Leaves spirally or imbricately arranged, ovate, ovate-lanceolate, or lanceolate. Flowers many, in spicate or racemose inflorescences, rarely solitary; bract 1, usually similar to leaves; bractlets 2 or absent. Pedicel short or absent. Calyx cupular or campanulate, apex 4-lobed or nearly 4- or 5-parted, occasionally 5- or 6-toothed, sometimes 2-parted to base and lobes entire or 2-toothed. Corolla bilabiate, curved; upper lip entire, emarginate, or 2-lobed; lower lip 3-lobed, shorter to longer than upper lip. Stamens 4, didynamous, included; filaments base pubescent or glandular pubescent. Ovary 1-locular; parietal placentas 4; ovules numerous. Style elongated, usually persistent; stigma inflated, peltate, or 2–4-lobed. Capsule ovoid-globose or ellipsoid, dehiscing by 2 valves. Seeds numerous, minute, ellipsoid or subglobose; testa reticulate.

About 100 species: mostly in North Temperate regions, less represented in S Central America and E and N Africa; 25 species in China.

Species 1–7 belong to subgen. *Phelipanche* (Pomel) Tzvelev (bractlets 2), whereas species 8–25 belong to subgen. *Orobanche* (bractlets absent).

1a. Bractlets 2.

2a. Stems usually branched; inflorescences loose; parasitic on cultivated plants.

3a. Corolla 1.8–2 cm, pale blue or pale violet; anthers glabrous or subglabrous 6. *O. brassicae*

3b. Corolla 2–3.5 cm, blue-violet or blue; anthers villous 7. *O. aegyptiaca*

2b. Stems unbranched; inflorescences usually dense; parasitic on wild plants.

4a. Inflorescences densely arachnoid-villous and glandular pubescent; anthers glabrous, rarely subglabrous 1. *O. lanuginosa*

4b. Inflorescences glandular pubescent; anthers villous or frequently subglabrous.

5a. Folds of lower corolla lip glabrous; calyx lobes triangular-lanceolate or triangular; style glabrous; parasitic on *Kochia prostrata* 4. *O. kelleri*

5b. Folds of lower corolla lip pilose; calyx lobes usually lanceolate; style sparsely glandular pubescent; parasitic on species of the Asteraceae.

6a. Anthers densely villous along sutures 3. *O. mongolica*

6b. Anthers sparsely villous, often subglabrous.

7a. Calyx lobes lanceolate, subequalling tube; lower corolla lip usually shorter than upper 2. *O. uralensis*

7b. Calyx lobes narrowly lanceolate, 1.5–2.5 × longer than tube; lower corolla lip usually longer than upper 5. *O. coelestis*

1b. Bractlets absent.

8a. Calyx cupular, 4(or 5)-lobed.

9a. Corolla pale grayish blue or blue-purple, 2.5–3.5 cm; inflorescences 8–20(–30) cm, many flowered; calyx lobes narrowly lanceolate 17. *O. sinensis*

9b. Corolla pale yellow, 2.5–2.8 cm; inflorescences 3–6 cm, 3–6-flowered; calyx lobes triangular-lanceolate 18. *O. mupinensis*

- 8b. Calyx divided into 2 lateral, entire or 2-cleft segments.
- 10a. Inflorescences whitish arachnoid-villous.
- 11a. Anthers glabrous, rarely subglabrous 8. *O. coeruleascens*
- 11b. Anthers densely villous along sutures 9. *O. ombrochares*
- 10b. Inflorescences glandular pubescent, rarely sparsely villous.
- 12a. Corolla tubular or tubular-campanulate, slightly constricted below middle and above attachment of filaments; upper corolla lip 2-lobed or emarginate; filaments inserted 5–8(–12) mm above corolla base.
- 13a. Anthers densely villous along sutures 10. *O. pycnostachya*
- 13b. Anthers glabrous or slightly villous near base.
- 14a. Corolla strongly curved, becoming conspicuously inflated; anthers glabrous, rarely subglabrous.
- 15a. Corolla yellow or pale yellow, upper lip emarginate; bracts usually equal or longer than flowers 11. *O. solmsii*
- 15b. Corolla pale blue or pale violet on upper part, rarely pale yellow, upper lip 2-lobed; bracts shorter than flowers 12. *O. cernua*
- 14b. Corolla slightly curved, not inflated; anthers villous near base, rarely subglabrous.
- 16a. Corolla blue, blue-purple, or pale blue on upper part.
- 17a. Corolla 2–2.5 cm; calyx segments 2-toothed 13. *O. amoena*
- 17b. Corolla 1.3–2 cm; calyx segments entire, rarely 2-toothed 14. *O. clarkei*
- 16b. Corolla pale yellow or yellow-white.
- 18a. Inflorescences glandular pubescent; upper corolla lip 2-lobed ... 15. *O. sordida*
- 18b. Inflorescences villous and glandular pubescent; upper corolla lip emarginate 16. *O. kotschyi*
- 12b. Corolla campanulate or tubular-campanulate, not constricted below middle; upper corolla lip entire or emarginate; filaments inserted 1.5–6(–7) mm above corolla base.
- 19a. Corolla 2–3.5(–4) cm, subcampanulate, substraight along dorsal line.
- 20a. Anthers glabrous or subglabrous, abruptly narrowed basally into a cusp 0.1–0.3 mm; filaments inserted 1.5–3(–4) mm above corolla base; corolla pale pink or pale yellow; parasitic on species of *Galium* 20. *O. caryophyllacea*
- 20b. Anthers villous, gradually narrowed basally into a cusp 0.3–0.5 mm; filaments inserted 4–7 mm above corolla base; corolla pale yellow or pale blue 19. *O. megalantha*
- 19b. Corolla 1.5–2.5 cm, tubular-campanulate, curved along dorsal line.
- 21a. Inflorescences villous and glandular pubescent along axis and bracts; corolla pale yellow or brown-yellow often tinged with purple; parasitic on species of Apiaceae 25. *O. alsatica*
- 21b. Inflorescences glandular pubescent; corolla of different colors.
- 22a. Corolla white or yellow-white, sometimes reddish, margin glandular pubescent with reddish hairs; calyx segments usually entire; parasitic on species of Lamiaceae 21. *O. alba*
- 22b. Corolla red, yellow-brown, or pale yellow, margin glabrous or sparsely glandular, hairs not reddish; calyx segments usually 2-lobed.
- 23a. Corolla usually red 24. *O. yunnanensis*
- 23b. Corolla yellow-brown or pale yellow.
- 24a. Filaments pubescent along basal 1/4–1/3, glabrous or sparsely glandular upward; stems and leaves glandular pubescent; parasitic on species of Asteraceae 22. *O. elatior*
- 24b. Filaments pubescent along basal 1/2–3/4, glandular upward; lower part of stems and lower leaves glabrous; plants parasitic on species of *Thalictrum* 23. *O. krylowii*

1. *Orobanche lanuginosa* (C. A. Meyer) Beck ex Krylov, Trudy Obshch. Estestvoisp. Imp. Kazansk. 9: 202. 1881.

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Phelipaea lanuginosa C. A. Meyer in Ledebour, Fl. Altaic. 2: 460. 1830; *Orobanche caesia* Reichenbach; *Phelipanche caesia* (Reichenbach) Soják.

Herbs perennial or biennial, 15–30 cm tall. Stems 3–5 mm in diam., upward densely villous and glandular

pubescent. Leaves broadly lanceolate, 1–1.7 cm × 3–4 mm. Inflorescences spicate, 5–10(–13) cm; bract ovate-lanceolate, 1.2–1.5 cm, along with leaves, bractlets, and calyx lobes densely white villous and glandular pubescent at margin and abaxially; bractlets lanceolate or linear-lanceolate, 8–10 mm. Pedicel obsolete or to 2 mm. Calyx campanulate-tubular, 1–1.4 cm, 4-parted; segments 2-lobed. Corolla purple or pale blue-purple, 2–2.5 cm; upper lip 2-lobed, lobes subtriangular or semirounded, 2–3 × 3–4 mm; lower lip slightly longer than upper, lobes elliptic or oblong, 4–5 × 3–4 mm, villous and glandular pubescent at margin and abaxially. Stamens inserted near corolla base, 1–1.2 cm, glabrous; anthers ovoid, 1.8–2 mm, glabrous, base mucronate. Pistil 1.2–1.6 cm; ovary ellipsoid. Style glabrous or sparsely glandular pubescent; stigma 2-lobed. Capsule ellipsoid-globose, ca. 10 × 5 mm. Seeds ellipsoid, ca. 0.5 × 0.1 mm. Fl. Mar–Jun, fr. Jun–Sep. $2n = 24$.

Slopes, thickets; 800–2900 m. NE Xinjiang, W Xizang [Afghanistan, Kashmir, Kazakstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Uzbekistan; SW Asia, Europe].

Parasitic on species of *Artemisia* Linnaeus and *Berberis* Linnaeus.

2. *Orobanche uralensis* Beck, Monogr. Orob. 132. 1890.

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Phelipaea pallens Bunge (1847), not *Orobanche pallens* F. Schultze (1840); *Phelipanche uralensis* (Beck) Czerepanov; *P. pallens* (Bunge) Soják.

Herbs perennial, 15–20 cm. Stems unbranched, densely yellow-white glandular pubescent. Leaves ovate-lanceolate, ca. 10 × 4 mm, along with bracts, bractlets, calyx, and corolla densely yellow-white glandular pubescent at margin and abaxially. Inflorescences spicate; bract ovate-lanceolate, shorter than calyx, 5–7 mm; bractlets linear-lanceolate, ca. 8 mm, apex acuminate. Calyx campanulate, 0.9–1.1 cm, 4- or 5-lobed to middle part, occasionally 1 lobe dentate. Corolla blue-purple, 2–2.2 cm, indistinctly bilabiate; upper lip 2-lobed; lower lip subequalling upper lip; lobes subrounded, dentate and glandular pubescent at margin. Filaments inserted near base of corolla tube, 0.9–1.1 cm, glabrescent; anthers long ovoid or ellipsoid, 1.8–2 mm, white villous, base mucronate. Pistil 1.5–1.6 cm; ovary ellipsoid-globose. Style ca. 1 cm, sparsely pubescent; stigma 2-lobed. Fruit unknown. Fl. Jul–Sep. Xinjiang [Kazakstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan].

3. *Orobanche mongolica* Beck, Monogr. Orob. 117. 1890.

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Herbs 15–30 cm tall. Stems slender, yellow-brown glandular pubescent. Leaves numerous, basal ones ovate, 3–6 × 3–4 mm, upper ones lanceolate, 1–1.5 cm × 2–3 mm, glandular pubescent abaxially. Inflorescences subspicate, many flowered, 7–13 cm; bract lanceolate, shorter than calyx; bractlets narrowly linear, 1–1.2 cm × 2–3 mm, 1-veined, apex subulate, subsessile. Calyx oblique campanulate, 1.2–1.6 cm,

glandular pubescent and pubescent abaxially, 4-parted; lobes narrowly lanceolate, subequal, 6–9 mm, apex long acuminate or subulate. Corolla pale purple, 1.8–2.5 cm; upper lip 2-lobed; lower lip distinctly longer than upper; lobes subtriangular or oblong, 2–2.5 × 3.5–4.5 mm, oblong, unequal, sinuate and crenate, densely white villous; tube constricted, broadly funnelform upward, densely yellow-brown glandular pubescent. Stamens inserted at base of corolla tube, 1–1.2 cm, glabrescent or pubescent basally; anthers long ovoid, 1.5–1.8 mm, densely and white villous along suture. Ovary ellipsoid-ovoid, glandular pubescent upward. Style 1.2–1.5 cm, glandular pubescent; stigma 2-lobed. Capsule ellipsoid-globose, ca. 10 × 5 mm. Seeds long globose, ca. 0.4 × 0.3 mm. Fl. Apr–Jun, fr. Jun–Aug. • Sandy beaches, valleys; 1300–1500 m. S Liaoning (Qian Shan), SW Shaanxi (Feng Xian), E Shandong (Ai Shan).

4. *Orobanche kelleri* Novopokrovsky, Not. Syst. Herb. Inst. Bot. Acad. USSR 13: 308. 1950.

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Phelipanche kelleri (Novopokrovsky) Soják.

Herbs biennial, ca. 25 cm tall. Stems glandular pubescent. Leaves deltate-ovate or broadly lanceolate, 8–10 mm. Inflorescences spicate, ca. 14 cm; bract ovate, 6–9 mm, along with bractlets and calyx glandular pubescent abaxially; bractlets linear-subulate, shorter than bract. Calyx broadly campanulate, 8–11 mm, 4-lobed; lobes deltate or deltate-lanceolate, ca. 1/2 as long as calyx tube. Corolla pale yellow, white on tube, sometimes pale purple villous on lobes, becoming pale yellow when dry, 1.8–2.2 cm; tube slightly enlarged, constricted upward, glandular pubescent abaxially; upper lip suberect, lobes ovate. Stamens inserted near base of corolla tube, glabrous or ± pubescent; anthers white after drying, villous. Style glabrous; stigma yellow. Fl. Jun–Jul.

S Xinjiang [Kazakstan, Russia].

Parasitic on *Kochia prostrata* (Linnaeus) Schrader.

5. *Orobanche coelestis* (Reuter) Boissier & Reuter ex Beck, Monogr. Orob. 114. 1890.

长齿列当 chang chi lie dang

Phelipaea coelestis Reuter in A. de Candolle, Prodr. 11: 5. 1847; *Orobanche coelestis* f. *persia* Beck; *O. heldreichii* (Reuter) Beck; *Phelipaea heldreichii* Reuter; *Phelipanche coelestis* (Reuter) Soják.

Herbs biennial, 15–40 cm tall. Stems unbranched, white glandular pubescent, glabrescent upward. Leaves ovate-lanceolate or lanceolate, 1–1.5 cm. Inflorescences spicate, 6–18 cm; bract ovate-lanceolate, 0.8–1.8 cm, along with bractlets, calyx, and corolla glandular pubescent abaxially; bractlets narrowly lanceolate or linear, shorter than calyx, subsessile or short pedicelled.

Calyx short campanulate, 1–1.5 cm, 4-lobed; lobes narrowly lanceolate, ca. 2/3 as long as calyx. Corolla blue, tubular; tube slightly whitish, pubescent adaxially, 1.8–2.6 cm; upper lip 2-lobed; lower lip longer than upper. Stamens pubescent basally, sparsely glandular pubescent upward, rarely glabrous; anthers sparsely villous, base mucronate. Ovary ellipsoid-globose. Style short, glandular pubescent; stigma 2-lobed. Capsule ellipsoid-globose, 0.9–1.1 cm. Seeds ellipsoid or globose, 0.4–0.6 mm. Fl. May–Jun, fr. Jun–Sep.

S Xinjiang [S Kazakstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

Parasitic on species of *Centaurea* Linnaeus, *Eryngium* Linnaeus, *Micromeria* Benth, *Phlomis* Linnaeus, *Tanacetum* Linnaeus, and *Thymus* Linnaeus.

6. *Orobanchae brassicae* (Novopokrovsky) Novopokrovsky, *Izv. Donsk. Inst. Sel'sk. Khoz. Melior.* 9: 47, 54, 58. 1929.

光药列当 *guang yao lie dang*

Orobanchae mutellii F. Schultz subsp. *brassicae* Novopokrovsky, *Izv. Donsk. Inst. Sel'sk. Khoz. Melior.* 8: 52. 1928; *Phelipanche brassicae* (Novopokrovsky) Soják.

Herbs annual, 10–30 cm tall, densely glandular pubescent. Stems ± branched from base. Leaves 1–8 cm, along with bracts, bractlets, calyx, and corolla densely glandular pubescent at margin and abaxially. Inflorescences spicate, 7–10 cm; bract ovate-lanceolate, ca. 8 × 3.5 mm, apex acute; bractlets linear, 6–7 mm, apex acuminate. Calyx ca. 8 mm, 4-lobed; lobes subequal, lanceolate, 4–5 mm, apex acute. Corolla pale blue-purple, suberect, 1.8–2 cm, gradually enlarged upward; upper lip 2-lobed; lobes subtriangular, ca. 2.5 × 3.5 mm, white villous at margin and adaxially, margin dentate. Stamens inserted near base of corolla tube, 8–10 mm, sparsely pubescent below middle; anthers ovoid, ca. 1.5 mm, glabrous, base mucronate. Pistil ca. 1.5 cm; ovary ellipsoid. Style ca. 1 cm, sparsely glandular pubescent above middle; stigma 2-lobed. Capsule ellipsoid-globose. Seeds subglobose, ca. 0.4 mm in diam. Fl. Mar–May, fr. May–Aug. Naturalized in Fujian (Xiamen City) [India, Russia; SW Asia, Europe].

Parasitic on *Brassica oleracea* Linnaeus var. *capitata* Linnaeus.

7. *Orobanchae aegyptiaca* Persoon, *Syn. Pl.* 2: 181. 1807.

分枝列当 *fen zhi lie dang*

Orobanchae indica Buchanan-Hamilton ex Roxburgh; *Phelipaea aegyptiaca* (Persoon) Walpers; *P. indica* (Buchanan-Hamilton ex Roxburgh) G. Don; *Phelipanche aegyptiaca* (Persoon) Pomel.

Herbs annual, 15–50 cm tall, glandular pubescent. Stems branched above middle. Leaves ovate-lanceolate, 8–10 × 2–4 mm, along with bracts, bractlets, calyx, and corolla densely glandular pubescent abaxially. Inflorescences spicate, 8–15 cm; bract ovate-lanceolate or lanceolate, 6–10 × 3–4 mm; bractlets linear, 6–10 mm. Flowers sessile or short pedicelled. Calyx

campanulate, 1–1.4 cm, 4- or 5-lobed to middle; lobes linear-lanceolate, 4–7 mm. Corolla blue-purple, 2–3.5 cm, suberect; tube ca. 2 cm; upper lip 2-lobed; lower lip longer than upper; lobes entire, white villous at margin. Pistil 2.2–2.6 cm; ovary ellipsoid. Style 1.8–2 cm, glandular pubescent; stigma 2-lobed, lobes semirounded. Capsule oblong, 0.8–1.2 cm × ca. 6 mm. Seeds long ovoid, 0.4–0.6 × ca. 0.2 mm. Fl. Apr–Jun, fr. Jun–Aug. $2n = 24$.

Fields, gardens; 100–1400 m. Xinjiang [Afghanistan, Bangladesh, India, Kashmir, Kazakstan, Kyrgyzstan, Nepal, Pakistan, S Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia].

Parasitic on *Citrullus lanatus* (Thunberg) Matsumura & Nakai, *Cucumis melo* Linnaeus, *C. sativa* Linnaeus, and *Lycopersicon esculentum* Miller.

8. *Orobanchae coerulescens* Stephan in Willdenow, *Sp. Pl.* 3: 349. 1800.

列当 *lie dang*

Orobanchae ammophila C. A. Meyer; *O. bodinieri* H. Léveillé; *O. canescens* Bunge; *O. coerulescens* var. *albiflora* Kuntze; *O. coerulescens* f. *korshinskyi* (Novopokrovsky) Ma; *O. coerulescens* f. *pekinensis* Beck; *O. korshinskyi* Novopokrovsky; *O. mairei* H. Léveillé; *O. japonensis* Makino; *O. nipponica* Makino; *O. pycnostachya* Hance var. *yunnanensis* Beck.

Herbs biennial, 15–40(–50) cm tall, densely villous. Stems erect, unbranched. Leaves ovate-lanceolate, 1.5–2 cm × 5–7 mm, along with bracts and calyx densely villous at margin and abaxially. Inflorescences 10–20 cm; bract similar to leaves; bractlets absent. Calyx 1.2–1.5 cm, 2-parted almost to base; segments divided to half; lobes narrowly lanceolate, 3–5 mm. Corolla dark blue, blue-purple, pale purple, or yellow, 2–2.5 cm; tube constricted, open upward; upper lip 2-lobed, rarely emarginate. Filaments 1.2–1.4 cm, usually villous; anthers ovoid, ca. 2 mm, glabrous. Pistil 1.5–1.7 cm; ovary ellipsoid. Style as long as filaments, usually glabrous; stigma 2-lobed. Capsule ovoid-oblong or oblong, ca. 10 × 4 mm. Seeds irregularly ellipsoid or long ovoid, ca. 0.3 mm. $2n = 38$.

Slopes, grasslands; 900–4000 m. Gansu, Hebei, Heilongjiang, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Japan, Kazakstan, Korea, Kyrgyzstan, Mongolia, Nepal, Russia, Turkmenistan; Europe].

Parasitic on species of *Artemisia* Linnaeus.

The whole plant is used medicinally for invigorating the kidneys and strengthening yang, relaxing the bowels, strengthening bones and muscles.

Plants with white-yellow flowers, which have been recognized as f. *korshinskyi* or var. *albiflora*, are distributed in Gansu, Hebei, Heilongjiang, Liaoning, and Nei Mongol, as well as in Europe, Mongolia, and Russia.

9. *Orobanchae ombrochares* Hance, *J. Linn. Soc., Bot.* 13: 84. 1873.

毛药列当 *mao yao lie dang*

Orobanchae coerulescens Stephan f. *ombrochares* (Hance) Beck.

Herbs 15–30 cm tall, densely white arachnoid-tomentose throughout. Stems erect, unbranched. Leaves ovate-lanceolate or lanceolate, 1.5–2.2 cm × 4–5 mm, along with bracts and calyx densely white arachnoid-tomentose abaxially and villous. Inflorescences spicate, many flowered, terminal, 8–15 cm; bract shorter than leaves; bractlets absent. Calyx 1–1.2 cm, 2-parted to base; segments 2-toothed; lobes lanceolate, unequal, 3–4 mm. Corolla dark blue and blue-purple, 2–2.5 cm; upper lip 2-lobed; lower lip slightly longer than upper; lobes oblong, margin irregularly crenate. Filaments ca. 1 cm, lower and basal part pubescent; anthers ovoid, 1.8–2 mm, densely white tomentose-villous along suture. Style shorter than stamens; stigma 2(–4)-lobed. Capsule rounded, ca. 1 cm. Seeds subglobose or oblong, ca. 0.3 × 0.2 mm. Fl. Apr–Jul, fr. Jul–Oct.

• Sandy places on slopes; 600–1300 m. Hebei, Liaoning (Zhangwu Xian), Nei Mongol, Shaanxi, Shanxi.

10. *Orobanche pycnostachya* Hance, J. Linn. Soc., Bot. 13: 84. 1873.

黄花列当 *huang hua lie dang*

Herbs perennial or biennial, 10–40(–50) cm tall, densely glandular pubescent. Stems unbranched, erect. Leaves ovate-lanceolate or lanceolate, 1–2.5 cm × 4–8 mm, along with bracts, calyx lobes, and corolla lobes densely glandular pubescent at margin and abaxially. Inflorescences spicate, 8–20 cm, many flowered; bract ovate-lanceolate, 1.6–1.8 cm × 4–6 mm, apex caudate-acuminate or long caudate-acuminate; bractlets absent. Calyx 1.2–1.5 cm, 2-parted to base; segments 2-lobed; lobes narrowly lanceolate or sublinear, unequal, 4–6 mm. Corolla 2–3 cm; tube slightly curved, constricted, enlarged upward; upper lip 2-lobed, occasionally emarginate; lower lip longer than upper; lobes subrounded, margin sinuate or irregularly dentate. Filaments 1.4–1.6 cm, sparsely glandular pubescent basally; anthers ovoid, villous. Ovary oblong-ellipsoid. Style ca. 1.5 cm, sparsely glandular pubescent; stigma 2-lobed. Capsule oblong, ca. 10 × 3–4 mm. Seeds oblong, ca. 0.3 × 0.2 mm.

Slopes, roadsides, grasslands; 300–2500 m. Anhui, Fujian, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Zhejiang [Korea, Mongolia, Russia].

1a. Corolla yellow 10a. var. *pycnostachya*

1b. Corolla blue or blue-purple 10b. var. *amurensis*

10a. *Orobanche pycnostachya* var. *pycnostachya*

黄花列当(原变种) *huang hua lie dang* (*yuan bian zhong*)

Corolla yellow. Fl. Apr–Jun, fr. Jun–Aug.

Slopes, grasslands; 300–2500 m. Anhui, Fujian, Hebei, Heilongjiang, Henan, Jiangsu, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Zhejiang [Korea, Mongolia, Russia].

Parasitic on species of *Artemisia* Linnaeus.

10b. *Orobanche pycnostachya* var. *amurensis* Beck, Monogr. Orob. 141. 1890.

黑水列当 *hei shui lie dang*

Orobanche amurensis (Beck) Komarov.

Corolla blue or blue-purple. Fl. Apr–Jun, Jun–Aug.

Slopes, roadsides, grasslands; 300–1400 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shanxi [Korea, Russia (Far East)].

Parasitic on species of *Artemisia* Linnaeus.

11. *Orobanche solmsii* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 325. 1884.

长苞列当 *chang bao lie dang*

Herbs perennial or biennial, 15–20 cm tall, densely white villous and glandular pubescent. Stems 10–15 cm. Leaves lanceolate or long lanceolate, 2–2.5 cm × 3–4 mm, along with bracts and calyx densely white villous and glandular pubescent at margin and abaxially, apex long acuminate. Inflorescences spicate, 5–10 × 2.5–3 cm; bract lanceolate or narrowly lanceolate, usually longer than flowers, 1.2–1.6 cm × 2–3 mm, apex acuminate; bractlets absent. Calyx ca. 9 mm, 2-parted to base; segments 2-lobed; lobes linear, longest ca. 5 mm, shorter ones 2.5–3 mm. Corolla yellow, 1.3–2 cm, curved, densely glandular pubescent abaxially; upper lip emarginate, lower lip shorter than upper; lobes subrounded, dentate, villous. Filaments inserted near base of corolla tube, ca. 8 mm, sparsely pubescent basally, glabrescent upward; anthers oblong, 1.4–1.8 mm, glabrous. Pistil 1–1.2 cm; ovary oblong. Style ca. 6 mm, sparsely pubescent; stigma 2-lobed. Capsule oblong, ca. 10 × 3–5 mm. Seeds oblong, ca. 0.4 × 0.2 mm. Fl. May–Jun, fr. Jun–Aug.

Waste places and forests; ca. 2700 m. S Xinjiang, W and SE Xizang [Bhutan, Kashmir, Nepal, Pakistan, Sikkim].

Parasitic on species *Heracleum* Linnaeus.

Orobanche solmsii was misidentified as *O. sinensis* in Fl. Xizang 4: 389. 1985.

12. *Orobanche cernua* Loefling, Iter Hispan. 152. 1758.

弯管列当 *wan guan lie dang*

Herbs annual, biennial, or perennial, 15–35(–40) cm tall, densely glandular pubescent, usually with branched fleshy roots. Stems unbranched. Leaves deltate-ovate or ovate-lanceolate, 1–1.5 cm × 5–7 mm, along with bracts, calyx, and corolla densely glandular pubescent abaxially, glabrescent adaxially. Inflorescences spicate, 5–20(–30) cm; bract ovate or ovate-lanceolate, 1–1.5 cm × 5–6 mm; bractlets absent. Calyx campanulate, 1–1.2 cm, irregularly 2-parted to base; segments 2-lobed, rarely entire; lobes linear, 2 longer than others. Corolla 1–2.2 cm; tube pale yellow or dark blue-purple, distinctly enlarged, turned into a rounded curve or suberect, constricted upward; upper lip 2-lobed; lower lip slightly shorter than upper; lobes pale purple or pale blue, subrounded. Filaments 7–9 mm, glabrous or pubescent basally; anthers ovoid, 1–1.2 mm, glabrous. Ovary ovoid-oblong. Style 6–8 mm; stigma 2-lobed. Capsule oblong or oblong-ellipsoid, 1–1.2 cm × 5–7 mm. Seeds long ellipsoid, 0.4–0.5 × ca. 0.2 mm.

Grasslands, slopes, forests, roadsides; 500–3000 m. Gansu, Hebei, W Jilin, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, W Xizang [Afghanistan, Kazakstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

The reports in FRPS of *Orobanche cernua* var. *cernua* represent plants of var. *cumana*. The former variety probably does not occur in China and appears to be restricted to SW Asia and Europe.

Orobanche cernua is highly variable in plant size, division of calyx, size and color of flowers, and pubescence of filaments. It requires further studies, and the account adopted here is provisional.

1a. Corolla pale yellow, tube distinctly enlarged and turned into a rounded curve; filaments glabrous 12a. var. *cumana*

1b. Corolla dark blue-purple, tube suberect or slightly curved; filaments pubescent basally 12b. var. *hansii*

12a. *Orobanche cernua* var. *cumana* (Wallroth) Beck, Monogr. Orob. 143. 1890.

欧亚列当 ou ya lie dang

Orobanche cumana Wallroth, Orob. Gen. Diask. 58.

1825; *O. bicolor* C. A. Meyer; *O. cernua* subsp.

cumana (Wallroth) Soó.

Corolla pale yellow, tube distinctly enlarged and turned into a rounded curve. Filaments glabrous. $2n = 24$.

Grasslands, slopes, forests, roadsides; 500–3000 m. Gansu, Hebei, W Jilin, Nei Mongol, Qinghai, Shaanxi, Shanxi, Xinjiang [Afghanistan, Kazakstan, Kyrgyzstan, Mongolia, Nepal, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

Parasitic on species of *Artemisia* Linnaeus.

Orobanche cernua is highly variable in plant size, division of calyx, size and color of flower, and pubescence of filaments. It requires further studies, and the account adopted here is provisional.

12b. *Orobanche cernua* var. *hansii* (A. Kerner) Beck, Monogr. Orob. 144. 1890.

直管列当 zhi guan lie dang

Orobanche hansii A. Kerner, Nov. Pl. Spec. Decas 2:

15. 1870; *Cistanche feddeana* Hao.

Corolla dark blue-purple, tube suberect or slightly curved. Filaments pubescent basally.

Sichuan, S Xinjiang, W Xizang [Afghanistan, Kazakstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

Parasitic on species of *Cousinia* Cassini.

A critical study of the type of *Cistanche feddeana* reveals that it belongs to the *Orobanche cernua* complex. It is placed in var. *hansii* on account of its flower color and pubescent filaments.

13. *Orobanche amoena* C. A. Meyer in Ledebour, Fl. Altaic. 2: 457. 1830.

美丽列当 mei li lie dang

Herbs 15–30 cm tall, densely white villous. Stems erect, unbranched. Leaves ovate-lanceolate, 1.5–2.2 cm × 4–5 mm, along with bracts and calyx densely white arachnoid-tomentose at margin and abaxially.

Inflorescences spicate, 8–15 cm, many flowered; bract similar to and subequalling leaves; bractlets absent.

Calyx 1–1.2 cm, 2-parted to base; segments 2-toothed;

lobes lanceolate, 3–4 mm. Corolla dark blue or blue-purple, 2–2.5 cm; tube constricted, slightly enlarged upward; upper lip 2-lobed; lower lip slightly longer than upper; lobes oblong, margin irregularly dentate. Filaments 1.2–1.3 cm, sparsely pubescent near base. Pistil shorter than flowers. Style sparsely pubescent distally; stigma 2(–4)-lobed. Capsule oblong, ca. 1 cm. Seeds subglobose or oblong, ca. 0.3 × 0.2 mm. Fl. Apr–Jul, fr. Jul–Oct.

Slopes, sandy places; 600–1500 m. Hebei, Liaoning (Zhangwu Xian), Nei Mongol, Shaanxi, Shanxi (Huangqu Xian), Xinjiang [Kazakstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan].

14. *Orobanche clarkei* J. D. Hooker, Fl. Brit. India 4: 326. 1884.

西藏列当 xi zang lie dang

Herbs perennial or biennial, 5–15 cm tall, densely glandular pubescent. Stems erect. Leaves lanceolate, 5–8 × 2–4 mm, along with bract, calyx, and corolla densely glandular pubescent abaxially. Inflorescences spicate, 2–5 cm; bract ovate-lanceolate, ca. 1/2 as long as corolla; bractlets absent. Calyx 6–8 mm, 2-parted to base; lobes ovate, ovate-lanceolate, or lanceolate, usually entire or 2-lobed. Corolla blue-purple, 1.3–1.7 cm; tube suberect, not enlarged; upper lip 2-lobed; lower lip slightly shorter than upper, margin dentate. Filaments 6–7 mm, glabrous; anthers long ovoid, 1–1.2 mm, glabrous or subglabrous, base mucronate. Ovary long ellipsoid. Style slender, glandular pubescent; stigma 2-lobed. Capsule oblong, 7–8 × 3–4 mm. Seeds ovoid-oblong. Fl. May–Jun, fr. Jul–Aug.

Thickets; 2900–3400 m. W Xizang (Zhada Xian) [Kashmir, Pakistan, Tajikistan].

Orobanche clarkei was misidentified as *O. cernua* in Fl. Xizang 4: 389. 1985.

15. *Orobanche sordida* C. A. Meyer in Ledebour, Fl. Altaic. 2: 455. 1830.

淡黄列当 dan huang lie dang

Herbs 25–30 cm. Stems 15–20 cm, short glandular pubescent. Leaves ovate-oblong, 1–1.2 cm × ca. 4 mm, glabrescent abaxially. Inflorescences spicate, 8–12 cm; bract oblong-lanceolate, ca. 10 × 4–5 mm, along with calyx and corolla sparsely glandular pubescent abaxially, glabrescent adaxially; bractlets absent. Calyx 2-parted to base; lobes lanceolate, 2-segmented halfway, rarely entire; lobes narrowly lanceolate, subequal, 4–6 mm, apex acuminate. Corolla pale yellow, slightly curved, 2–2.2 cm; tube slightly constricted, slightly enlarged upward; upper lip 2-lobed, lobes semirounded, 2–2.5 × ca. 4 mm; lobes of lower lip oblong, 3–4 × 3–3.5 mm, entire or indistinctly dentate. Filaments 1–1.2 cm, base sparsely pubescent; anthers ellipsoid, ca. 1.8 mm, sparsely pubescent. Pistil ca. 1.5 cm; ovary oblong. Style ca. 1 cm, sparsely glandular pubescent; stigma 2-parted, lobes subrounded. Capsule obovoid-oblong, 8–10 × ca. 5 mm. Fl. May–Jul, fr. Jul–Sep.

Xinjiang (Tacheng Xian) [Kazakstan, Russia].

16. *Orobanche kotschy* Reuter in A. de Candolle, Prodr. 11: 33. 1847.

缢筒列当 yi tong lie dang

Orobanche gigantea (Beck) Gontsch; *O. kotschy* Reuter var. *gigantea* Beck.

Herbs biennial or perennial, 30–60 cm tall, densely white villous. Stems erect. Leaves lanceolate, 1–1.5 cm × ca. 5 mm, upper ones densely white villous. Inflorescences spicate, 10–20 cm; bract lanceolate, 1.5–2 cm, apex acuminate, along with calyx densely white villous; bractlets absent. Calyx 1–1.2 cm, 2-parted to base; segments 2-lobed halfway; lobes linear-lanceolate, 5–7 mm. Corolla pale yellow or ?blue-purple, 2–2.5 cm; tube slightly enlarged, middle part distinctly constricted, enlarged and strongly curved upward, sparsely pubescent abaxially, glabrescent adaxially; upper lip entire or emarginate; lobes elliptic, subequal, margin sinuate or dentate. Filaments 1–1.2 cm, base pubescent; anthers oblong, 1.8–2 mm, densely white villous. Ovary oblong-ellipsoid. Style 1.2–1.4 cm, sparsely pubescent or glabrous; stigma 2-lobed. Capsule oblong, 1–1.4 cm. Seeds ovoid-ellipsoid, 0.3–0.5 mm. Fl. May–Jul, fr. Jul–Sep.

Slopes; ca. 600 m. N Xinjiang [Afghanistan, Kazakstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

Parasitic on species of the Apiaceae.

It is not clear if *Orobanche gigantea* should be reduced to the synonymy of *O. kotschy*.

17. *Orobanche sinensis* Harry Smith, Acta Hort. Gothob. 8: 128. 1933.

四川列当 si chuan lie dang

Plants densely glandular pubescent and villous. Stems thick. Leaves ovate-lanceolate, 1.2–2 cm × 4–6 mm, along with bracts and calyx lobes yellow-brown glandular and white villous at margin and abaxially. Inflorescences spicate, 10–20(–30) cm, many flowered; bract ovate-lanceolate, 1.4–1.6 cm × ca. 5 mm, glabrous adaxially. Flowers subsessile; bractlets absent. Calyx tubular, 1–1.4 cm, irregularly 2-lobed; segments 2-lobed; lobes linear or linear-lanceolate, unequal. Corolla pale gray-blue, blue, or blue-purple, rarely yellow, 2.5–3.5 cm; tube suberect, densely glandular pubescent abaxially, villous adaxially; upper lip entire or 2-lobed; lower lip subequalling upper. Filaments 1.8–2.1 cm, white villous basally, sparsely glandular pubescent upward; anthers long ovoid, 2.5–3 mm, densely villous. Pistil 1.5–2.5 cm; ovary long ellipsoid, glandular pubescent. Style 1.5–2 cm, glandular pubescent; stigma 2-lobed. Capsule oblong, 1–1.2 cm × ca. 4 mm. Seeds oblong, ca. 0.4 × 0.25 mm.

• Slopes, roadsides, forests, thickets; 1600–3500 m. S Qinghai (Nangqian Xian), NW Sichuan, SE Xizang.

1a. Plants 20–40 cm tall; corolla tube

not constricted, enlarged funnellform

upward, upper lip entire 17a. var. *sinensis*

1b. Plants ca. 20 cm tall; corolla tube

constricted, slightly enlarged upward,

upper lip entire or 2-lobed 17b. var. *cyanescens*

17a. *Orobanche sinensis* var. *sinensis*

四川列当(原变种) si chuan lie dang (yuan bian zhong)

Plants 20–40 cm tall. Corolla tube not constricted, enlarged funnellform upward; upper lip entire. Fl. May–Jun, fr. Jun–Aug.

• Slopes, roadsides, forests, thickets; 1600–3500 m. S Qinghai (Nangqian Xian), NW Sichuan, SE Xizang.

Parasitic on species of *Artemisia* Linnaeus.

17b. *Orobanche sinensis* var. *cyanescens* (Harry Smith) Z. Y. Zhang, Acta Phytotax. Sin. 26: 395. 1988.

蓝花列当 lan hua lie dang

Orobanche cyanescens Harry Smith, Acta Hort. Gothob. 8: 130. 1933.

Plant ca. 20 cm tall. Corolla tube constricted, slightly enlarged upward; upper lip entire or 2-lobed; lobes irregularly dentate, villous. Fl. May–Jun, fr. Jun–Aug.

• Slopes; 1800–2000 m. NW Sichuan.

18. *Orobanche mupinensis* Hu, Bull. Fan. Mem. Inst. Biol. Bot. ser. 9: 202. 1939.

宝兴列当 bao xing lie dang

Herbs 15–20 cm tall, densely glandular pubescent. Stems suberect. Leaves ovate-lanceolate, 0.8–1.2 cm × 3–5 mm, along with bracts and calyx densely glandular pubescent abaxially. Inflorescences spicate, ca. 4 cm, 3–5-flowered; bract ovate-lanceolate, as long as leaves; subsessile; bractlets absent. Calyx campanulate, ca. 1 cm, irregularly 2-parted; segments 2-lobed; lobes triangular-lanceolate, 5–7 mm, apex acuminate. Corolla pale yellow, tubular-funnelform, 2.5–2.8 cm; upper lip entire, apex glabrescent adaxially, mucronate, mucro 1–2 mm; lower lip shorter than upper; lobes subrounded, ca. 3 mm in diam., sparsely pubescent. Filaments 1.9–2.1 cm, densely villous basally; anthers ovoid, ca. 3 mm, white villous. Pistil ca. 2 cm; ovary ellipsoid. Style ca. 1.6 cm, upper part pubescent; stigma 2-lobed. Fruit unknown. Fl. May–Jul.

• Roadsides; ca. 2100 m. Sichuan (Baoping Xian).

19. *Orobanche megalantha* Harry Smith, Acta Hort. Gothob. 8: 131. 1933.

大花列当 da hua lie dang

Orobanche eximia Harry Smith.

Herbs 16–18 cm tall. Stems erect, yellow-brown glandular pubescent. Leaves triangular or triangular-lanceolate, 0.8–1.2 cm × 3–5 mm, along with bracts, calyx, and corolla densely glandular pubescent abaxially. Inflorescences spicate, 5–10 cm; bract ovate-lanceolate, 1.2–1.4 cm × 6–7 mm; bractlets absent.

Calyx ca. 1.3 cm, irregularly 2-parted; segments 2-lobed, sparsely pubescent adaxially; lobes lanceolate, 5–6 mm, 1-veined. Corolla yellow or blue, tubular-funnelform, 3.5(–5) cm; tube not constricted; upper lip entire; lower lip slightly shorter than upper; lobes subrounded, 5–6 mm, margin sinuate. Filaments 2–2.2 cm, base villous, sparsely glandular pubescent upward; anthers ovoid, 2.5–3 mm, villous. Pistil ca. 2.5 cm; ovary glandular pubescent. Style ca. 2 cm, glandular pubescent; stigma 2-lobed. Fruit and seeds unknown. Fl. May–Jun.

• N Sichuan (Wenchuan Xian).

Parasitic on species of *Indigofera* Linnaeus and *Jasminum* Linnaeus.

20. *Orobanche caryophyllacea* Smith, Trans. Linn. Soc. 4: 169. 1797.

丝毛列当 *si mao lie dang*

Orobanche galii Duby; *O. major* Linnaeus; *O. quadrifida* C. Koch; *O. vulgaris* Poiret.

Herbs 35–50 cm tall. Stems 15–30 cm, sparsely glandular pubescent upward. Leaves ovate-lanceolate or lanceolate, 2–2.5 cm × 4–6 mm, glabrous adaxially, glandular pubescent at margin and abaxially. Inflorescences spicate, 10–20 cm; bract ovate-lanceolate, 2–3 cm × 4–5 mm, along with calyx densely glandular pubescent; bractlets absent. Calyx 1–1.2 cm, irregularly 2-parted; segments lanceolate, entire or 2-lobed; lobes linear-lanceolate, unequal, 4–8 mm, usually 3-veined, apex long acuminate. Corolla yellow, 2–3.5 cm; tube not constricted, distinctly enlarged upward; upper lip slightly emarginate or mucronate; lobes subrounded, unequal, glandular pubescent at margin and on both sides, margin irregularly dentate or sinuolate. Filaments 1.2–1.4 cm, white villous proximally, glabrescent distally; anthers oblong, 1.8–2 mm, white pubescent. Pistil ca. 1.6 cm; ovary narrowly ellipsoid. Style ca. 1 cm, glandular pubescent; stigma 2-lobed, lobes globose, ca. 1 mm in diam. Capsule oblong, 1–1.2 cm. Seeds oblong, 0.4–0.5 × ca. 0.3 mm. Fl. May–Jul, fr. Jul–Sep. $2n = 38$.

E and N Xinjiang [Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe].

Parasitic on species of *Galium* Linnaeus.

21. *Orobanche alba* Stephan in Willdenow, Sp. Pl. 3: 350. 1800.

白花列当 *bai hua lie dang*

Herbs 35–65 cm tall, glandular pubescent. Stems erect, thick. Leaves ovate or ovate-lanceolate, 2–3 cm × 6–8 mm, along with bracts, calyx, and corolla lobes glandular pubescent at margin and abaxially. Inflorescences spicate, 10–22 cm, many flowered; bract lanceolate, 2–2.5 cm, apex long acuminate or caudate-acuminate; bractlets absent. Calyx usually 2-parted to base; segments ovate, oblong, or lanceolate, 1–1.5 cm,

entire or irregularly 2-lobed; lobes lanceolate, unequal. Corolla usually pinkish white or whitish, campanulate, slightly curved, 2–2.5 cm; tube enlarged; upper lip entire or emarginate; lower lip slightly shorter than upper; lobes subrounded, ca. 3 mm in diam., dentate, villous. Filaments 0.9–1.2 cm, base sparsely pubescent, glandular pubescent upward; anthers oblong, ca. 1.5 mm, pubescent. Pistil 1.6–1.8 cm; ovary oblong, densely glandular pubescent. Style ca. 1 cm, densely glandular pubescent; stigma usually red, 2-lobed, lobes semirounded. Capsule oblong, 1–1.2 cm × ca. 3 mm. Seeds oblong, ca. 0.4 × 0.2 mm. Fl. Apr–Jun, fr. Jul–Aug. $2n = 38$.

Slopes, valleys, roadsides; 2500–3700 m. NW Sichuan, SE Xizang [Afghanistan, Kashmir, Nepal, Pakistan, Turkmenistan; SW Asia, Europe].

Parasitic on species of the Lamiaceae.

22. *Orobanche elatior* Sutton, Trans. Linn. Soc. 4: 178. 1797.

短唇列当 *duan chun lie dang*

Herbs 25–45 cm tall. Stems erect, densely glandular pubescent. Leaves ovate-lanceolate, 1.5–2 cm × ca. 4 mm, along with bracts and calyx densely glandular pubescent abaxially and at margin. Inflorescences spicate, 6–15 cm, many flowered; bract similar to and as long as leaves; bractlets absent. Calyx 1–1.3 cm, irregularly 2-parted, rarely 2-parted to base; lobes ovate-lanceolate, usually irregularly 2-lobed, rarely entire. Corolla yellow or yellow-brown, campanulate, 2–2.5 cm, curved; tube enlarged upward; upper lip entire or emarginate, 7–9 mm; lower lip shorter than upper; lobes subrounded, unequal, glandular pubescent abaxially, margin irregularly dentate, glabrous. Filaments 1–1.2 cm, base sparsely pubescent, glandular pubescent upward; anthers ovoid, 1.5–1.8 mm, pubescent. Pistil 1.6–1.8 cm; ovary ellipsoid, upper part sparsely glandular pubescent. Style ca. 1 cm; stigma 2-lobed. Capsule oblong, 1–1.2 cm × 3–4 mm. Seeds oblong, ca. 0.4 × 0.3 mm. Fl. May–Jul, fr. Jul–Sep. $2n = 38$.

Slopes, forests, sandy places; 900–3500 m. S Gansu, W Hubei, Xinjiang [India, Kazakstan, Kyrgyzstan, Russia, Tajikistan; SW Asia, Europe].

Parasitic on species of the Asteraceae (Cardueae).

The name *Orobanche major* Linnaeus has been misapplied to this species.

23. *Orobanche krylowii* Beck, Oesterr. Bot. Z. 31: 309. 1881.

丝多毛列当 *si duo mao lie dang*

Orobanche major Linnaeus f. *krylowii* (Beck) Beck. Herbs perennial, 20–40 cm tall. Stems glabrous below, sparsely glandular pubescent above. Leaves ovate-lanceolate or lanceolate, 1–2 cm × 3–7 mm, lower ones glabrous, others glandular pubescent. Inflorescences spicate, 6–20 cm, usually shorter than stem; bract ovate or broadly lanceolate, 1.2–1.8 cm × 3–7 mm, glandular pubescent; bractlets absent. Calyx 6–12 mm, 2-parted;

segments unequally 2-lobed or entire; lobes narrowly lanceolate, apex acuminate. Corolla tubular-campanulate, pale yellow, curved, glandular pubescent, 1.7–2.2 mm, constricted below middle; upper lip subentire; lobes subglabrous at margin. Filaments 0.8–1.4 cm, pubescent along basal 1/2–3/4, glandular above; anthers oblong, villous. Style sparsely glandular pubescent. Capsule ellipsoid. Seeds oblong. Fl. Jun–Jul, fr. Jul–Aug.

Slopes, thickets, roadsides, forests; 1000–2500 m. Xinjiang [Kazakistan, Kyrgyzstan, Russia].

Parasitic on species of *Thalictrum* Linnaeus.

No material of this species has been found in Chinese herbaria.

24. *Orobanche yunnanensis* (Beck) Handel-Mazzetti, Symb. Sin. 7: 875. 1936.

滇列当 dian lie dang

Orobanche alsatica Kirschleger var. *yunnanensis* Beck in Engler, Pflanzenr. IV. 261 (Heft 96): 259. 1930.

Herbs biennial or perennial, 15–25 cm tall, densely glandular pubescent. Stems erect, unbranched. Leaves ovate-lanceolate, 1–1.5 cm × 4–6 mm, along with bracts, calyx, and corolla lobes densely glandular pubescent at margin and abaxially. Inflorescences spicate, 6–10(–12) cm; bracts ovate-lanceolate or lanceolate, 1–1.5(–1.8) cm × 4–6 mm, apex long acuminate or caudate-acuminate; bractlets absent. Calyx 1–1.2(–1.5) cm, irregularly 2-parted to base; lobes long ovate or ovate-lanceolate, 2- or 3-lobed or entire. Corolla usually red, rarely yellow-brown, becoming red-brown or brown when dry, 1.5–1.8(–2) cm, curved; tube enlarged; upper lip elongated, 5–6 mm, apex emarginate; lower lip ca. 1/2 as long as upper; lobes usually reflexed, semirounded, ca. 2 × 3 mm, glandular pubescent, indistinctly dentate villous. Filaments 9–10 mm, sparsely pubescent basally, sparsely glandular pubescent upward; anthers oblong, 1–1.2 mm, sparsely pubescent. Pistil ca. 1.7 cm; ovary ellipsoid, glandular pubescent. Style ca. 1 cm, glandular pubescent; stigma

2-lobed. Capsule ellipsoid, ca. 8 × 3–4 mm. Seeds long ellipsoid, ca. 0.3 × 0.2 mm. Fl. May–Jun, fr. Jul–Aug.

• Slopes; 2200–3400 m. W Guizhou (Weining Xian), SW Sichuan (Muli Xian), N Yunnan.

Orobanche yunnanensis was misidentified as *O. sinensis* in Fl. Xizang 4: 389. 1985.

Parasitic on species of *Origanum* Linnaeus and other Lamiaceae.

25. *Orobanche alsatica* Kirschleger, Prodr. Fl. Alsace 109. 1836.

多色列当 duo se lie dang

Orobanche alsatica subsp. *libanotidis* (Ruprecht)

Tzvelev; *O. alsatica* var. *libanotidis* (Ruprecht) Beck;

O. bartlingii Grisebach; *O. libanotidis* Ruprecht.

Plants biennial or perennial, 15–40 cm tall. Stems glandular pubescent and villous upward. Leaves ovate or ovate-lanceolate, 1–2.5 cm × 4–6 mm, subvillous abaxially and along margin. Inflorescences spicate, 0.4–1.7 cm, shorter than stem; bract ovate-lanceolate, 1–2.5 cm × 2–6 mm, villous and glandular pubescent; bractlets absent. Calyx 6–10 mm, 2-parted; segments lanceolate-ovate, usually 2-lobed; lobes narrowly lanceolate, subequal, 3.5–5 mm, usually 3-veined, apex acuminate. Corolla pale yellow or brown-yellow, often tinged with purple, tubular-campanulate, curved, glandular pubescent, 1.5–2 cm, constricted below middle; upper lip slightly emarginate; lobes subrounded, unequal, margin sparsely glandular. Filaments 0.8–1.2 cm, basal 1/3 sparsely pubescent, glabrous upward; anthers oblong, 1.4–1.6 mm, sparsely villous. Pistil 0.8–1.3 cm; ovary narrowly ellipsoid, glabrous. Stigma 2-lobed. Capsule ellipsoid, 8–9 mm. Seeds oblong, ca. 0.3 × 0.2 mm. Fl. May–Jul, fr. Jul–Aug. $2n = 38$.

Slopes, valleys, forests. W Hubei, Sichuan [Kazakistan, Kyrgyzstan, Russia, Uzbekistan; SW Asia, Europe].

Parasitic on species of the Apiaceae.

No material of this species has been found in Chinese herbaria.

3. BOSCHNIAKIA C. A. Meyer in Bongard, Mém. Acad. Imp. Sci. St. Pétersbourg, Sér. 6, Sci. Math. 2: 159. 1833.

草丛蓉属 cao cong rong shu

Xylanche Beck.

Herbs fleshy, glabrescent. Rootstock globose, subglobose, or long cylindric. Stems usually 1–3, erect, unbranched, cylindric, fleshy. Leaves spirally arranged, triangular or ovate-triangular. Inflorescences racemose or spicate; bract 1; bractlets 2 or absent. Flowers subsessile or short pedicelled. Calyx cupular or short cupular, apex irregularly 2–5-toothed; lobes triangular or lanceolate, partly or all deciduous and calyx-tube margin truncate. Corolla bilabiate; tube erect, enlarged; upper lip entire or apex emarginate; lower lip 3-lobed, lobes subequal. Stamens 4, exerted, inserted near base of corolla tube; filaments pubescent at base, glabrescent upward; anthers 2-celled, free or slightly connate. Ovary 1-locular; parietal placentas 2 or 3. Style slightly curved, persistent; stigma 2- or 3-lobed. Capsule ovoid-oblong or subglobose, dehiscent by 2 or 3 valves. Seeds ellipsoid-oblong or irregularly globose.

Two species: China, N India, Japan, Korea, Russia, North America; both species in China.

1a. Rootstock long cylindric; stems usually 2 or 3; inflorescences spicate; pedicel to 2 mm, 5–8 mm in fruit; corolla 1–1.2 cm; seeds ellipsoid-globose 1. *B. rossica*

1b. Rootstock globose or subglobose; stems usually 1; inflorescences racemose; pedicel 6–10 mm, 8–17 mm in

fruit; corolla 1.5–2.5 cm; seeds irregularly globose 2. *B. himalaica*

1. *Boschniakia rossica* (Chamisso & Schlechtendal) B. Fedtschenko in B. Fedtschenko & Flerov, Fl. Europ. Ross. 896. 1910.

草苳蓉 cao cong rong

Orobancha rossica Chamisso & Schlechtendal, Linnaea 3: 132. 1828; *Boschniakia glabra* C. A. Meyer; *O. glabra* (C. A. Meyer) Hooker.

Plants 15–35 cm tall. Rootstock horizontal, cylindrical. Stems usually 2 or 3, erect. Leaves 6–8(–10) × 6–8(–10) mm. Inflorescences spicate, 7–22 cm, 1.5–2.5 cm in diam.; bract glabrous abaxially, pubescent adaxially; bractlets absent. Pedicel to 2 mm, 5–8 mm in fruit. Calyx cupular, 5–7 mm, apex irregularly 3–5-toothed. Corolla dark purple-red, broadly campanulate; tube enlarged; upper lip 5–7 mm, margin pubescent; lower lip very short, 3-lobed. Filaments 5.5–6.5 mm; anthers ovoid, ca. 1.2 mm, glabrous. Ovary subglobose, 3–4 mm in diam.; placentas 2. Style 5–7 mm, glabrous; stigma 2-lobed. Capsule subglobose, 8–10 × 6–8 mm, dehiscent by 2 valves. Seeds ellipsoid-globose, 0.4–0.5 × ca. 0.2 mm; testa reticulate. Fl. May–Jul, fr. Jul–Sep.

Slopes, forests, riversides; 1500–1800 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Russia; North America (Alaska)].

Parasitic on species of *Alnus* Miller.

The whole plant is used medicinally for invigorating the kidneys and relaxing the bowels.

2. *Boschniakia himalaica* J. D. Hooker & Thomson in J. D. Hooker, Fl. Brit. India 4: 327. 1884.

丁座草 ding zuo cao

Boschniakia handelii Beck; *B. handelii* f. *minor* Beck; *B. kawakamii* Hayata; *Xylanche himalaica* (J. D. Hooker & Thomson) Beck; *X. kawakamii* (Hayata) Beck.

Plants 15–45 cm tall. Rootstock globose or subglobose, 2–5 cm in diam. Stems usually 1, erect, unbranched. Leaves 1–2 cm × 6–12 mm. Inflorescences racemose, 8–20 cm; bract 1–1.5 cm × 5–8 mm; bractlets 2 or absent. Pedicel 6–10 mm, 0.8–1.7 cm in fruit. Calyx short cupular, 4–5 × 5–8 mm, apex 5-lobed; lobes unequal, linear-lanceolate or narrowly triangular, 2–5 mm, usually partly or all deciduous after anthesis and calyx margin entire. Corolla yellow-brown or pale purple, 1.5–2.5 cm; tube slightly enlarged; upper lip emarginate or entire, 7–9 mm; lower lip 2–3 mm, 3-lobed; lobes pubescent at margin. Filaments 1.2–1.4 cm, pubescent basally, glabrescent upward; anthers ovoid-oblong, usually glabrous. Ovary oblong; placentas (2 or)3. Style ca. 1 cm, glabrous; stigma usually 3-lobed. Capsule subglobose or ovoid-oblong, 1.5–2.2 × 1–1.5 cm, usually dehiscent by (2 or)3 valves. Seeds irregularly globose, 0.8–2.2 mm in diam. Fl. Apr–Jun, fr. Jun–Sep.

Slopes, forests, thickets; 2500–4400 m. Gansu, Hubei, Qinghai, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, N India, Nepal, Sikkim].

Parasitic on species of *Rhododendron* Linnaeus.

The whole plant is used medicinally for regulating vital energy, alleviating pain, relieving cough, and reducing sputum.

4. AEGINETIA Linnaeus, Sp. Pl. 2: 632. 1753.

野菰属 ye gu shu

Herbs fleshy. Stems very short, branched or not. Flowers large, solitary or clustered at stem apex. Bractlets absent. Pedicel very long, erect. Calyx spathe-like, apex acute or obtuse-rounded. Corolla tubular or campanulate, indistinctly bilabiate; upper lip 2-lobed; lower lip 3-lobed; lobes subrounded. Stamens 4, included; anthers adherent, 1 cell fertile, another reduced into a spur. Carpels 2; ovary usually 1-locular and parietal placentas 2 or 4, occasionally imperfectly 2-locular and placentas axile. Style slightly curved; stigma fleshy, peltate. Capsule dehiscent by 2 valves. Seeds numerous; testa reticulate.

About four species: Cambodia, China, India, Indonesia, Japan, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam; three species in China.

1a. Pedicel 2–6(–10) cm; ovary 1-locular and parietal placentas 2, or imperfectly 2-locular and placentas axile 3. *A. acaulis*

1b. Pedicel 7–50 cm; ovary 1-locular; parietal placentas 4.

2a. Flower buds apex acuminate; calyx apex acute or acuminate; corolla tubular-campanulate, 2–4.5 cm, lobes subtire 1. *A. indica*

2b. Flower buds and calyx apices obtuse-rounded; corolla enlarged campanulate, 4–6 cm, lobes dentate at margin 2. *A. sinensis*

1. *Aeginetia indica* Linnaeus, Sp. Pl. 2: 632. 1753.

野菰 ye gu

Aeginetia japonica Siebold & Zuccarini; *Orobancha aeginetia* Linnaeus; *Phelipaea indica* (Linnaeus) Sprengel ex Steudel.

Plants 15–40(–50) cm tall. Root slightly fleshy, with small branches. Stems unbranched or branched from near base. Leaves red, ovate-lanceolate or lanceolate, 5–10 × 3–4 mm, glabrous. Flowers usually solitary. Pedicel usually erect, 10–30(–40) cm, ca. 3 mm in diam.

Calyx apex acute or acuminate. Corolla purple-red striate, indistinctly bilabiate, tubular-campanulate, 2–4.5 cm; tube slightly curved; lobes subentire. Filaments purple, 7–9 mm, glabrous; anthers yellow. Ovary 1-locular; parietal placentas 4. Style 1–1.5 cm; stigma pale yellow. Capsule conical, or long ovoid-globose, 2–3 cm. Seeds yellow, ellipsoid, ca. 0.04 mm. Fl. Apr–Aug, fr. Aug–Oct. $2n = 30$.

Slopes, roadsides; 200–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

Parasitic on species of *Miscanthus* Andersson and *Saccharum* Linnaeus.

The roots and flowers are used medicinally for clearing away heat and toxic materials.

2. *Aeginetia sinensis* Beck in Engler, Pflanz. IV. 261 (Heft 96): 19. 1930.

中国野菰 *zhong guo ye gu*

Plants 15–30 cm tall, glabrous. Stems 6–7 cm, 4–5 mm in diam., usually branched from base. Leaves at stem base, ovate-lanceolate or lanceolate, 6–8 × 3–4 mm. Flowers solitary, terminal. Pedicel purple-red, erect, 15–20(–25) cm, striate. Calyx spathe-like, 4.5–5 cm, apex obtuse-rounded. Corolla red-purple, sometimes red-purple on upper part and white on lower part, nearly bilabiate, 5.5–6 cm, apex 5-lobed; lobes subrounded or nearly flabellate, ca. 8 mm × 1–1.2 cm, margin dentate. Filaments 1.3–1.5 cm. Ovary 1-locular; parietal placentas 4. Style glabrous, 2–2.5 cm; stigma 8–9 mm in diam. Capsule conical, 2–2.5 × ca. 1.5 cm. Seeds

numerous, discoid, ca. 0.04 mm in diam.; testa reticulate. Fl. Apr–Jun, fr. Jun–Sep.

Roadsides; 800–900 m. Anhui, Fujian, Jiangxi, Zhejiang [Japan]. Frequently parasitic on roots of species of the Poaceae.

3. *Aeginetia acaulis* (Roxburgh) Walpers, Repert. Bot. Syst. 3: 481. 1844.

短梗野菰 *duan geng ye gu*

Orobanche acaulis Roxburgh, Pl. Coromandel 3: 89. 1819; *Aeginetia pedunculata* (Roxburgh) Wallroth; *Orobanche pedunculata* Roxburgh.

Plants 6–14 cm tall. Stems short, cylindrical, unbranched, glabrous, 2–6 cm. Leaves sparse at stem base, ovate-triangular, ca. 1 × 0.5 cm, glabrous on both sides, apex acute or slightly obtuse-rounded. Inflorescences short racemose, 3- to several flowered. Pedicel thick, 2–4 cm. Calyx red or yellow, spathe-like, subequalling or slightly shorter than corolla, apex acute, base acuminate. Corolla tubular, indistinctly bilabiate, 4–5 cm; tube yellow-white, base constricted; lobes 5, blue or blue-purple, subequal, rounded or reniform, 8–10 × 8–10 mm, margin dentate. Filaments glabrous. Ovary 1-locular and parietal placentas 2, or imperfectly 2-locular and placentas axile. Style ca. 2 cm, persistent; stigma inflated, discoid, 3–4 mm in diam. Capsule ovoid-globose. Seeds brown. Fl. Apr–Jun, fr. Jun–Aug. Slopes, forests; 900–1200 m. W Guangxi (Hechi Xian and Longlin Xian), SW Guizhou (Anlong Xian) [Cambodia, India, ?Indonesia, Myanmar, ?Philippines].

Aeginetia mairei H. Léveillé, which was recorded from Yunnan (see Launer, Notes Roy. Bot. Gard. Edinburgh 38: 462. 1980), may belong here, but neither the type nor other Chinese material has been seen.

5. MANNAGETTAEA Harry Smith, Acta Horti Gothob. 8: 135. 1933.

豆列当属 *dou lie dang shu*

Herbs small. Stems thick, short. Inflorescences subcapitate or subcorymbose; bract 1, long ovate or ovate-lanceolate; bractlets 2, linear or linear-lanceolate. Calyx tubular, apex 5-lobed. Corolla yellow or purple, bilabiate; tube longer than lip; upper lip entire or emarginate, larger than lower lip; lower lip 3-lobed. Stamens 4, included; anthers 2-celled, connective not elongated. Carpels 2; ovary 1-locular; parietal placentas 4. Style elongated; stigma subglobose. Capsule oblong or ovoid-globose. Seeds numerous; testa reticulate. Two species: China, Russia; both species in China.

1a. Plants 10–11 cm tall; bractlets linear-lanceolate, 2–2.2 cm; corolla 5–6 cm, upper lip entire 1. *M. labiata*

1b. Plants 3–5(–8) cm tall; bractlets linear, ca. 1.5 cm; corolla 2.2–2.5(–3) cm, upper lip entire or 2-lobed 2. *M. hummelii*

1. *Mannagettaea labiata* Harry Smith, Acta Horti Gothob. 8: 137. 1933.

豆列当 *dou lie dang*

Herbs 10–11 cm tall. Leaves ovate-lanceolate, ca. 1.5 cm × 6–9 mm. Inflorescences subcapitate, in 8–10-flowered clusters at stem apex; bract ovate-lanceolate, 1.8–2.2 cm × 4–5 mm, apex acuminate, glabrous on both sides, along with bractlets and corolla lobes densely yellow-white tomentose at margin; bractlets linear-lanceolate, 2–2.2 cm. Pedicel obsolete or to 5 mm. Calyx tubular, 2.5–3 cm; lobes unequal, 1 smaller and 2–2.5 × 2–2.5 mm, 4 larger and 6–9 × 3–4.5 mm.

Corolla yellow after drying, bilabiate, erect, 5–6 cm; tube gradually enlarged upward; upper lip 1.8–2 cm, entire; lower lip 3-lobed; lobes subequal, narrowly lanceolate, 1–1.2 cm × 3–4 mm, apex acuminate, glabrescent abaxially, densely tomentose adaxially, 1–3-veined. Filaments 3–3.5 cm, densely tomentose below middle; anthers ovoid, 3–3.5 mm, densely tomentose, base mucronate. Ovary ovoid, 7–7.5 mm. Style 4–4.5 cm, sparsely pubescent. Fruit unknown. Fl. Jun–Jul.

• Roadside, slopes; ca. 3600 m. Sichuan (Songpan Xian).

Parasitic on species of *Caragana* Fabricius.

2. Mannagettaea hummelii Harry Smith, Acta Horti Gothob. 8: 138. 1933.

矮生豆列当 ai sheng dou lie dang

Gleadovia kokonorica Keng; *Mannagettaea irtutensis* Popov.

Herbs 3–5 cm tall. Stems 1–1.5 cm. Leaves several, broadly ovate-triangular, 6–7 × 6–7 mm, glabrous, apex obtuse. Inflorescences corymbose; bract long ovate, 1.8–2.2 cm × 4–6 mm, margin densely tomentose, apex acuminate; bractlets 2, linear, adnate to upper part of pedicel or calyx base, 1.5–1.6 × 1–1.5 cm, usually 1-veined. Pedicel ca. 2 mm. Calyx tubular, 1.5–1.7 cm; lobes triangular, subequal, 3–5 × 2–4 mm, sometimes 2-lobed. Corolla purple, slightly curved, 2.2–2.5(–3) cm;

tube densely villous at apex and adaxially; upper lip entire or 2-lobed, 5–8 mm; lower lip 3-lobed; lobes linear, 4–5 × 1–2 mm. Filaments 1–1.5 cm, densely tomentose on lower part; anthers ovoid, 1.6–1.8 mm, white pubescent, base mucronate. Ovary long ovoid, 6–7 × 3–4 mm. Style 8–10 mm, glabrescent. Capsule oblong or ovoid-globose, 8–10 × ca. 6 mm. Seeds numerous, oblong, ca. 0.15 mm; testa reticulate. Fl. Jun–Jul, fr. Aug–Sep.

Slopes, thickets or forests; 3200–3700 m. SW Gansu, SE Qinghai [Russia].

Parasitic on species of *Caragana* Fabricius and *Salix* Linnaeus.

6. GLEADOVIA Gamble & Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69: 488. 1901.

寄生属 biao ji sheng shu

Herbs. Stems unbranched. Inflorescences subcapitate or subcorymbose, 3- to several flowered; bract 1; bractlets 2. Calyx tubular or tubular-campanulate, apex 5-lobed. Corolla rose-red or purple, rarely white, bilabiate. Stamens 4, included; anthers 2-celled, both cells fertile, connective broad, apex conical. Ovary 1-locular, parietal placentas 2. Style slender; stigma 2-lobed. Capsule ovoid-globose. Seeds numerous; testa reticulate.

Two species: China, India; both species in China.

1a. Flowers at stem apex; pedicel 1–2(–2.5) cm; bractlets oblong or spatulate, 1.4–2 cm × 4–8(–10) mm, borne at base or on lower part of pedicel; calyx tubular-campanulate, funnelform upward, 1.5–1.8 cm in diam. 1. *G. ruborum*

1b. Flowers on upper part of stem; pedicel (2–)4–9 cm; bractlets linear or linear-lanceolate, 2–3 cm × 3–4 mm, borne on stem; calyx tubular, slightly enlarged upward, 1–1.2 cm in diam. 2. *G. mupinense*

1. Gleadovia ruborum Gamble & Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69: 489. 1901.

寄生 biao ji sheng

Gleadovia yunnanense Hu.

Plants 8–18 cm tall. Stems 4–10 cm, 1–1.5 cm in diam. Leaves ovate or oblong, along with bracts and bractlets glabrous. Flowers clustered at stem apex. Bract borne at pedicel base, long ovate or oblong, 1.4–2 cm × 6–8 mm, apex acute; bractlets borne at base or lower part of pedicel; oblong or spatulate, 1.5–2 cm × 4–8(–10) mm, apex obtuse or dentate. Pedicel 1–2(–2.5) cm. Calyx tubular-campanulate, funnelform upward, 1.5–1.8 cm in diam. Corolla usually red, rose-red, or rarely white, fragrant, 5–7 cm, glabrous abaxially, villous adaxially; tube slightly constricted, upward enlarged; upper lip 2-lobed, lobes semirounded, entire or dentate; lower lip smaller, 3-lobed, lobes oblong-lanceolate. Filaments 2–3 cm, base densely villous; anthers ovoid, 3–4 mm, connective broad, apex elongated and conical. Ovary ovoid. Style 3–5 cm; stigma discoid or 2-lobed. Capsule ovoid-globose. Seeds ellipsoid. Fl. Apr–Aug, fr. Aug–Oct.

Humid places in forests or thickets; 900–3500 m. N Guangxi, Hubei, W Hunan, SW Yunnan [India].

2. Gleadovia mupinense Hu, Sunyatsenia 4: 2. 1939.

宝兴 寄生 bao xing biao ji sheng

Herbs 10–20(–30) cm tall. Stems thick, 5–12(–20) cm. Leaves oblong-lanceolate or lanceolate, 1.5–2 cm × 8–10 mm, along with bracts and bractlets glabrous. Flowers borne on upper part of stem. Bract borne at pedicel base, oblong or ovate, 1.5–2 cm × 8–10 mm; bractlets 2, borne on the upper part of stem, linear or linear-lanceolate, 2–3 cm × 2–4 mm. Pedicel thick, (2–)4–9 cm. Calyx tubular, slightly enlarged upward, 2.5–3 × 1–1.2 cm, apex 5-lobed; lobes oblong-triangular. Corolla pale purple, pale purple-red, or rarely white, 4–7.5 cm; tube narrow, as long as calyx, slightly enlarged upward; upper lip 2-lobed; lower lip 3-lobed; lobes densely villous on both sides. Filaments 2.5–3.5 cm, base densely villous; anthers ovoid, 3–3.5 mm, connective slightly elongated. Ovary ovoid-globose. Style 4–5.5 cm; stigma irregularly 2-lobed. Fruit unknown. Fl. Apr–Jul.

• Roadsides, forests, humid places; 3000–3500 m. Sichuan.

7. CHRISTISONIA Gardner, Calcutta J. Nat. Hist. 8: 153. 1847.

假野菰属 jia ye gu shu

Herbs small, usually several in a cluster. Stems short, unbranched. Inflorescences racemose or spicate; bractlets present or absent. Calyx tubular, apex 4- or 5-lobed; lobes usually unequal. Corolla white, pale purple (yellow, purple-red, or rose-red), tubular (tubular-campanulate or funnellform), apex 5-lobed. Stamens 4, included, or slightly exerted; anther cells 1 fertile and 1 absent or reduced into a spur, rarely both fertile. Ovary 1-locular and 2 placentas parietal (or 2-locular and placentas axile). Stigma lobed. Capsule ovoid or subglobose, dehiscent loculicidally. Seeds numerous, some reduced; testa reticulate.

About 16 species: tropical Asia; one species in China.

1. *Christisonia hookeri* C. B. Clarke in J. D. Hooker, Fl. Brit. India 4: 321. 1884.

假野菰 *jia ye gu*

Christisonia sinensis Beck; *Gleadovia kwangtungense* Hu; *G. lepoense* Hu.

Plants 3–8(–12) cm tall, subglabrous. Stems 1–2 cm. Leaves ovate. Flowers 2 to several clustered at stem apex; bract oblong or ovate, 8–10 × 5–6 mm. Pedicel short or absent. Calyx tubular, 1.5–3 cm, submembranous or leathery when dry, apex irregularly (4 or)5-lobed; lobes triangular or lanceolate, 2 larger

and 0.5–1 cm, 3 smaller and 4–8 mm, apex usually acute. Corolla white or rarely pale purple, tubular, 2–7 cm; lobes 5, subrounded, entire. Filaments 8–10 mm, glabrous or sparsely glandular pubescent at base; anthers with 1 fertile cell in upper 2 stamens, reduced into sticks in lower 2 stamens. Ovary 1-locular. Style 2.5–4 cm; stigma larger, discoid, 4–6 mm in diam. Capsule ovoid.

Forests, humid places; 1500–2000 m. N and S Guangdong, SW Guangxi, E Guizhou, Hainan, Sichuan, SE Yunnan [India, Laos, Sri Lanka, Thailand].

8. PHACELLANTHUS Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Acad. Wiss. 4(3): 141. 1846.

黄筒花属 *huang tong hua shu*

Tienmuia Hu.

Herbs fleshy. Stems short, cylindric. Leaves spirally arranged. Inflorescences subcapitate; bract 1, navicular-ovate, ca. 1/2 as long as corolla; bractlets absent. Flowers subsessile. Calyx absent. Corolla tubular-bilabiate; tube suberect, not enlarged; upper lip emarginate or 2-lobed; lower lip 3-lobed, much shorter than upper. Stamens (3 or)4(or 5), included; anthers 2-celled, all fertile, connective slightly elongated. Carpels 3; ovary 1-locular; parietal placentas (4–)6(or 10). Style long; stigma 2-lobed. Capsule ovoid. Seeds minute; testa reticulate.

One species: China, Japan, Korea, Russia (Far East).

1. *Phacellanthus tubiflorus* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Acad. Wiss. 4(3): 141. 1846.

黄筒花 *huang tong hua*

Phacellanthus continentalis Komarov; *Tienmuia triandra* Hu.

Plants 5–11 cm tall, glabrescent. Stems erect, solitary or clustered, unbranched. Leaves ovate-triangular or narrowly so, 5–8(–10) × 3–4 mm, margin slightly membranous, apex acute. Bract 1.5–2.3 cm × 5–8 mm, apex acuminate or subobtusate. Corolla white or pale yellow, 2.5–3.5 cm; tube 2.5–3 cm; lobes subequal, oblong, ca. 3 × 2 mm. Filaments 1.2–1.4 cm, sparsely

pubescent on lower part; anthers ca. 1.8 mm. Ovary ellipsoid-globose. Style 1.3–1.6 cm, glabrous. Capsule 1–1.4 cm × 5–8 mm. Seeds ovoid, 0.3–0.4 × ca. 0.2 mm; testa reticulate. Fl. May–Jul, fr. Jul–Aug.

Slopes, forests; 800–1400 m. Gansu, Hubei, Hunan, Jilin, Shaanxi, Zhejiang [Japan, Korea, Russia (Far East)].

Parasitic on species of *Fraxinus* Linnaeus.

An examination of the type of *Tienmuia triandra* reveals that it is indistinguishable from *Phacellanthus tubiflorus*. The bracts were mistaken for sepals in the original description of the former.

9. LATHRAEA Linnaeus, Sp. Pl. 2: 605. 1753.

齿鳞草属 *chi lin cao shu*

Herbs. Stems erect, unbranched or branched from base. Inflorescences racemose or spicate; bract 1; bractlets absent. Pedicel very short or almost absent. Calyx campanulate, apex 4-lobed. Corolla bilabiate. Stamens 4, slightly exerted; anthers 2-celled, both cells fertile. Ovary 1-locular, base usually with nectar glands; parietal placentas 2. Style slender; stigma discoid. Capsule dehiscent by 2 valves. Seeds subglobose, 4 (2 or numerous).

About 5 species: China, Japan, Russia, Europe; one species in China.

1. *Lathraea japonica* Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 205. 1867.

齿鳞草 chi lin cao

Lathraea chinfushanica Hu & Tang; *L. japonica* var. *miqueliana* (Franchet & Savada) Ohwi; *L. miqueliana* Franchet & Savada; *L. nakaharai* Makino.

Plants 20–30(–35) cm tall, densely yellow-brown glandular pubescent. Stems usually branched from base. Leaves white, borne at stem base, broadly ovate or semirounded, glabrescent on both sides. Inflorescences racemose, 10–20(–25) cm; bracts borne at pedicel base, ovate-lanceolate or lanceolate, 6–9 mm, along with pedicels, calyx, and corolla densely glandular pubescent. Calyx campanulate, 7–9 mm, apex irregularly 4-lobed; lobes triangular, 4–5 mm. Corolla purple or blue-purple, 1.5–1.7 cm; tube white; upper lip entire or emarginate; lower lip 3-lobed. Filaments 5–7 mm, pubescent; anthers long ovoid, 1.8–2 mm, densely white pubescent, base mucronate. Ovary subobovoid, 1.5–2.5 mm. Style 1.2–1.4 cm; stigma 2-lobed. Capsule obovoid, 5–7 × 3–4 mm. Seeds 4, irregularly globose, 1.8–2 mm in diam. Fl. Mar–May, fr. May–Jul.

Roadsides, forests, humid places; 1500–2200 m. S Gansu, N Guangdong, N Guizhou, S Shaanxi, SE Sichuan [Japan, Korea].