

5. SCROPHULARIA Linnaeus, Sp. Pl. 2: 619. 1753.

玄参属 xuan shen shu

Herbs, perennial or suffrutescent, rarely annual. Leaves opposite or rarely upper ones alternate. Cymes axillary or terminal and solitary, or inflorescences lateral thyrses, racemose, spicate, or subcapitate, usually pedunculate. Calyx 5-lobed. Corolla usually 2-lipped; lower lip shorter than upper lip, 3-lobed, middle lobe flattened forward, lateral lobes suberect; upper lip 2-lobed, lobes suberect. Stamens 4, somewhat didynamous, included to exerted, adnate to corolla tube; anther locules confluent; staminode 1, small. Disc present. Style as long as or longer than ovary, slightly shorter in *S. urticifolia*; stigma often small. Capsule septical. Seeds numerous.

About 200 species: temperate Asia, Europe (mostly Mediterranean), North America; 36 species in China.

- 1a. Leaf veins not reticulate; stems woody, much branched at base as if tufted.
 - 2a. Calyx lobes at anthesis without conspicuous membranous margin; capsule narrowly ovoid 1. *S. dentata*
 - 2b. Calyx lobes at anthesis with conspicuous membranous margin; capsule subglobose.
 - 3a. Calyx lobe margin broadly membranous; leaf blade often apically toothed or coarsely serrate to pinnately parted, basally pinnately parted to pinnatisect 2. *S. kiriloviana*
 - 3b. Calyx lobe margin narrowly membranous; leaf blade \pm toothed to lobed, rarely basally 1- or 2-segmented 3. *S. incisa*
- 1b. Leaf veins reticulate; stems herbaceous, sometimes basally woody in *S. nankinensis* and *S. alaschanica*, solitary or few tufted.
 - 4a. Cymes subcapitate or inflorescences in a terminal raceme or spike.
 - 5a. Calyx lobes acute to short acuminate at apex.
 - 6a. Corolla campanulate, hairy inside 32. *S. delavayi*
 - 6b. Corolla not campanulate, glabrous inside.
 - 7a. Inflorescences very short, with 1 to few cymes; plants usually less than 15 cm . 33. *S. chasmophila*
 - 7b. Inflorescences long, with many cymes; plants usually more than 15 cm.
 - 8a. Corolla 5–6 mm; leaf base cordate; calyx 3–4 mm 34. *S. pauciflora*
 - 8b. Corolla 8–10 mm; leaf base broadly cuneate, obtuse, or subcordate; calyx 4–5 mm.
 - 9a. Lower stem nodes without scalelike leaves; lower part of stem at anthesis becoming hard and not easily compressed; style ca. 3.5 mm 35. *S. spicata*
 - 9b. Lower stem nodes with scalelike leaves; lower part of stem at anthesis soft and easily compressed; style less than 3 mm 36. *S. mapienensis*
 - 5b. Calyx lobes obtuse to truncate or \pm toothed at apex.
 - 10a. Lateral roots fusiform or clavate enlarged 25. *S. buergeriana*
 - 10b. Lateral roots neither fusiform nor enlarged.
 - 11a. Upper corolla lip entire or retuse 26. *S. moellendorffii*
 - 11b. Upper corolla lip deeply 2-lobed.
 - 12a. Inflorescences more than 2 cm; plants usually more than 20 cm tall.
 - 13a. Corolla ca. 8 mm, tube enlarged, subglobose 30. *S. henryi*
 - 13b. Corolla 10–15 mm, tube hardly enlarged, not subglobose and bent forward 31. *S. alaschanica*
 - 12b. Inflorescences to 2 cm; plants usually less than 20 cm tall.
 - 14a. Corolla 7–9 mm; style 4–5 mm; inflorescences surpassing upper leaves; calyx ca. 3 mm 27. *S. hypsophila*
 - 14b. Corolla ca. 15 mm; style 8.5–11 mm; inflorescences not surpassing upper leaves; calyx 4–6 mm.
 - 15a. Stems sparsely pilose apically 28. *S. przewalskii*
 - 15b. Stems glandular hairy throughout 29. *S. lhasaensis*
 - 4b. Cymes solitary from upper leaf axils (sometimes 1-flowered) or in a terminal panicle.
 - 16a. Lateral roots fusiform.
 - 17a. Calyx lobe apex acute to acuminate.
 - 18a. Leaf margin regularly serrate 6. *S. kakudensis*
 - 18b. Leaf margin double serrate 7. *S. yoshimurae*
 - 17b. Calyx lobe apex obtuse to rounded.
 - 19a. Corolla brown-purple; calyx lobes suborbicular; leaves to 30 cm 4. *S. ningpoensis*

- 19b. Corolla yellow-green; calyx lobes oblong to ovate; leaves 5–11 cm 5. *S. lijiangensis*
- 16b. Lateral roots not fusiform.
- 20a. Annual, mostly with fibrous roots or primary root poorly developed 9. *S. nankinensis*
- 20b. Perennial, often rhizomatous.
- 21a. Rhizomes often with small globose nodules.
- 22a. Corolla ca. 2 mm 10. *S. souliei*
- 22b. Corolla 8–10 mm.
- 23a. Corolla subcampanulate, upper lip almost as long as lower lip; calyx ca. 3 mm
..... 11. *S. aequilabris*
- 23b. Corolla conspicuously labiate, upper lip much longer than lower lip; calyx 4–5 mm 12. *S. kansuensis*
- 21b. Rhizomes without small globose nodules.
- 24a. Stems conspicuously winged.
- 25a. Calyx lobes ovate, apex acute to subacute, margin not membranous; stamens much exerted; capsule 7–8 mm 13. *S. elatior*
- 25b. Calyx lobes broadly ovate, apex nearly rounded, margin broadly membranous; stamens shorter than corolla; capsule 5–6 mm 14. *S. umbrosa*
- 24b. Stems wingless or slightly ribbed.
- 26a. Flowers ca. 3 mm; filaments exerted from corolla 15. *S. heucheriiiflora*
- 26b. Flowers more than 5 mm; filaments shorter than corolla.
- 27a. Cymes with large and foliaceous bracts.
- 28a. Corolla 1.5–1.8 cm; style ca. 8 mm, ca. 2 × as long as ovary 16. *S. stylosa*
- 28b. Corolla 0.6–1.2 cm; style 2–6 mm, slightly longer or shorter than ovary.
- 29a. Leaves coarsely serrate, base cuneate to narrowly attenuate; plants less than 30 cm tall 8. *S. formosana*
- 29b. Leaves usually double serrate, base broadly cuneate to cordate; plants more than 30 cm tall.
- 30a. Peduncles and pedicels glabrous; corolla 6–7 mm, green
..... 17. *S. urticifolia*
- 30b. Peduncles and pedicels glandular pilose; corolla 7–12 mm, purple or purple-red.
- 31a. Leaves ovate to ovate-orbicular, base cordate to rounded; stems and leaves often hairy 18. *S. fargesii*
- 31b. Leaves ovate to ovate-lanceolate, base truncate to rounded; stems and leaves glabrous, rarely lower stem pubescent 7. *S. yoshimurae*
- 27b. Cymes with small bracts.
- 32a. Calyx lobes acute.
- 33a. Racemes 8–15 cm, 8–25-flowered, in 1-flowered cymes 22. *S. taihangshanensis*
- 33b. Racemes mostly short in cymes of 3 to many flowers (*S. macrocarpa* often with cymes reduced to a single flower).
- 34a. Inflorescences racemose or narrowly paniculate, ca. 5 cm; cymes often 1-flowered, rarely 3-flowered; capsule 1.1–1.4 cm 23. *S. macrocarpa*
- 34b. Inflorescences paniculate (corymbose before spreading), to 15 cm; lower cymes 3–5-flowered; capsule ca. 1 cm
..... 24. *S. dipodonta*
- 32b. Calyx lobe apex obtuse (sometimes acute in *S. mandarinorum*).
- 35a. Staminode ± fanlike to transversely oblong, width greater than length 19. *S. modesta*

35b. Staminode subrotund to obcordate, width equal or subequal to length.

36a. Plants usually 1 m; leaves 8–10 pairs; calyx 2–3 mm 20. *S. mandarinorum*

36b. Plants 0.3–0.4 m, rarely to 0.8 m; leaves 4 or 5 pairs; calyx ca. 4.5 mm 21. *S. yunnanensis*

1. *Scrophularia dentata* Royle ex Benth, Scroph. Ind. 19. 1835.

齿叶玄参 *chi ye xuan shen*

Herbs, suffrutescent, 20–40 cm tall, multibranching from a woody base as if tufted, whole plant generally black when dry. Stems subterete, glabrous or puberulent. Leaves sessile or short petiolate; leaf blade narrowly oblong to ovate-oblong, 1.5–5 cm, base attenuate to cuneate, margin shallowly toothed, pinnately parted, pinnatisect, or rarely entire; pinnule basally sparsely and shallowly toothed. Panicles terminal, lax, narrow, 5–20 cm; cymes 1–3-flowered; peduncle sparsely glandular puberulent. Pedicel sparsely glandular puberulent. Calyx ca. 2 mm; lobes rotund to rotund-elliptic, glabrous, margin membranous, conspicuous only in fruit. Corolla purple-red, ca. 6 mm; tube globose-terete, ca. 4 mm; lower lip ca. 1/2 as long as upper lip; upper lip transversely rounded. Stamens ± as long as corolla; staminode suboblong. Ovary ca. 2 mm. Style ca. 2.5 × as long as ovary. Capsule narrowly ovoid, 5–8 mm including beak. Fl. May–Oct, fr. Aug–Nov.

Floodplains, grassland, mountain slopes, forests; 4000–6000 m. Xizang [India, Pakistan].

2. *Scrophularia kiriloviana* Schischkin, Fl. URSS 22: 306. 1955.

裂叶玄参 *lie ye xuan shen*

Herbs, suffrutescent, 30–50 cm tall, multibranching from a woody base as if tufted. Stems subterete, glabrous. Petiole 0.3–2 cm; leaf blade ovate-elliptic to ovate-oblong, 3–10 cm, margin basally pinnately parted to pinnatisect, apically toothed or serrate to pinnately parted; lobes serrate, rarely all coarsely serrate. Panicles terminal, lax, narrow, rarely axillary, 10–30 cm; cymes 3–7-flowered; rachises and pedicels sparsely glandular hairy. Calyx ca. 2.5 mm; lobes rotund, margin conspicuously membranous. Corolla purple-red, 5–7 mm; tube subglobose, 3.5–4 mm; lower lip ca. 1/2 as long as upper lip; upper lip lobes rotund. Stamens ± as long as corolla lower lip; staminode oblong to narrowly oblong. Ovary ca. 1.5 mm. Style ca. 4 mm. Capsule subglobose. Fl. May–Jul, fr. Jul–Aug.

Edge of forests, shady places in mountains, along streams, crevices or sandy places; 700–2100 m. Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

3. *Scrophularia incisa* Weinmann, Bot. Gart. Dorpat. 136. 1810.

砾玄参 *li xuan shen*

Scrophularia canescens Bongard var. *glabrata* Franchet; *S. cretacea* Fischer ex Sprengel var. *glabrata* (Franchet) Stiefelbogen.

Herbs, suffrutescent, 20–70 cm tall, multibranching from a woody base as if tufted. Stems subterete, apically glabrous or glandular puberulent. Leaves short petiolate; leaf blade narrowly oblong to ovate-elliptic, 1–5 cm, base cuneate to attenuate, usually glabrous, margin shallowly toothed to lobed and basally rarely 1- or 2-parted, apex acute to obtuse. Panicles terminal, 10–35 cm, narrow, lax; cymes 1–7-flowered; peduncle glandular puberulent. Pedicel glandular puberulent. Calyx ca. 2 mm, glabrous or basally glandular puberulent; lobes rotund, margin narrowly membranous. Corolla rosy to dark purple-red, 5–6 mm; tube globose-cylindric, ca. 1/2 as long as corolla; lobes of lower lip ca. 1/2 as long as those of upper lip. Stamens as long as corolla; staminode oblong. Ovary ca. 1.5 mm. Style ca. 3 × as long as ovary. Capsule globose-ovoid, ca. 6 mm including beak. Fl. Jun–Aug, fr. Aug–Sep.

Gravelly floodplains, grassland in wet mountain valleys; 600–2600 m. Gansu, Nei Mongol, Ningxia, Qinghai [Kazakhstan, Kyrgyzstan, Mongolia, Russia (Siberia), Tajikistan, Uzbekistan].

4. *Scrophularia ningpoensis* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 178. 1890.

玄参 *xuan shen*

Scrophularia microdonta Franchet; *S. silvestrii* Bonati & Pampanini.

Herbs, to 1.5 m tall. Lateral roots few, fusiform to conical. Stems quadrangular, lightly grooved to nearly winged, glabrous or white crisped hairy. Leaves opposite, sometimes apically alternate; petiole to 4.5 cm; leaf blade below mostly ovate, upper ones ovate-lanceolate to lanceolate, to 30 × 19 cm, base cuneate, rounded, or subcordate, margin serrulate and rarely irregularly double serrate. Thyrses to 50 cm, largely lax; cymes terminal and axillary, often 2–4-flowered, rarely a terminal cyme less than 10 cm. Pedicel 0.3–3 cm, glandular hairy. Calyx 2–3 mm; lobes suborbicular, rounded, margin submembranous. Corolla brown-purple, 8–9 mm; tube subglobose; lower lip lobes subovate, middle lobe shorter than lateral lobes. Stamens slightly shorter than lower lip; staminode large and globose. Style ca. 3 mm. Capsule ovoid, 8–9 mm. Fl. Jun–Oct, fr. Sep–Nov.

• Bamboo forests, along streams, thickets, tall grasses; below 1700 m. Anhui, Fujian, Guangdong, Guizhou, N Hebei, Henan, Jiangsu, Jiangxi, S Shaanxi, Shanxi, Sichuan, Zhejiang.

Used medicinally.

5. *Scrophularia lijiangensis* T. Yamazaki, J. Jap. Bot. 65: 342. 1990.

丽江玄参 li jiang xuan shen

Herbs, erect, 40–80 cm tall. Lateral roots fusiform. Stems quadrangular, glabrous. Leaves opposite; petiole 1.5–3 cm, glabrous; leaf blade ovate, 5–11 × 2.5–5 cm, base truncate to cuneate, margin ± regularly serrate and often double serrate, apex acute; midrib abaxially raised; lateral veins 3 or 4 on each side of midrib. Thyrses terminal, narrow, 5–10 × ca. 2 cm; cymes 1–5-flowered; peduncle 3–5 mm, often glandular pubescent; bracts linear-lanceolate, 2–4 mm, glabrous, margin entire. Pedicel 0.5–1.5 cm, erect, sparsely glandular pilose. Calyx campanulate, glabrous; lobes oblong to ovate, ca. 3 × 1.5–2 mm, apex obtuse to rounded. Corolla yellow-green, ca. 5 mm, glabrous; tube ca. 3 mm; lower lip ca. 1 mm, lobes orbicular and ca. 1 mm in diam.; upper lip fanlike, ca. 2 mm, lobes orbicular and ca. 1.5 mm in diam. Stamens included; filaments glandular pilose; staminode fanlike. Style ca. 3 mm; stigma capitate. Capsule ovoid, ca. 5 × 3 mm. Fl. and fr. Aug–Sep.

• 2600–2800 m. Yunnan (Lijiang Naxizu Zizhixian, Eryuan Xian).

6. *Scrophularia kakudensis* Franchet, Bull. Soc. Bot. France 26: 87. 1879.

丹东玄参 dan dong xuan shen

Scrophularia kakudensis var. *latisejala* (Kitagawa) Kitagawa; *S. latisejala* Kitagawa.

Herbs, to 1 m tall, unbranched or apically branched. Lateral roots fusiform. Stems quadrangular, grooved, white pilose, pith white. Petiole to 4 cm; leaf blade ovate to narrowly ovate, 5–12 cm, abaxially glabrous or pubescent on veins, base rounded, subtruncate, or subcordate, margin regularly serrate. Thyrses to 30 cm; cymes terminal or axillary; peduncle and pedicels glandular hairy. Calyx ca. 4.5 mm; lobes ovate-elliptic to broadly ovate, apex acute. Corolla outside green, inside purplish brown, 7–8 mm; tube globose-cylindric; lower lip ca. 1.5 mm; upper lip ca. 3.5 mm, lobes rotund and with overlapping margins. Stamens ca. 1.5 mm; filaments compressed; staminode fanlike, ca. 1.5 mm. Ovary 2–2.5 mm. Style slightly longer than ovary. Capsule broadly ovoid, 7–9 mm. Fl. Jul–Aug, fr. Sep–Oct.

Scrub on mountain slopes. Liaoning (Dandong Shi, Xiuyan Xian) [Japan, Korea].

7. *Scrophularia yoshimurae* T. Yamazaki, J. Jap. Bot. 23: 86. 1949.

双锯叶玄参 shuang ju ye xuan shen

Perennials, 40–120 cm tall, usually branched. Roots often fusiform. Stems quadrangular, mostly glabrous, rarely basally pubescent. Leaves all green; petiole 0.5–2.5 cm; leaf blade ovate to ovate-lanceolate, glabrous, 5–14 × 2–5 cm, base truncate, rounded, or cuneate, margin double serrate, apex acute to acuminate. Thyrses terminal, lax, large; cymes terminal and axillary, 2–9-flowered; peduncle glandular pilose.

Pedicel 0.8–2 cm, glandular pilose. Calyx 3–5 mm; lobes ovate, apex obtuse to acute. Corolla purplish, urceolate, 7–12 mm; tube cylindric, 4–5 mm; lower lip ca. 1.5 mm; upper lip 3.5–4 mm, lobes rounded. Stamens ca. 1.5 mm longer than corolla tube; filaments white glandular; staminode obovate. Ovary glabrous. Style 3–5 mm. Capsule globose, 6–8 × 6–7 mm, apex pointed.

• Edge of forests, trailsides, open stream banks; 600–2900 m. Taiwan.

8. *Scrophularia formosana* H. L. Li, Quart. J. Taiwan Mus. 3: 68. 1950.

台湾玄参 tai wan xuan shen

Perennials, erect, 20–30 cm tall, branched. Stems flexible, ± quadrangular, glabrescent. Petiole 0.5–1 cm, slightly winged, glabrescent; leaf blade oblong-ovate, 2.5–4 × 1–2 cm, glabrous, base cuneate to narrowly attenuate, margin coarsely serrate, usually basally entire, apex acuminate. Peduncle 2–3 cm; bracts large, foliaceous. Cymes axillary, ± lax, many flowered. Pedicel 5–10 mm, glabrous. Calyx ca. 3 mm; lobes ca. 1/2 of calyx length, triangular-ovate, glabrous, apex acute to acuminate. Corolla yellow, 8–10 mm, glabrous; tube cylindric, ca. 6 mm; lateral and middle lobes of lower lip erect, rounded, ca. 3 mm; upper lip 3–4 mm, slightly 2-lobed. Stamens included; filaments basally hairy. Ovary glabrous. Style ca. 6 mm, glabrous. Fruit unknown.

• Taiwan (Taidong Xian).

9. *Scrophularia nankinensis* P. C. Tsoong, Fl. Reipubl. Popularis Sin. 67(2): 394. 1979.

南京玄参 nan jing xuan shen

Annuals, to 50 cm tall, simple or occasionally branched. Roots filiform or primary root poorly developed. Stems basally woody. Leaves opposite, alternate upward; petiole ca. 6 mm; leaf blade ovate to rhomboid-ovate, base broadly cuneate to subcordate, margin irregularly and coarsely few serrate. Cymes axillary, 1-flowered, rarely 2- or 3-flowered below. Pedicel to 1.5 cm, sparsely glandular hairy. Calyx ca. 3 mm; lobes ovate-lanceolate to narrowly ovate, apex acute. Corolla red, ca. 6.5 mm; lower lip lobes similar to each other; upper lip slightly longer than lower lip, lobes broadly rounded and with overlapping margins. Stamens ± as long as lower lip; staminode rounded. Ovary ovoid. Style ca. 2.5 mm, slightly shorter than ovary. Fruit unknown. Fl. Apr–May.

• Low elevations. Jiangsu (Nanjing Shi).

10. *Scrophularia souliei* Franchet, Bull. Soc. Bot. France 47: 15. 1900.

小花玄参 xiao hua xuan shen

Herbs, slender, 3–20 cm tall. Rhizomes slender, ca. 5 mm in diam., often with globose nodules. Stems erect or ± bent and ascending, pilose. Leaf blade ovate to triangular-ovate, rarely oblong-ovate, abaxially pilose on veins, adaxially appressed white hairy, base cuneate to truncate, margin irregularly and obtusely coarsely

toothed. Thyrses terminal, narrow, lax; cymes mostly 3-flowered, opposite; peduncle slender, to 1.7 cm. Pedicel ca. 2 mm, glandular hairy. Calyx ± hooded, ca. 1 mm; lobes triangular-ovate. Corolla green, ca. 2 mm; tube globose; throat brownish; lower lip conspicuously shorter than upper lip, with much smaller lobes; upper lip lobes orbicular, margins not overlapping. Stamens included; staminode subglobose to reniform. Ovary ca. 0.7 mm. Style slightly longer than ovary. Capsule narrowly ovoid, 4–5 mm. Fl. and fr. Jun–Jul.

• Grassland on mountain slopes; ca. 3700 m. S Gansu, E Qinghai, W Sichuan.

11. *Scrophularia aequilabris* P. C. Tsoong, Fl. Reipubl. Popularis Sin. 67(2): 394. 1979.

等唇玄参 deng chun xuan shen

Herbs, slender, to 20 cm tall, unbranched. Rhizomes slender, sometimes with small globose nodules. Stems hollow, narrowly winged, striate. Leaves on lower nodes scalelike, otherwise leaf blade broadly ovate, 0.2–3 cm, adaxially glabrous or sparsely pubescent, base truncate to subcordate, margin with few irregular large teeth or double toothed. Cymes mostly from upper leaf axils, 1-flowered, rarely 2-flowered. Pedicel slender, more than 2.5 cm, puberulent to subglabrous. Calyx ca. 3 mm; lobes ovate-oblong, apex subobtuse to acute. Corolla white, subcampanulate, ca. 8 mm; lower lip lobes narrow; upper lip almost as long as lower lip, lobes broadly rounded, with overlapping margins. Stamens slightly longer than corolla tube; staminode small, narrowly spatulate. Ovary 1.5–2 mm. Style 5–6 mm. Fruit unknown. Fl. Jun–Jul.

• Forests; 3300–3900 m. W Sichuan.

12. *Scrophularia kansuensis* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 381. 1894.

甘肃玄参 gan su xuan shen

Herbs, 5–40 cm tall. Rhizomes slender, ca. 5 mm in diam, usually with small globose nodules. Stems hollow, erect, subquadrangular, glandular hairy. Petiole to 2 cm; leaf blade ovate, 1–3 cm, abaxially densely hairy, adaxially glabrous or sparsely hairy, base rounded to subcordate, margin subentire to irregularly coarsely toothed. Cymes 1- or 2-flowered, solitary in upper axils or in a subterminal and narrow inflorescence; peduncle 1–2.5 cm, glandular hairy. Pedicel shorter than peduncle, glandular hairy. Calyx 4–5 mm, glandular hairy; lobes oblong-ovate to ovate-lanceolate, apex obtuse to acute. Corolla greenish white, ca. 1 cm; tube subglobose; lower lip lobes rotund; upper lip conspicuously longer than lower lip, lobes obovate. Stamens shorter than lower lip; staminode subglobose. Ovary slightly shorter than style. Style 4–5 mm. Capsule ovoid, ca. 8 mm. Fl. and fr. May–Aug.

• Grassland on mountain slopes, fields; 2300–4500 m. SE Gansu, Qinghai (Tongde Xian), N Sichuan.

13. *Scrophularia elatior* Bentham, Scroph. Ind. 18. 1835.

高玄参 gao xuan shen

Scrophularia petitmenginii Bonati.

Herbs, to 2 m tall, often branched. Lateral roots with nodules to 2.6 cm in diam. Rhizomes with fibrous roots. Stems quadrangular, conspicuously winged, pith white. Petiole to 10 cm, conspicuously winged; leaf blade ovate to lanceolate, 5–25 cm, base cuneate, orbicular, or rarely shallowly cordate, margin serrate to double serrate. Thyrses terminal, to 30 cm; cymes 5–8-flowered; peduncle to 5 mm, glandular hairy. Pedicel glandular hairy. Calyx ca. 3 mm; lobes ovate, margin not membranous, apex acute to subacute. Corolla green, ca. 6 mm; lower lip with narrow middle lobe; upper lip slightly longer than lower, lobes orbicular, ca. 1 mm, with overlapping margins. Stamens ca. 2 × as long as corolla, exerted; staminode fanlike to obovate, slightly longer than upper lip, sometimes absent. Ovary ca. 2.8 mm. Style ca. 7 mm. Capsule globose-ovoid, 7–8 mm including short beak. Fl. Jul–Sep, fr. Sep–Nov.

Forests, wet grassland; 2000–3000 m. S Xinjiang, Yunnan [Nepal, Sikkim].

14. *Scrophularia umbrosa* Dumortier, Fl. Belg. 37. 1827.

翅茎玄参 chi jing xuan shen

Herbs, erect, 50–130 cm tall, glabrous except for glandular hairs on pedicels. Stems quadrangular, to 8 mm in diam., narrowly winged, white pithed or hollow with age. Petiole to 5 cm, narrowly winged; leaf blade ovate to ovate-lanceolate, 7–10 cm, base rounded to subcordate, margin shallowly serrate. Thyrses terminal, to 20 cm; cymes numerous. Pedicel to 1 cm. Calyx 2–3 mm; lobes broadly ovate, margin broadly membranous, apex nearly rounded. Corolla green, purplish yellow, or brown, 4–6 mm; tube subglobose; lower lip middle lobe somewhat narrow; upper lip slightly longer than lower lip, lobes ± semiorbicular, with overlapping margins. Stamens almost as long as lower lip; staminode reniform. Ovary ca. 2 mm. Style ca. 2 mm. Capsule ovoid-globose, 5–6 mm. Fl. Jun–Aug, fr. Jul–Sep.

Forests, along streams; 900–1700 m. N Xinjiang [Russia; Europe].

15. *Scrophularia heucheriiflora* Schrenk in Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 25. 1841.

新疆玄参 xin jiang xuan shen

Herbs, to 8 cm tall. Stems subquadrangular, white hairy, apically glandular hairy, pith white. Leaves scalelike on lower nodes. Petiole to 5 cm, densely white hairy; leaf blade mostly triangular-ovate, to 13 × 9 cm, abaxially with short white hairs, base cordate to rarely broadly cuneate, margin irregularly triangular-serrate. Thyrses narrowly conical, to 30 cm, less than 3.5 cm wide, densely glandular hairy; peduncle less than 1 cm. Pedicel ca. 5 mm. Calyx ca. 2.5 mm; lobes linear-oblong, margin submembranous. Corolla ca. 3 mm, slightly longer than calyx; upper lip slightly longer than lower lip; lobes orbicular. Stamens ca. 5 mm, exerted from corolla; staminode large, ligulate. Ovary ca. 1 mm. Style to 5 mm. Capsule ovoid-globose, ca. 6 mm

including beak, veins conspicuously reticulate. Fl. and fr. May–Jun.

Below 900 m. N Xinjiang [Kazakstan, Kyrgyzstan, Tajikistan, Uzbekistan].

16. *Scrophularia stylosa* P. C. Tsoong, Fl. Reipubl. Popularis Sin. 67(2): 394. 1979.

长柱玄参 chang zhu xuan shen

Stems to 60 cm tall, simple or apically short branched. Stems densely glandular hairy, hollow. Leaves lower 2 pairs smaller than others; petiole to 4 cm, narrowly winged; leaf blade narrowly to broadly ovate, to 9 × 9.5 cm, thin, abaxially grayish white, adaxially green, base broadly cuneate to subcordate, margin toothed to rarely shallowly crenate-toothed. Cymes axillary, 1–3-flowered; peduncle slender, ca. 1.5 cm, glandular hairy; bracts large, foliaceous. Pedicel slender, to 2.5 cm, glandular hairy. Calyx 4–5 mm, glandular pubescent; lobes lanceolate-ovate to lanceolate, apex acute. Corolla light yellow, 1.5–1.8 cm; tube 0.9–1.1 cm; lower lip lobes orbicular, middle lobe larger than other lobes; upper lip ca. 1.5 mm longer than lower lip, lobes rotund, with overlapping margins. Stamens slightly shorter than lower lip; staminode obcordate, ca. 0.5 mm. Ovary ca. 3 mm. Style ca. 8 mm. Capsule narrowly ovoid, 0.9–1.1 cm including beak. Fl. Jun, fr. Jul–Sep.

• On rocks; 2000–3000 m. Shaanxi (Foping Xian).

17. *Scrophularia urticifolia* Wallich ex Benth, Scroph. Ind. 18. 1835.

荨麻玄参 qian ma xuan shen

Scrophularia forrestii Diels.

Herbs, to 1 m tall. Stems quadrangular, pith white. Leaves 3–5 pairs; petiole 2–4 cm or to 7 cm below; leaf blade broadly ovate, ovate-elliptic, or oblong, 6–9 × 4–6 cm, base subcordate to rounded, margin coarsely double serrate. Thyrses large and spreading, terminal on lateral branches, to 30 cm; peduncle glabrous; bracts large and foliaceous, gradually decreasing in size toward inflorescences apex. Pedicel glabrous. Calyx ca. 3 mm; lobes elliptic, apex obtuse. Corolla light green, 6–7 mm; tube 3–4 mm; lower lip lobes subequal; upper lip ca. 2 mm longer than lower lip, lobes with overlapping margins. Stamens ± as long as lower lip; staminode subglobose. Ovary ca. 2 mm. Style slightly shorter than ovary. Fruit unknown. Fl. Apr–May.

Grassland of mountain slopes, scrub; 2700–2800 m. S Xizang, W Yunnan [Bhutan, India (Darjeeling), Nepal, Sikkim].

18. *Scrophularia fargesii* Franchet, Bull. Soc. Bot. France 47: 12. 1900.

长梗玄参 chang geng xuan shen

Scrophularia franchetiana P. C. Tsoong; *S. wilsonii* Bonati.

Perennials, more than 60 cm tall. Roots stout, ± fleshy. Stems obscurely quadrangular, hollow, glabrous, white pilose, or glandular pilose. Leaves opposite; petiole to 5 cm, narrowly winged; leaf blade ovate to ovate-orbicular, 5–9 cm, thin, abaxially puberulent on veins, adaxially glabrous or sparsely hairy, base rounded,

cordate-truncate, or rarely broadly cuneate, margin unequally double serrate. Cymes axillary or terminal, 1–3-flowered, rarely 5-flowered; peduncle slender, more than 3 cm. Pedicel slender, more than 3 cm, glandular pilose; bracts large, foliaceous. Calyx ca. 5 mm; lobes narrowly ovate to orbicular-ovate, apex obtuse to acute, margin membranous and more conspicuous in fruit. Corolla purple-red, 1–1.2 cm; tube ovoid-globose; lower lip lobes rounded, middle lobe smaller than other lobes; upper lip 2–3 mm longer than lower lip, lobes 1.5–2 mm, with overlapping margins. Stamens slightly shorter than lower lip; staminode subglobose. Ovary slightly shorter than style. Style 3–4 mm. Capsule narrowly ovoid, 9–10 mm. Fl. Jun–Jul, fr. Aug.

• Grassland, scrub; 2000–3300 m. Hubei (Shennongjia Linqu), Sichuan.

Scrophularia maximowiczii Gorschkova is reported from NE China (Bot. Mater. Gerb. Inst. Komarova Akad. Nauk SSSR 14: 444. 1951) and is similar to *S. fargesii* but differs by having lanceolate calyx lobes with acute apices. The authors have not seen any specimens of this species.

19. *Scrophularia modesta* Kitagawa, Rep. Exped. Manchoukuo sect. IV, 2: 28. 1935.

山西玄参 shan xi xuan shen

Herbs, to 60 cm tall. Stems densely glandular hairy, white pithed or sometimes hollow. Leaves ovate, ovate-oblong, or oblong-lanceolate, to 9 × 5 cm, pubescent, base often asymmetrical and rounded, subtruncate, subcordate, or rarely broadly cuneate, margin variously toothed. Thyrses terminal or sometimes on lateral branches, to 30 cm; cymes widely spaced, 3–7-flowered; peduncle to 1.5 cm, glandular hairy; bracts small. Pedicel usually 4(–10) mm, glandular hairy. Calyx ca. 4 mm, subglabrous; lobes ovate, apex obtuse. Corolla green to yellow-green, ca. 8 mm; tube oblong-globose, ca. 4 mm; lower lip middle lobe slightly shorter than lateral lobes; upper lip ca. 1 mm longer than lower lip, lobes ovate, with overlapping margins. Stamens slightly shorter than lower lip; staminode ± fanlike to transversely oblong, wider than long. Ovary ca. 2.5 mm. Style 3–4 mm. Capsule ovoid, 5–9 mm. Fl. May–Jul, fr. Jul–Sep.

• Grassland along rivers, under forests; 1100–2300 m. Hebei, Shaanxi, Shanxi.

Scrophularia modesta is similar to *S. mandarinorum* and *S. yunnanensis* which together form a natural group. T. Yamazaki (J. Jap. Bot. 23: 83. 1949) treated *S. modesta* as a synonym of *S.*

moellendorffii Maximowicz. Although these two species are superficially similar, the flower morphology is quite different.

20. *Scrophularia mandarinorum* Franchet, Bull. Soc. Bot. France 47: 13. 1900.

单齿玄参 dan chi xuan shen

Scrophularia duclouxii Stiefel & Bonati; *S. stiefelhagenii* Bonati.

Herbs, to 1 m tall. Stems glandular, hairy or basally subglabrous, pith white. Leaves ca. 8–10 pairs; petiole

to 2.5 cm, narrowly winged, glandular hairy or glabrous; leaf blade ovate to ovate-lanceolate, glabrous, puberulent, or pilose, base broadly cuneate, rounded, or subcordate, margin regularly to somewhat irregularly serrate or rarely double serrate. Thyrses narrow, ca. 20 cm; peduncle 0.5–1.5 cm, glandular hairy; bracts small. Pedicel 0.5–1.5 cm, glandular hairy. Calyx 2–3 mm; lobes ovate-lanceolate to lanceolate-oblong, apex obtuse to acute. Corolla 5–8 mm; tube 3–5 mm; upper lip 1–1.5 mm longer than lower lip; lobes orbicular, with overlapping margins, lateral lobes wider than long, middle lobe smaller than lateral lobes. Stamens as long as or slightly shorter than lower lobes; staminode small, subglobose, ± as wide as long. Ovary ca. 2 mm. Style ca. 2 mm. Capsule ovoid, 6–7 mm including beak. Fl. Jul–Aug, fr. Aug–Oct.

• Forests, grassland on mountain slopes, riverbanks; 1800–3800 m. SW to W Sichuan, S to SE Xizang, NW Yunnan.

21. *Scrophularia yunnanensis* Franchet, Bull. Soc. Bot. France 47: 12. 1900.

云南玄参 *yun nan xuan shen*

Herbs, slender, 30–40(–80) cm tall. Rhizomes slender. Stems glandular hairy. Leaves often crowded below, ca. 4 or 5 pairs, increasing in size upward; petiole to 3.5 cm, narrowly winged, pilose; leaf blade elliptic-ovate to oblong-obovate, to 8 × 5 cm, sparsely white hairy on both surfaces or only on veins abaxially, base subcordate, truncate, or broadly cuneate, margin undulate and double serrate. Thyrses terminal, narrow, 8–20 cm; cymes 2–5-flowered; peduncle ca. 2 cm, glandular hairy; bracts small. Pedicel ca. 2 cm, glandular hairy. Calyx ca. 4.5 mm; lobes ovate-orbicular, apex obtuse-rounded. Corolla green, 7–10 mm; tube subglobose; lower lip middle lobes smaller than lateral lobes; upper lip lobes orbicular, with overlapping margins. Stamens as long as or slightly longer than lower lip; staminode obcordate to subglobose, ± as wide as long. Ovary ca. 2 mm. Style to 3 mm. Capsule narrowly ovoid, ca. 8 mm. Fl. May–Aug, fr. Aug–Sep.

• Rocky grassland; 3000–3700 m. SW Sichuan, NW Yunnan.

22. *Scrophularia taihangshanensis* C. S. Zhu & H. W. Yang, Acta Phytotax. Sin. 35: 76. 1997.

太行山玄参 *tai hang shan xuan shen*

Perennials, 20–45 cm tall. Stems, peduncles, bracts, pedicels, and calyces pilose and glandular pubescent. Stems quadrangular. Petiole 4–6 cm. Basal leaf blade ovate to ovate-deltoid, 3.5–5 × (2.5–)3–4.5 cm, puberulent, base subcordate, margin double dentate or lobed and lobes dentate, apex acute to obtuse. Stem leaf blades 5–8 × 3.5–5 cm, puberulent, base cordate, rounded, or broadly cuneate, margin double dentate or lobed and lobes dentate, apex acute to obtuse. Thyrses terminal, racemose, 8–15 cm, (8–)10–25-flowered; rachis zig-zag; bracts linear, small. Pedicel 1–2 cm. Calyx 6–8 mm; lobes parted to near base, lanceolate,

apex acute. Corolla yellow-green, 6–8 mm; tube 4–5 × 2–2.5 mm; upper lip 0.5–1 mm longer than lower lip, lobes obovate-oblong, 2–2.5 × ca. 1.5 mm. Stamens ± as long as corolla; staminode oblong. Capsule ovoid, 4–5 mm including beak. Seeds oblong, 0.4–0.5 × ca. 0.3 mm, angular. Fl. and fr. Jul–Aug.

• Edge of forests; ca. 900 m. Henan (Qinyang Xian).

23. *Scrophularia macrocarpa* P. C. Tsoong, Fl. Reipubl. Popularis Sin. 67(2): 395. 1979.

大果玄参 *da guo xuan shen*

Perennials, 15–35 cm tall. Roots ± stout, ca. 2 cm in diam. Stems hollow. Basal leaves 3 or 4 pairs, scalelike. Stem leaves petiole flattened, narrowly winged, to 6 cm; leaf blade ovate, broadly ovate, or triangular-ovate, to 9.5 cm, adaxially glabrous or puberulent, base cuneate to shallowly cordate, margin double serrate. Thyrses terminal, racemose or narrowly paniculate, ca. 5 cm; cymes 1(–3)-flowered; peduncle glandular hairy; bracts small. Pedicel glandular hairy. Calyx 5–6 cm; lobes ovate-lanceolate, apex acute. Corolla yellow-green, ca. 9 cm; tube subglobose, ca. 6 mm; lower lip lobes rounded; upper lip ca. 2.5 mm longer than lower lip, lobes orbicular, with overlapping margins. Stamens slightly shorter than lower lip; staminode obovate, small. Style as long as ovary or slightly longer. Capsule ovoid, 1–1.4 cm. Fl. May, fr. Jun.

• Forests; 3000–3600 m. SW Sichuan, Yunnan (Luquan Xian).

24. *Scrophularia diplodonta* Franchet, Bull. Soc. Bot. France 47: 14. 1900.

重齿玄参 *chong chi xuan shen*

Scrophularia crenatosepala H. L. Li; *S. diplodonta* var. *tsanchanensis* Franchet.

Perennials, to 70 cm tall. Roots stout. Stems hollow, striate, sometimes apically quadrangular. Basal leaves scalelike. Stem leaves petiole narrowly winged, to 2 cm; leaf blade lanceolate to ovate, 5–10 cm, papery, base cuneate to subcordate, margin serrate or double serrate. Thyrses terminal, corymbose at first, paniculate later, ca. 15 × 7 cm, lower cymes 3–5-flowered; peduncle to 2 cm; bracts small. Pedicel to 1.5 cm, glandular and eglandular puberulent. Calyx ca. 5 mm; lobes subequal, narrowly ovate to ovate-lanceolate, margin entire or irregularly crenate, apex acute. Corolla whitish green, ca. 1 cm; tube globose, ca. 5 mm; lower lip lobes oblong to oblong-ovate; upper lip ca. 2.5 mm longer than lower lip, lobes obovate, with overlapping margins. Stamens almost as long as lower lips; staminode obovate to obtriangular-cordate. Ovary ca. 2 mm. Style slightly longer than ovary. Capsule ca. 1 cm. Fl. May–Jun, fr. Jul–Aug.

• Grassland on mountain slopes, mixed forests; 3000–3600 m. NW Yunnan.

25. *Scrophularia buergeriana* Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 116. 1865.

北玄参 *bei xuan shen*

Herbs, to 1.5 m tall. Lateral roots fusiform, inflated. Rhizomes with fleshy nodules. Herbage glabrous, sparsely hairy, or white villous. Stems narrowly winged, pith white. Petiole to 5.5 cm; leaf blade ovate to elliptic-ovate, 5–12 cm, base broadly cuneate to truncate, margin acutely serrate. Thyrses spicate, to 50 cm, less than 2 cm wide; cymes all alternate or lower ones subopposite; peduncle less than 5 mm, sparsely glandular hairy. Pedicel less than 5 mm, sparsely glandular hairy. Calyx ca. 2 mm; lobes ovate-elliptic to broadly ovate, apex obtuse to rounded. Corolla yellow-green, 5–6 mm; lower lip lobes rounded to obtuse; upper lip ca. 1.5 mm longer than lower lip, lobes rounded to obtuse, with overlapping margins. Stamens almost as long as lower lip; staminode obovate. Ovary ca. 1.5 mm. Style ca. 3 mm. Capsule ovoid, 4–6 mm. Fl. Jul, fr. Aug–Sep.

Wild or cultivated. Lower mountain slopes, wet grassland; 200–1500 m. Gansu (Huating Xian), Hebei, Henan, Jilin, Liaoning, Shaanxi (Taibai Shan), Shandong, Shanxi (Xia Xian) [Japan, Korea].

Scrophularia amgunensis F. Schmidt and *S. mandchurica* Maximowicz have been reported from NE China (P. Y. Fu, ed. *Clavis Plantarum Chinae Boreali-Orientalis*, ed. 2, 602. 1995), but these reports may actually be *S. buergeriana*.

- 1a. Stems, petioles, and abaxial surface of leaf blades glabrous or sparsely hairy 25a. var. *buergeriana*
1b. Stems, petioles, and abaxial surface of leaf blades white villous 25b. var. *tsinglingensis*

25a. *Scrophularia buergeriana* var. *buergeriana*
北玄参(原变种) bei xuan shen (yuan bian zhong)

Scrophularia oldhami Oliver.

Stems, petioles, and abaxial surface of leaf blades glabrous or sparsely hairy. Fl. Jul, fr. Aug–Sep.

Lower mountain slopes, wet grassland; 200–1100 m. Hebei, Henan, Jilin, Liaoning, Shandong [Japan, Korea].
Used medicinally.

25b. *Scrophularia buergeriana* var. *tsinglingensis* P. C. Tsoong, Fl. Reipubl. Popularis Sin. 67(2): 395. 1979.

北秦岭玄参 bei qin ling xuan shen
Stem, petiole, and abaxial surface of leaf blades with white villous multicellular hairs. Fl. Jul–Aug.

• Grassland along rivers, cultivated in Taibai Shan area; 1000–1500 m. Gansu (Huating Xian), Shaanxi (Taibai Shan), Shanxi (Xia Xian).
Used medicinally.

26. *Scrophularia moellendorffii* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 26: 501. 1880.

华北玄参 hua bei xuan shen
Perennials, to 60 cm tall. Stems subterete, narrowly winged, hollow, often glandular hairy apically. Leaves on lower nodes scalelike. Stem leaves petiole 0.5–2.5 cm; leaf blade ovate, oblong-ovate, or rarely oblong-lanceolate, to 10 cm, base broadly cuneate to occasionally subtruncate, margin often coarsely irregularly double toothed. Thyrses terminal; cymes opposite or whorled; lower whorls ca. 4 cm distant from each other; peduncle short, densely glandular hairy.

Flowers crowded. Pedicel short, densely glandular hairy. Calyx oblique, less than 3 mm; lobes ovate. Corolla yellow, ca. 7 mm, outside sparsely glandular puberulent; tube subglobose; lower lip lobes orbicular, middle lobe smaller than other lobes; upper lip ca. 2 mm longer than lower lip, margin entire or retuse. Stamens \pm as long as corolla tube; staminode small. Ovary ca. 2 mm, 1/3–1/2 as long as style. Style slender. Capsule ovoid, ca. 7 mm. Fl. Jul, fr. Jul–Aug.

• Among shady rocks, mountain tops; 1500–2000 m. Shanxi (Taihang Shan).

27. *Scrophularia hypsophila* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 62: 238. 1925.

高山玄参 gao shan xuan shen

Herbs, to 25 cm tall. Rhizomes elongated, woody. Stems mostly fascicled, apically slightly curved, hollow. Basal leaves scalelike. Stem leaves petiole 3–4 mm, narrowly winged; leaf blade ovate to elliptic-ovate, to 3.5 cm, glabrous, base broadly cuneate to rounded, margin coarsely and irregularly double serrate. Thyrses surpassing upper leaves, capitate, to 2 cm; cymes often 1-flowered. Calyx ca. 3 mm, deeply lobed; lobes subequal, subovate to oblong, margin 2- or 3-toothed, apex obtuse to truncate. Corolla yellow, 7–9 mm; tube subglobose, somewhat inflated, 4–5 mm; lower lip lobes unequal; upper lip 1–2 mm longer than lower lip, lobe margins not overlapping. Stamens \pm as long as lower lip; staminode apex narrow to semiorbicular. Ovary ca. 2 mm. Style 4–5 mm. Capsule subglobose, 6–7 mm in diam. Fl. Jul–Sep, fr. Sep.

• Alpine grassland, sandy mountain slopes; 3000–4100 m. NW Yunnan.

28. *Scrophularia przewalskii* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 382. 1894.

青海玄参 qing hai xuan shen

Perennials, 8–30 cm tall. Rhizomes to 5 mm in diam. Stems 1–3, often branched from middle or apically, sparsely pilose apically. Leaves on lower nodes scalelike. Stem leaves petiole to 1.5 cm, sparsely pubescent; leaf blade ovate, 1–4 \times 0.8–3 cm, abaxially sparsely pubescent, margin dentate, serrate, or crenulate. Thyrses terminal on main stems and not surpassing upper leaves, or also on lateral branches, less than 2 cm; cymes (1–)3-flowered; peduncle glandular hairy. Pedicel glandular hairy, ca. 3 mm at anthesis, to 7 mm in fruit. Calyx lobes ovate-oblong, 4–6 \times 2.5–3.5 mm, glandular, apex rounded. Corolla yellow, ca. 1.5 cm; upper lip ca. 2.5 mm longer than lower lip, lobes rounded, ca. 5 mm wide. Stamens \pm as long as lower lip. Style ca. 1.1 cm. Capsule globose, ca. 7 \times 6 mm. Fl. Jun–Aug, fr. Aug–Sep.

Sunny and rocky slopes; 4100–4600 m. SE Qinghai [Sikkim].

29. *Scrophularia lhasaensis* D. Y. Hong, Novon 6: 372. 1996.

拉萨玄参 la sa xuan shen

Perennials, ca. 15 cm tall, glandular hairy throughout except on corollas, stamens, and pistils. Rhizomes ca. 9 mm in diam. Stems several, cespitose, branched apically and branches usually sterile. Leaves on lower nodes 1 or 2; petiole 2–3 mm; leaf blade scalelike. Stem leaves sessile, ovate to ovate-orbicular, 1.7–4.5 × 1–2.5 cm, base rounded to subtruncate, margin entire or rarely weakly serrate. Thyrses terminal, very short; cymes 4-flowered, in pairs; peduncle ca. 1.2 cm. Pedicel 2–3 mm. Calyx ca. 5 mm, parted almost to base; lobes linear-oblong, apex obtuse. Corolla green-yellow, urceolate, ca. 1.1 cm, glabrous; lower lip ca. 2 mm, upper lip ca. 3.8 mm, lobes not overlapping and ca. 5 mm wide. Stamens slightly exerted, glabrous; staminode clavate. Ovary ovoid, apex gradually tapering. Style ca. 8.5 mm, glabrous. Fl. Jun–Aug.

• Rocky terrain; ca. 4600 m. C Xizang.

30. *Scrophularia henryi* Hemsley in F. B. Forbes & Hemsley, J. Linn. Soc., Bot. 26: 178. 1890.

鄂西玄参 *e xi xuan shen*

Scrophularia henryi var. *glabrescens* Hemsley.

Perennials, to 40 cm tall. Stems 1 or 2, subquadrangular, hollow, apically puberulent to lanose when young, glabrescent. Petiole 1–2 cm; leaf blade ovate to elliptic, 4–6 cm, abaxially glabrous or puberulent, base obtuse, margin serrate or occasionally ± double serrate. Thyrses terminal, spikelike, 4–10 cm, capitate; cymes opposite or whorled; lower whorls 2–5 cm apart; peduncle short; rachis, peduncle, and pedicel densely puberulent. Calyx ca. 4 mm; lobes ovate-orbicular. Corolla yellow-green, ca. 8 mm; tube subglobose, ca. 4 mm; lower lip middle lobe smaller than lateral lobes; upper lip ca. 2 mm longer than lower lip, lobes obovate, with overlapping margins. Stamens slightly shorter than lower lip; staminode ca. 0.5 mm, obovate. Ovary ca. 3 mm. Style ca. 4 mm. Capsule globose-ovoid, ca. 8 mm. Fl. Jun–Jul, fr. Jul–Aug.

• Mountain slopes, on rocks; 2700–3100 m. W Hubei (Shennongjia Linqu).

31. *Scrophularia alaschanica* Batalin, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 380. 1894.

贺兰山玄参 *he lan shan xuan shen*

Perennials, to 40 cm tall. Roots to 5 mm in diam. Stems hollow or basally ± woody, glandular hairy. Basal leaves scalelike. Upper leaves petiole to 1.3 cm, narrowly winged; leaf blade ovate-elliptic to ovate-lanceolate, 3–8 × 3–5 cm, margin coarsely and irregularly double serrate. Thyrses short spicate or subcapitate, 2–8 cm, with 2–4 nodes; cymes opposite; peduncle short. Pedicel short. Calyx 4–5 mm, densely glandular hairy; lobes broadly oblong to broadly elliptic, apex obtuse to rounded. Corolla yellow, 1–1.5 cm, outside glandular hairy; tube slightly inflated, bent forward; upper lip ca. 2.5 mm longer than lower lip, lobes orbicular, with overlapping margins. Staminode

linear-cuneate. Style 2 × or more as long as ovary. Capsule broadly ovoid, ca. 1 cm. Fl. May–Jun, fr. Jul–Aug.

• Crevices along streams, grassland of mountain slopes; 2200–2500 m. Ningxia.

32. *Scrophularia delavayi* Franchet, Bull. Soc. Bot. France 47: 15. 1900.

大花玄参 *da hua xuan shen*

Scrophularia campanulata H. L. Li; *S. muliensis* H. L. Li.

Perennials, to 45 cm tall. Rhizomes apically to 1.2 cm in diam. Stems fascicled, hollow, sparsely hairy. Basal leaves scalelike. Upper leaves petiole to 4 cm, flattened, narrowly winged; leaf blade ovate to ovate-rhomboid, 2.5–7 cm, usually glabrous, base broadly cuneate to subtruncate, margin incised and double serrate. Thyrses subcapitate or subspicate, 3–10 cm, 1–3-whorled, glandular hairy; cymes 1–3-flowered. Pedicel to 1 cm. Calyx 5–7 mm, oblique, somewhat 2-lipped; lobes acute. Corolla yellow, 0.9–1.5 cm, outside glabrous; tube subcampanulate, ca. 6 mm, inside villous; lower lip middle lobe narrow, ligulate; upper lip longer than lower lip, inside villous, lobes orbicular, with overlapping margins. Stamens ca. 1/2 length of lower lip; staminode rounded to subreniform. Ovary ca. 3 mm. Style at least 2 × as long as ovary. Capsule narrowly ovoid, ca. 7 mm. Fl. May–Jul, fr. Aug.

• Grassland on mountain slopes, moist areas in scrub, rocky crevices; 3100–3800 m. SW Sichuan, N Yunnan.

33. *Scrophularia chasmophila* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 13: 181. 1921.

岩隙玄参 *yan xi xuan shen*

Herbs, to 10 cm tall. Roots to 15 cm. Stems soft and bent. Basal leaves scalelike. Upper leaves petiole 0.5–1.5 cm, often winged; leaf blade subrhomboid-ovate, 1.3–2.7 × 1–2.2 cm, abaxially hairy, adaxially densely strigose, base broadly cuneate, margin serrate or coarsely serrate, rarely subentire and hairy, veins hairy. Peduncle to 5 mm. Thyrses terminal, cymose, short. Pedicel ca. 7 mm, glandular pilose. Calyx 5–7 mm, somewhat oblique, glandular hairy; lobes unequal, apex often acute. Corolla greenish yellow, 1.5–2.2 cm, glabrous; lower lip lobes ca. 3 mm, middle lobe smallest; upper lobes ca. 5 mm longer than lower lobes, orbicular, with overlapping margins. Stamens shorter than upper lip; staminode linear, clavate, or obovoid. Ovary ca. 2 mm. Style 4–5 × as long as ovary. Capsule 1–1.1 cm, including beak. Fl. Jun–Jul, fr. Jul.

• Stony grassland, among rocks; 3500–4600 m. SW Sichuan, Xizang (Nyingchi Xian), NW Yunnan.

1a. Corolla to 1.5 cm; staminode linear or clavate; leaves sparsely serrate or subentire 33a. subsp. *chasmophila*

1b. Corolla 1.8–2.2 cm; staminode obovoid; leaves usually coarsely dentate 33b. subsp. *xizangensis*

33a. *Scrophularia chasmophila* subsp. *chasmophila*

岩隙玄参(原亚种) *yan xi xuan shen* (*yuan ya zhong*)

Scrophularia nana H. L. Li; *S. rockii* H. L. Li.

Leaves to 1.8×1.6 cm, sparsely serrate or subentire.

Corolla to 1.5 cm. Staminode linear or clavate. Fl. Jun–Jul, fr. Jul.

- Stony grassland; 3500–4500 m. SW Sichuan, NW Yunnan.

33b. *Scrophularia chasmophila* subsp. ***xizangensis*** D. Y. Hong, *Novon* 6: 374. 1996.

西藏岩隙玄参 xi zang yan xi xuan shen

Leaves $1.3\text{--}2.7 \times 1\text{--}2.2$ cm, conspicuously and coarsely dentate. Corolla 1.8–2.2 cm. Staminode obovoid.

- Among rocks; 4000–4600 m. Xizang (Nyingchi Xian).

34. *Scrophularia pauciflora* Bentham, *Scroph. Ind.* 17. 1835.

轮花玄参 lun hua xuan shen

Herbs, erect, to 1 m tall, branched, blackish when dry.

Stems subquadrangular, pith white. Petiole ca. 5 cm, decurrent on stem and becoming winglike ribs, glandular hairy; leaf blade cordate-ovate, to 10 cm, short hairy on veins when young, margin coarsely double serrate. Thyrses often terminal, narrowly spicate, to 20 cm; cymes opposite, widely spaced, usually 4-flowered; peduncle short, glandular hairy. Flowers crowded. Pedicel short, glandular hairy. Calyx 3–4 mm; lobes ovate-lanceolate, glandular hairy, apex acute.

Corolla 5–6 mm, glabrous; lower lip middle lobe smaller than lateral lobes; upper lip slightly longer than lower lip. Stamens slightly shorter than lower lip; staminode small or absent. Ovary ovoid, ca. 1.5 mm.

Style \pm as long as ovary. Capsule ovoid, 6–8 mm.

Along streams, sandy and wet places; 2000–3500 m. Xizang (Yadong Xian) [Bhutan, India (Darjeeling), Nepal, Sikkim].

35. *Scrophularia spicata* Franchet, *Bull. Soc. Bot. France* 47: 14. 1900.

穗花玄参 sui hua xuan shen

Perennials, 0.5–1.5 m tall. Roots fibrous, apically with inflated nodules. Rhizomes perpendicular downward. Stems quadrangular, narrowly winged, basally sparsely villous, apically glandular pubescent, pith white; lower stem hard and not easily compressed at anthesis. Petiole to 5 cm, flattened, narrowly winged; leaf blade oblong-ovate to lanceolate, ca. 10×4 cm, base broadly cuneate to subcordate-truncate, margin crenate to serrate.

Thyrses terminal, narrowly spicate, to 50 cm; cymes opposite or subopposite, to 20 pairs, widely spaced, compound, many flowered; peduncle short, densely glandular hairy. Pedicel short, densely glandular hairy. Calyx 4–5 mm; lobes ovate-lanceolate, apex acute.

Corolla green to yellow green, 8–10 mm, glabrous; middle lobe of lower lip smallest; upper lip 1.5–2 mm longer than lower lip, lobes ovate, with overlapping margins. Stamens shorter than upper lip; staminode obovate to subrounded. Style ca. 3.5 mm, slightly longer than ovary. Capsule narrowly ovoid to ovoid, to 8 mm. Fl. Jul–Aug, fr. Aug–Sep.

- Alpine grassland, scrub, valleys; 2800–3300 m. NW Yunnan.

36. *Scrophularia mapienensis* P. C. Tsoong, *Fl. Reipubl. Popularis Sin.* 67(2): 395. 1979.

马边玄参 ma bian xuan shen

Perennials, to 80 cm tall. Lateral roots slender.

Rhizomes stout, to 3 cm in diam. Stems erect, hollow; lower stems soft and easily compressed at anthesis.

Leaves on basal nodes scalelike, sparsely hairy. Petiole of other leaves less than 2 cm, broadly flattened, basally comose; leaf blade lanceolate-oblong to ovate, 3–7 cm, abaxially often hairy on veins, adaxially sparsely pubescent, base cuneate to obtuse, margin irregularly serrate or double serrate. Thyrses capitate or spicate, to 8 cm in fruit; cymes opposite, widely spaced, often to 4 pairs; peduncle glandular hairy. Pedicel glandular hairy. Calyx 4–5 mm; lobes ovate, glabrous to densely glandular hairy, apex acute. Corolla yellow-white or purple, ca. 9 mm, outside glabrous to glandular hairy, inside glabrous; tube somewhat inflated, ca. 5 mm; lower lip lobes small; upper lip ca. 2 mm longer than lower lip, lobes with overlapping margins. Stamens as long as corolla tube; staminode varying in shape. Ovary 2–3 mm. Style nearly as long as ovary. Capsule narrowly ovoid, 1–1.3 cm. Fl. Jun–Jul, fr. Aug–Oct.

- Under scrub, grassland on mountain slopes; 2900–3900 m. SW Sichuan, NE Yunnan.

