

**10. ADENOPHORA** Fischer, *Mém. Soc. Imp. Naturalistes Moscou* 6: 165. 1823.

沙参属 sha shen shu

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Herbs, perennial. Roots usually thickened, various in shape, carrot-shaped, mostly fleshy. Caudexes often short, sometimes elongated and branched. Stems erect, less frequently ascending. Basal leaves often rosulate, usually long petiolate, cordate; cauline leaves mostly alternate, rarely opposite or verticillate. Flowers in a cyme; cymes sometimes reduced to a branch with 1 terminal flower and 1 to several bracts, sometimes glomerate into a panicle. Calyx epigynous, rarely semi-epigynous, tube various in shape; lobes 5, entire or dentate. Corolla always epigynous, campanulate, funnellform, or tubular, 5-lobed or 5-fid to middle. Stamens 5; filaments much dilated into a lamella at base; lamellae densely ciliate-villous, valvate, enveloping disk; anthers elongate. Disk usually tubular, rarely annular. Ovary inferior, 3-locular; ovules numerous; style with pollen-receiving hairs; stigma 3-lobed, lobes narrow, recurved. Capsule 3-poricidal below persistent calyx lobes. Seeds numerous, ellipsoid, 1-angular.

Sixty-two species: E Asia, south to India and Vietnam, with one species extending into Europe and another endemic to Crimea; 38 species (23 endemic) in China.

- 1a. Cauline leaves all or mostly verticillate.
  - 2a. Corolla small, less than 11 mm; calyx lobes filiform ..... 38. *A. tetraphylla*
  - 2b. Corolla larger than 13 mm; calyx lobes lanceolate or subulate.
    - 3a. Calyx lobes toothed; corolla tubular-campanulate, 18–25 mm; style slightly shorter than corolla ..... 33. *A. wulingshanica*
    - 3b. Calyx lobes entire; corolla campanulate, 13–20 mm; style exserted or included.
      - 4a. Cauline leaves partially verticillate; inflorescence branches not verticillate; calyx lobes lanceolate, 3–6 mm ..... 31. *A. pereskiiifolia*
      - 4b. Cauline leaves all verticillate; inflorescence branches often verticillate; calyx lobes elliptic-lanceolate, 5–10 mm ..... 32. *A. divaricata*
- 1b. Cauline leaves all alternate.
  - 5a. Cauline leaves (at least lower ones) petiolate, very rarely subsessile.
    - 6a. Calyx lobes toothed.
      - 7a. Cauline leaves pinnatifid up to over half; capsule columnar, base rounded, only ca. 3 mm wide ..... 34. *A. lobophylla*
      - 7b. Cauline leaves toothed; capsule ellipsoid, base obtuse, more than 3 mm wide.
        - 8a. Cauline leaves with petioles 2–4 cm, cordate at base; disk ca. 0.7 mm high; style equal to corolla in length ..... 7. *A. cordifolia*
        - 8b. Cauline leaves with petioles less than 2.5 cm, cuneate or shallowly cordate at base; disk 1.5–2.5 mm; style ± exserted.
          - 9a. Inflorescence a pseudoraceme or narrow panicle, without secondary branches; calyx lobes with verrucose teeth, or even entire; leaves glabrous adaxially ..... 8. *A. liliifolia*
          - 9b. Inflorescence a large panicle, with secondary branches; calyx lobes often with 1–4 pairs of long teeth, rarely verrucose teeth; leaves sparsely scaberulose adaxially ..... 20. *A. potaninii*
    - 6b. Calyx lobes entire, usually ovate to lanceolate, rarely linear-lanceolate, (1–)1.5–4 mm wide.
      - 10a. Cauline leaves all obviously petiolate, base cordate or rounded, not decurrent or shortly decurrent; calyx lobes obtuse at apex.
        - 11a. Cauline leaves all cordate, papery; calyx tube (hypanthium) obconic at least at anthesis ..... 1. *A. trachelioides*
        - 11b. Cauline leaves rounded or broadly cuneate, only some lower ones shallowly cordate, membranous; calyx tube obovoid or obovoid-conical ..... 2. *A. remotiflora*
      - 10b. Cauline leaves only lower ones petiolate, upper ones sessile or shortly cuneate-petiolate; calyx lobes acute or acuminate at apex.
        - 12a. Cauline leaves only 2, lower one cordate, upper one much smaller ..... 5. *A. brevidiscifera*
        - 12b. Cauline leaves many, not cordate.
          - 13a. Calyx tube globose, calyx lobes subulate-lanceolate, 8–14 mm; pedicels 1.5–3 cm ..... 6. *A. longipedicellata*
          - 13b. Calyx tube obovoid or obconical, calyx lobes usually shorter; pedicels shorter.
            - 14a. Corolla 1.5–2.7 cm, lobes 5–11 mm; calyx lobes ovate to linear-lanceolate, 1.5–4 mm wide ..... 3. *A. petiolata*
            - 14b. Corolla less than 1.8 cm, lobes less than 5 mm; calyx lobes linear-lanceolate or subulate, 1–2 mm wide.
              - 15a. Leaves usually sparsely hispidulous, 7–13 × 1.5–3 cm; calyx mostly hairy, occasionally glabrous, lobes 1–2 mm wide; corolla ca. 17 mm ..... 4. *A. rupincola*
              - 15b. Leaves glabrous or hairy along veins, 3–8 cm; calyx glabrous, occasionally scaberulose; corolla 13–15 mm.
                - 16a. Leaves often hairy on margins and along veins; calyx tube obovoid or obconic; inflorescence a narrow panicle or pseudoraceme ..... 8. *A. liliifolia*

- 16b. Leaves glabrous throughout; calyx tube usually globose, rarely obovoid-globose; inflorescence a panicle ..... 11. *A. sinensis*
- 5b. Cauline leaves sessile, only some individuals of some species (e.g., *A. stricta*) with lower cauline leaves very shortly winged-petiolate.
- 17a. Corolla small, less than 17 mm, constricted at throat and thus corolla urceolate; style strongly exerted, more than  $1.5 \times$  as long as corolla; disk narrowly tubular, 2–7 mm, less than 1 mm wide.
- 18a. Calyx lobes filiform, 3–20 mm, sometimes with 1 or 2 pairs of verrucose teeth at lower part ..... 37. *A. capillaris*
- 18b. Calyx lobes subulate, entire.
- 19a. Stems and leaves densely scaberulose; corolla 10–17 mm ..... 35. *A. stenanthina*
- 19b. Stems and leaves glabrous or villous; corolla 8–12 mm ..... 36. *A. liliifolioides*
- 17b. Corolla usually larger, campanulate; style slightly exerted or included, less than  $1.5 \times$  as long as corolla; disk not much longer than broad.
- 20a. Calyx lobes entire.
- 21a. Calyx scaberulose; calyx lobes subulate, broadest at base, 6–8 mm; style nearly as long as corolla ..... 10. *A. stricta*
- 21b. Calyx mostly glabrous, if hairy then corolla  $\pm$  constricted at throat; calyx lobes triangular-lanceolate to linear-lanceolate, 2–6 mm, if more than 6 mm then calyx tube never globose and glabrous; style obviously exerted or not.
- 22a. Calyx lobes very short, shorter than 2.5 mm.
- 23a. Cauline leaf blade linear, ca. 5 cm  $\times$  0.8 mm; corolla 18–19 mm ..... 14. *A. pinifolia*
- 23b. Cauline leaf blade linear to oblong, 1.5–4  $\times$  0.3–1 cm; corolla 12–14 mm ..... 15. *A. micrantha*
- 22b. Calyx lobes longer than 3 mm, broadest at middle.
- 24a. Calyx variously hairy; corolla shallowly lobed,  $\pm$  constricted at throat, lobes less than  $1/4$  as long as total length, often reflexed.
- 25a. Corolla throat slightly constricted, 9–15 mm wide; corolla lobes 4–6 mm ..... 12. *A. polyantha*
- 25b. Corolla throat strongly constricted, 4–7 mm wide; corolla lobes up to 3 mm ..... 13. *A. contracta*
- 24b. Calyx glabrous; corolla more deeply lobed, not constricted at throat, lobes more than  $1/4$  as long as total length.
- 26a. Calyx lobes elliptic, ca. 2 mm wide, middle part broadest, nearly  $2 \times$  as broad as base ..... 16. *A. palustris*
- 26b. Calyx lobes linear-lanceolate or subulate, base broadest or middle part broadest but not  $2 \times$  as broad as base.
- 27a. Calyx lobes subulate, base broadest.
- 28a. Disk broadly tubular, 3–8 mm, up to 3 mm wide; calyx lobes 5–10 mm; inflorescence a pseudoraceme ..... 17. *A. himalayana*
- 28b. Disk less than 1.5 mm; calyx lobes 3–5 mm; inflorescence a panicle, rarely a pseudoraceme.
- 29a. Cauline leaves ovate to lanceolate, 5–25 mm wide; corolla 12–21 mm ..... 18. *A. amurica*
- 29b. Cauline leaves mostly linear to linear-elliptic, less than 5 mm wide; corolla 10–13 mm ..... 23. *A. stenophylla*
- 27b. Calyx lobes linear-lanceolate, middle part broadest, or at least broadest part not at base.
- 30a. Corolla 16–28 mm, lobes 6–8 mm; leaves entire or sparsely serrate, 2–13 mm wide; style usually shorter than or nearly as long as corolla ..... 19. *A. gmelinii*
- 30b. Corolla 13–22 mm, lobes 4–6 mm; leaves always crenulate, 5–40 mm wide; calyx lobes 3–6 mm; style exerted or not.
- 31a. Style included or as long as corolla; leaves 2.5–7 cm; corolla lobes 4–6 mm ..... 9. *A. lamarckii*
- 31b. Style exerted; leaves 6–13 cm; corolla lobes ca. 4 mm ..... 31. *A. pereskifolia*
- 20b. Calyx lobes toothed.
- 32a. Calyx lobes ovate-triangular, overlapping at lower part, recurved toward lateral side; capsule subglobose; style included ..... 21. *A. tricuspidata*
- 32b. Calyx lobes narrower, never overlapping, not recurved; capsule subglobose or not; style exerted or included.
- 33a. Cauline leaves aggregated at middle part of stems, glabrous, lanceolate or linear-elliptic ..... 22. *A. wilsonii*
- 33b. Cauline leaves evenly distributed or aggregated at lower part of stems, glabrous or hairy.
- 34a. Cauline leaves linear or linear-elliptic, less than 5 mm wide; calyx lobes subulate, 3–4 mm; corolla 10–13 mm ..... 23. *A. stenophylla*
- 34b. Cauline leaves wider; calyx lobes mostly larger; corolla mostly longer.
- 35a. Flowers solitary and terminal, or several in a pseudoraceme, very occasionally in a narrow panicle; corolla 2–3.4 cm, narrowly campanulate ..... 24. *A. elata*
- 35b. Flowers several to numerous, in a pseudoraceme or panicle; corolla rarely (except in *A. morrisonensis*) more than 2.4 cm, campanulate or broadly campanulate.
- 36a. Leaves mostly glabrous; stems mostly glabrous, or puberulent.

- 37a. Calyx lobes narrowly subulate, ca. 0.5 mm wide; style exerted 4–7 mm above corolla ..... 28. *A. hubeiensis*  
 37b. Calyx lobes 1–2 mm wide; style included, or slightly exerted, less than 4 mm above corolla.  
 38a. Corolla 28–35 mm; disk less than 1 mm ..... 29. *A. morrisonensis*  
 38b. Corolla much shorter; disk longer.  
 39a. Capsule ellipsoid or oblong, more than 3 mm in diam.; calyx lobes 5–7 mm ..... 8. *A. liliifolia*  
 39b. Capsule narrowly ellipsoid, ca. 3 mm in diam.; calyx lobes 2–4(–6) mm ..... 30. *A. ningxianica*
- 36b. Leaves ± hairy; stems usually hairy.  
 40a. Leaves mostly aggregated at lower half of stems, upper ones absent or much smaller; calyx lobes 5–20 mm, obviously toothed.  
 41a. Calyx lobes 5–8(–10) mm, often gray; corolla lobed to middle or near middle; disk 0.5–1 mm ..... 26. *A. jasionifolia*  
 41b. Calyx lobes 8–20 mm, green; corolla lobed to 1/3; disk 1.2–3.5 mm ..... 27. *A. coelestis*  
 40b. Leaves evenly distributed; calyx lobes 3–7 mm.  
 42a. Cauline leaves with 2 to several large teeth on each side, puberulent on both surfaces; disk 1.5–3 mm ..... 20. *A. potaninii*  
 42b. Cauline leaves with numerous teeth, adaxially sparsely scaberulose, hispidulous, or glabrous, abaxially hirsute or hispidulous; disk less than 1.4 mm.  
 43a. Cauline leaves narrowly elliptic or lanceolate, 0.5–2.5 cm; style mostly as long as corolla ..... 18. *A. amurica*  
 43b. Cauline leaves ovate, 1.5–6.5 cm; style ± exerted ..... 25. *A. khasiana*

**1. *Adenophora trachelioides*** Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9 [Prim. Fl. Amur.]: 186. 1859.

莽茺 ji ni

Stems single, 40–120 cm tall, up to 1 cm in diam., often ± zigzag-twisted, sometimes branched. Cauline leaves alternate; blade ovate or elliptic, 3–13 × 2–8.5 cm, base cordate, truncate, obtuse, or cuneate, margin serrate or doubly serrate, apex obtuse to shortly acuminate; petiole 1–6 cm, sometimes winged. Inflorescence branches mostly long and horizontally spreading, forming a large panicle, less frequently short, forming a narrow panicle. Hypanthium broadly obconic; calyx lobes elliptic or lanceolate 4–13 × 2–4 mm, margin entire (rarely ciliate). Corolla blue, blue-purple, or white, campanulate, 2–2.5 cm; lobes broadly elliptic, 5–7 mm wide, apex acute. Disk tubular, 2–3 mm. Style as long as corolla. Capsule ovoid-conical, ca. 7 × 5 mm. Seeds yellow-brown, black at both ends, narrowly oblong, slightly compressed, 0.8–1.5 mm. Fl. Jul–Aug, fr. Aug–Sep. *2n* = 34\*, 36\*.

• Mountain and hill slopes, grasslands, forest margins; below 2400 m. Anhui, Hebei, Jiangsu, Liaoning, Nei Mongol, Shandong, Zhejiang.

- 1a. Stems, leaves, calyx, and disk all glabrous ..... 1a. subsp. *trachelioides*  
 1b. Stems, leaves, calyx, and disk nearly always hairy ..... 1b. subsp. *giangsuensis*

**1a. *Adenophora trachelioides* subsp. *trachelioides***

莽茺(原亚种) ji ni (yuan ya zhong)

*Adenophora isabellae* Hemsley; *A. remotiflora* (Siebold & Zuccarini) Miquel var. *cordatifolia* (Debeaux) Zahlbruckner; *A. trachelioides* var. *cordatifolia* Debeaux; *A. trachelioides* f. *puberula* A. I. Baranov.

Stems, calyx, and disk always glabrous. Leaves occasionally sparsely hispidulous along veins.

• Mountain slopes, grasslands, forest margins; below 2400 m.

Anhui (Huang Shan), Hebei, N Jiangsu, Liaoning, Nei Mongol (Ongniud Qi), Shandong, Zhejiang (Hangzhou, Tianmu Shan).

**1b. *Adenophora trachelioides* subsp. *giangsuensis*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 186. 1983.

苏南莽茺 su nan ji ni

Stems and leaves usually densely white hirsute. Leaves often whitish green abaxially. Calyx and disk typically white hairy. Corolla pale purple.

• Hill slopes; lower elevations. S Jiangsu (Nanjing, Taihu, Zhenjiang).

**2. *Adenophora remotiflora*** (Siebold & Zuccarini) Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 193. 1866.

薄叶莽茺 bao ye ji ni

*Campanula remotiflora* Siebold & Zuccarini, Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4: 180. 1846; *Adenophora remotiflora* f. *cordata* Komarov; *A. remotiflora* f. *longifolia* Komarov.

Stems single, 40–100 cm tall, glabrous, usually simple. Cauline leaves long petiolate; blade typically ovate to ovate-lanceolate, rarely ovate-orbicular, 5–13 × 2–7 cm, membranous, glabrous, base mostly truncate, rounded, or obtuse, rarely cordate, margin serrate or doubly serrate, apex usually acuminate; petiole up to 3 cm. Flowers often solitary on pedicels, less frequently in several-flowered cymes, forming a pseudoraceme or narrow panicle. Hypanthium obovoid or obovoid-obconic, glabrous; calyx lobes lanceolate, 7–12 × 1.5–2 mm, margin entire. Corolla blue, campanulate, 2–3.5 cm; lobes 7–12 mm. Disk cylindrical, 2.5–3 mm, ca. 1 mm in diam. Capsule obovoid, 5–8 × 4–7 mm. Seeds narrowly oblong, slightly curved, ca. 1 mm. Fl. Jul–Aug, fr. Aug–Sep. *2n* = 34, 36.

Forest margins, forests, meadows; below 1700 m. Heilongjiang (Ning'an, Shangzhi), Jilin (E of Fusong and Jiaohe), SE Liaoning (Benxi, Huanren, Kuandian) [Japan, Korea, Russia (Far East)].

**3. *Adenophora petiolata*** Pax & K. Hoffmann, Repert. Spec. Nov. Regni Veg. Beih. 12: 499. 1922.

秦岭沙参 qin ling sha shen

Stems 60–120 cm tall, simple, glabrous or sparsely white hispidulous. Cauline leaves usually long petiolate, very rarely almost sessile; blade ovate, 3–15 × 2–5 cm, abaxially glabrous or hispidulous along veins, adaxially sparsely puberulent or glabrous, base broadly cuneate or subtruncate, margin serrate, apex acute to acuminate; petiole winged, up to 8 cm. Inflorescence branches long and horizontally spreading, forming a large panicle, or extremely short, with only 2 or 3 flowers or even a single flower, and thus forming an extremely narrow panicle or even a pseudoraceme; inflorescence rachises and all floral parts glabrous, scaberulose, or puberulent. Hypanthium obconic or obovoid; calyx lobes ovate, ovate-lanceolate, or linear-lanceolate, 4–9 × 1.5–4 mm, overlapping at base or not. Corolla blue, pale blue, purple, or white, campanulate, 15–27 mm; lobes ovate-deltoid, 4–11 × 7–9 mm. Disk shortly tubular, (0.5–)1–2.5 mm, glabrous or hairy at apex. Style nearly as long as corolla. Capsule ovoid-ellipsoid or obovoid, 5–8 × 4–6 mm. Seeds yellow-brown, oblong, slightly compressed, 1–1.5 mm, 1-ribbed. Fl. Jul–Sep, fr. Sep–Oct.  $2n = 34^*$ ,  $34+1B^*$ .

• Grassy slopes, mountain slopes, grasslands, forest margins, forests or roadsides on mountains; below 2300 m. S Anhui, Chongqing, W Fujian, Gansu, Guangdong, Guangxi, Guizhou, S Hebei, W Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan, Zhejiang.

- 1a. Calyx lobes ovate-lanceolate to linear-lanceolate, 1–2(–3) mm wide, never overlapping; disk glabrous; corolla 2–2.7 cm, lobes deltoid, 8–11 mm ..... 3a. subsp. *petiolata*
- 1b. Calyx lobes ovate to ovate-lanceolate, 1.5–4 mm wide, broadest at middle-lower part, usually ± overlapping; disk ± hairy, rarely glabrous; corolla 1.5–2 cm, lobes deltoid-ovate, 5–7 mm.
  - 2a. Cauline leaves petiolate, at least lower ones obviously petiolate, petiole up to 2.5 cm; calyx lobes 2–4 mm wide; disk 1.5–2.5 mm, mostly hairy ..... 3b. subsp. *hunanensis*
  - 2b. Cauline leaves subsessile or only lower ones shortly petiolate, petiole rarely up to 1.5 cm; calyx lobes 1.5–2.5 mm wide; disk (0.5–)1–1.5(–2) mm, mostly glabrous ..... 3c. subsp. *huadungensis*

**3a. *Adenophora petiolata* subsp. *petiolata***

秦岭沙参(原亚种) qin ling sha shen (yuan ya zhong)

Cauline leaves all long petiolate. Inflorescence rachises and all floral parts glabrous. Calyx lobes 1.5–2(–3) mm wide, never overlapping. Corolla 2–2.7 cm; lobes deltoid, 8–11 mm.

• Forests or roadsides on mountains; (1000–)1700–2300 m. Gansu (Chengxian, Huating, Wenxian), W Henan (Lushi, Songxian), Shaanxi (Qin Ling), Shanxi (Puxian, Qinxian, Ruicheng).

**3b. *Adenophora petiolata* subsp. *hunanensis*** (Nannfeldt) D.

Y. Hong & S. Ge, Novon 20: 427. 2010.

杏叶沙参 xing ye sha shen

*Adenophora hunanensis* Nannfeldt in Handel-Mazzetti, Symb. Sin. 7: 1070. 1936.

Cauline leaves mostly petiolate, or at least lower ones petiolate, rarely subsessile. Inflorescence rachises and floral parts often scaberulose. Calyx lobes 2–4 mm wide, ± overlapping at base. Disk 1.5–2.5 mm, mostly hairy. Corolla 1.5–2 cm; lobes 4–7 mm.

• Mountain slopes, grasslands, forest margins; below 2000 m. Chongqing, Guangdong (Liannan, Renhua, Ruyuan), Guangxi (Lingchuan, Xing'an, Yangshuo), Guizhou (Kaili), S Hebei (Cixian), W Henan, Hubei, Hunan, W Jiangxi, Shaanxi (S of Tongchuan), S Shanxi (Jincheng, Lingchuan, Yangcheng), Sichuan.

**3c. *Adenophora petiolata* subsp. *huadungensis*** (D. Y. Hong), D. Y. Hong & S. Ge, Novon 20: 427. 2010.

华东杏叶沙参 hua dong xing ye sha shen

*Adenophora hunanensis* subsp. *huadungensis* D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 186. 1983.

Cauline leaves subsessile, only lower ones shortly petiolate; petiole rarely up to 1.5 cm. Calyx lobes 1–2.5 mm wide, never overlapping. Disk (0.5–)1–1.5(–2) mm, mostly glabrous.

• Grassy slopes, forests; below 1900 m. S Anhui, W Fujian (Liancheng, Yong'an), Jiangsu (Liyang, Nanjing), E Jiangxi (including Lu Shan), Zhejiang (Longquan, Tianmu Shan).

**4. *Adenophora rupincola*** Hemsley, J. Linn. Soc., Bot. 26: 13. 1889.

多毛沙参 duo mao sha shen

*Adenophora pubescens* Hemsley.

Stems 70–150 cm tall, simple or with branches slender and upright, usually scaberulose, less often subglabrous. Lower cauline leaves petiolate, upper ones sessile; blade ovate-lanceolate to elliptic, 6–13 × 1.5–3 cm, both surfaces usually sparsely hispidulous, rarely almost glabrous, base attenuate, margin serrate, apex acuminate; petiole winged. Inflorescences with branches forming a panicle; inflorescence rachises, pedicels, and calyx rather densely puberulent or hispidulous, occasionally glabrous; pedicels short and stout, ca. 5 mm, or rarely elongate. Hypanthium obovoid or obconic; calyx lobes lanceolate to linear-lanceolate, 5–8 × 1–2 mm, very rarely reflexed. Corolla blue-purple or purple, campanulate, ca. 17 mm; lobes deltoid, ca. 5 mm. Disk annular to shortly tubular, 0.5–1.5 mm, glabrous. Style 2–2.2 cm, obviously exerted. Fl. Sep.

• Ravines, grassy slopes; below 1500 m. W Hubei, NW Hunan (Cili), Jiangxi, Sichuan.

**5. *Adenophora brevidiscifera*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 184. 1983.

短花盘沙参 duan hua pan sha shen

Stems ascending, slender, ca. 35 cm tall, simple, densely hirsute below, glabrous above. Basal leaves long petiolate, hirsute; blade ovate, ca. 3 cm wide, abaxially sparsely hirsute along

veins, adaxially hirsute, base cordate with sinus up to 4 cm deep, margin sinuate-crenate or serrate; petiole ca. 3 cm. Lowermost cauline leaf similar to basal leaves but slightly smaller; petiole ca. 2 cm. Upper cauline leaves only 2–4, less than 1 cm, linear, sessile. Cymes 2 or 3, lax, with only terminal flower; bracts filiform, minute; pedicels slender. Hypanthium obovoid, glabrous; calyx lobes subulate, 2–3 × ca. 0.5 mm, margin entire. Corolla narrowly campanulate, ca. 1.8 cm; lobes narrowly ovate-elliptic, equaling tube, ca. 4 mm wide, apex acute. Disk annular, less than 0.5 mm high. Style ca. 12 mm. Capsule oblong or obovoid, 5–7 × 3–4 mm. Fl. Aug–Sep, fr. Sep.

• Forests of *Pinus yunnanensis*; 2700–3000 m. SW Sichuan (Yanyuan).

*Adenophora brevidiscifera* resembles *A. jasionifolia*, from which it differs in having calyx lobes entire, the lower cauline leaves long petiolate and cordate, and disk shorter.

**6. *Adenophora longipedicellata*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 185. 1983.

湖北沙参 hu bei sha shen

Stems 1–3 m tall, simple or with slender branches up to 70 cm, glabrous. Basal leaves ovate, base cordate. Cauline leaves (at least lower ones) petiolate; blade ovate-elliptic or lanceolate, 7–12 × 2–5 cm, papery, glabrous or abaxially sparsely hispid along veins, base cuneate or obtuse, margin serrate or doubly serrate, apex acuminate. Inflorescences with slender and long branches, forming a large lax panicle, glabrous or puberulent; pedicels slender, 1–3 cm. Hypanthium subglobose or obovoid, glabrous; calyx lobes subulate-lanceolate, 8–14 mm. Corolla white, purple, or pale blue, funnellform, 1.9–2.1 cm; lobes deltoid, 5–6 mm. Disk annular, ca. 1 mm or shorter, glabrous. Style ca. 2.1 cm, almost as long as or slightly longer than corolla. Fl. Aug–Oct.

• Meadows, scrub, cliffs; below 2400 m. Chongqing (Fengjie, Nanchuan), Guizhou (Xishui), W Hubei (Laifeng), WC Sichuan.

**7. *Adenophora cordifolia*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 185. 1983.

心叶沙参 xin ye sha shen

Caudexes with horizontal branches and alternate membranous scales. Stems 1 or 2, erect, ca. 50 cm tall, simple, glabrous or retrorsely hirsute. Basal leaves unknown. Cauline leaf blade orbicular or ovate, 3–7 × 2–6 cm, both surfaces sparsely hispidulous or abaxially glabrous, base cordate with sinus 3–5 mm deep; petiole 2–4 cm, upper ones often shorter and sometimes ± decurrent. Inflorescences with short branches, forming a narrow panicle; pedicels less than 5 mm. Hypanthium obovoid, glabrous; calyx lobes linear-lanceolate, 3–7 × 1–1.5 mm, with 2 or 3 pairs of denticles up to 1 mm. Corolla purple, campanulate, 13–15 mm; lobes ovate-deltoid, ca. 1/2 as long as tube. Disk annular, 0.5–0.7 mm, glabrous. Style as long as corolla. Fl. Jul–Aug.

• Shaded and moist rock crevices; ca. 2100 m. Henan (Songxian, Tongbai, Yichuan).

**8. *Adenophora liliifolia*** (Linnaeus) A. Candolle, Monogr.

Campan. 358. 1830.

新疆沙参 xin jiang sha shen

*Campanula liliifolia* Linnaeus, Sp. Pl. 1: 165. 1753; *C. alpini* Linnaeus.

Roots carrot-shaped, 8–10 × 1–2 cm. Stems 50–150 cm tall, simple or branched, glabrous. Cauline leaves sessile or shortly petiolate; blade lanceolate or ovate, 5–13 × 1–5 cm, both surfaces glabrous, rarely sparsely white hirsute abaxially, margin serrate, apex acute to shortly acuminate; petiole (if present) up to 6 mm. Inflorescence a narrow panicle with branches with up to 7 flowers, or rarely only several flowers forming a pseudoraceme; pedicels slender, up to 2.5 cm. Hypanthium obovoid or obconic, glabrous; lobes lanceolate, 5–7 × 1–1.5 mm, mostly reflexed from anthesis, margin usually with a pair of denticles or rarely entire. Corolla blue or pale blue, campanulate, 1.2–2.2 cm; lobes ovate, ca. 1/2 as long as tube, apex acute. Disk shortly tubular, 1.5–2.5 mm, glabrous. Style as long as corolla or slightly exserted. Fl. Jul–Aug.  $2n = 34, 102$ .

Forests, scrub. NW Xinjiang (Burqin, Korgas, Toli) [Kazakhstan, Russia (European part); Europe].

**9. *Adenophora lamarckii*** Fischer, Mém. Soc. Imp. Naturalistes Moscou 6: 168. 1823.

天山沙参 tian shan sha shen

*Adenophora liliifolia* (Linnaeus) A. Candolle var. *lamarckii* (Fischer) Krylov; *Campanula lamarckii* (Fischer) D. Dietrich.

Roots carrot-shaped, up to 2.5 cm in diam. Stems simple, 30–100 cm tall, glabrous, rarely white pubescent. Cauline leaves sessile; blade ovate-lanceolate, 2.5–7 × 0.5–3 cm, both surfaces glabrous, sometimes hispidulous abaxially, base cuneate, margin serrate, apex acute or acuminate. Flowers several in a pseudoraceme or inflorescences with short branches of 2–4 flowers, forming a narrow panicle; pedicels less than 1 cm. Hypanthium obovoid or obconic, glabrous; calyx lobes linear-lanceolate or subulate, 3–5 × 1–1.2 mm, widest at base or at lower part, margin usually entire. Corolla blue, funnellform-campanulate, 1.5–2.2 cm; lobes ovate, ca. 1/2 as long as tube, apex acute. Disk shortly tubular, 1–2.5 mm, glabrous. Style nearly as long as or slightly longer than corolla. Fl. Jul–Aug.  $2n = 34, 102$ .

Forests, forest margins. N Xinjiang (Fukang, Toli, Wenquan) [Kazakhstan, Korea, N Mongolia, Russia (S Siberia)].

**10. *Adenophora stricta*** Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 192. 1866.

沙参 sha shen

Stems 40–80 cm tall, simple, often hispidulous or villous, rarely glabrous. Basal leaves ovate, base cordate. Cauline leaves sessile (lower ones sometimes with extremely short, winged petiole); blade elliptic or narrowly ovate, 3–11 × 1.5–5 cm, sparsely hispidulous, hirsute, or subglabrous, base cuneate, apex acute or shortly acuminate. Flowers often in a pseudo-

raceme, or inflorescences with short branches and thus in an extremely narrow panicle, very occasionally with long branches and panicle ample; pedicels less than 5 mm. Hypanthium obovoid or obconic, puberulent, verrucose-hairy, or less often glabrous; calyx lobes typically subulate, less often linear-lanceolate, 6–8 × 1–1.5 mm, margin entire. Corolla blue or purple, broadly campanulate, 1.5–2.5 cm, glabrous or hirsute at least along veins outside; lobes deltoid-ovate, ca. 1/2 as long as tube. Disk shortly tubular, 1–2.5 mm, glabrous. Style usually slightly longer (rarely shorter) than corolla. Capsule ellipsoid-globose (very rarely ellipsoid), 6–10 mm. Seeds brown-yellow, slightly compressed, ca. 1.5 mm. Fl. Aug–Oct.  $2n = 34$ .

Meadows, forest margins, scrub, open mountain slopes, forests, among grasses, in rock crevices; below 3300 m. Anhui, Chongqing, Fujian, SE Gansu, Guangxi, Guizhou, SE and W Henan, W Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, NW and S Sichuan, Yunnan, Zhejiang [Korea; naturalized in Japan].

The diagnostic characters of the present species are cauline leaves sessile; inflorescences pseudoracemose or narrowly paniculate; pedicels short; calyx mostly hairy, and calyx lobes subulate and entire.

- 1a. Leaves glabrous or sparsely villous; stems hispidulous ..... 10c. subsp. *confusa*
- 1b. Leaves hispidulous; stems hispidulous, less frequently hirsute, rarely glabrous.
  - 2a. Corolla 2–2.5 cm; disk 1.8–2.5 mm ..... 10d. subsp. *aurita*
  - 2b. Corolla 1.5–2.3 cm; disk 1–1.8 mm.
    - 3a. Corolla nearly always hirsute, very rarely subglabrous outside ..... 10a. subsp. *stricta*
    - 3b. Corolla glabrous or with a few hairs along veins at top outside ..... 10b. subsp. *sessilifolia*

**10a. *Adenophora stricta* subsp. *stricta***

沙参(原亚种) sha shen (yuan ya zhong)

*Adenophora argyi* H. Léveillé; *A. axilliflora* (Borbás) Borbás ex Prain; *A. rotundifolia* H. Léveillé; *A. sinensis* A. Candolle var. *pilosa* A. Candolle; *A. stricta* var. *nanjingensis* P. F. Tu & G. J. Xu; *A. stricta* var. *qinglongshanica* P. F. Tu & G. J. Xu; *Campanula axilliflora* Borbás.

Stems and leaves hispidulous. Calyx always and often densely hispidulous. Corolla densely or sparsely hirsute, rarely glabrous outside.  $2n = 34$ .

Among grasses, in rock crevices; lower to middle elevations. Anhui, Fujian (Chong'an), SE Henan (Xinxian), Hunan (Changsha, Yizhang), Jiangsu (Jurong, Nanjing), Jiangxi, Zhejiang (Cixi, Kaihua, Lin'an) [Korea; naturalized in Japan].

**10b. *Adenophora stricta* subsp. *sessilifolia*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 185. 1983.

无柄沙参 wu bing sha shen

*Adenophora stricta* subsp. *henanica* P. F. Tu & G. J. Xu.

Stems and leaves hispidulous. Calyx mostly hispidulous or

scaberulose, less frequently glabrous. Corolla usually glabrous or only with a few hairs along veins outside.

• Meadows or grassy places at forest margins; 600–2000 m. Chongqing, SE Gansu, Guangxi (Longsheng), Guizhou, W Henan, W Hubei (Shennongjia, Xingshan), W Hunan, S Shaanxi (S of Qin Ling), S Sichuan, NE Yunnan (Zhenxiang).

**10c. *Adenophora stricta* subsp. *confusa*** (Nannfeldt) D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 105. 1983.

昆明沙参 kun ming sha shen

*Adenophora confusa* Nannfeldt in Handel-Mazzetti, Symb. Sin. 7: 1068. 1936.

Stems and leaves glabrous or sparsely hirsute. Calyx usually glabrous.

• Open mountain slopes, forests; 1000–3200 m. Yunnan.

**10d. *Adenophora stricta* subsp. *aurita*** (Franchet) D. Y. Hong & S. Ge, Novon 20: 428. 2010.

川西沙参 chuan xi sha shen

*Adenophora aurita* Franchet, J. Bot. (Morot) 9: 366. 1895.

Calyx lobes 1–1.8 mm wide. Corolla 2–2.5 cm. Disk 1.8–2.5 mm.

• Meadows, forest margins, scrub; 2100–3300 m. NW Sichuan.

**11. *Adenophora sinensis*** A. Candolle, Monogr. Campan. 354. 1830.

中华沙参 zhong hua sha shen

*Adenophora polymorpha* Ledebour var. *sinensis* (A. Candolle) Pampanini; *A. sinensis* var. *glabra* A. Candolle; *Campanula sinensis* (A. Candolle) D. Dietrich.

Stems single or several from one root, 20–100 cm tall, simple, glabrous or sparsely scaberulose. Basal leaves ovate-orbicular, base rounded. Culine leaves petiolate, at least toward base; blade narrowly elliptic or narrowly lanceolate, 3–8 × 0.5–2 cm, both surfaces glabrous, base cuneate, margin serrate, apex obtuse to acuminate. Inflorescence branches often slender, forming a narrow panicle; pedicels slender, up to 3 cm. Hypanthium globose or obovoid, usually glabrous, less often sparsely scaberulose; calyx lobes linear-lanceolate, 5–7 × ca. 1 mm. Corolla purple or purple-blue, campanulate, 1.3–1.5 cm. Disk shortly cylindrical, 1–1.5 mm. Style 2–4 mm longer than corolla. Capsule broadly ellipsoid or globose, 6–7 × ca. 5 mm. Seeds brown-yellow, ellipsoid, ca. 1.8 mm. Fl. and fr. Aug–Oct.

• Grassy places or scrub by rivers or streams; below 1200 m. S Anhui (Qimen), Fujian (Jianning), N Guangdong (Liannan), Hunan (Xiangyin Shan), Jiangxi.

**12. *Adenophora polyantha*** Nakai, Bot. Mag. (Tokyo) 23: 188. 1909.

石沙参 shi sha shen

Stems single or several from one root, 20–100 cm tall, often simple, glabrous or hispidulous. Basal leaves reniform, base cordate, margin irregularly serrate. Culine leaves sessile;

blade ovate, lanceolate, or elliptic, occasionally linear-lanceolate, 2–10 × 0.5–2.5 cm, glabrous or hispidulous, margin serrate with teeth distant. Cymes with solitary flowers forming a pseudoraceme, or in a narrow panicle with short inflorescence branches; pedicels usually less than 1 cm. Hypanthium obconic, usually pubescent, rarely glabrous; calyx lobes triangular-lanceolate, 3.5–7 × 1–2 mm, margin entire. Corolla purple or dark blue, campanulate, slightly constricted at throat, 1.4–2.2 cm; lobes often reflexed, short, up to 1/4 as long as whole corolla. Disk tubular, (2–)2.5–4 mm, often sparsely puberulent. Style usually slightly exerted or sometimes as long as corolla. Capsule ovoid-ellipsoid, 5–12 × 4–7 mm. Seeds yellow-brown, ovoid-ellipsoid, slightly compressed, ca. 1.2 mm. Fl. Aug–Oct.  $2n = 34, 68$ .

Sunny grassy places; below 2000 m. Anhui, Gansu, Hebei, W Henan, Jiangsu, Liaoning, SE Nei Mongol, S Ningxia, Shaanxi, Shandong, Shanxi [NW Korea].

- 1a. Calyx lobes glabrous or sparsely hispidulous; capsule 5–7 mm; stems and leaves glabrous or puberulent ..... 12a. subsp. *polyantha*
- 1b. Calyx lobes hispidulous, rarely glabrous; capsule 6–12 mm; stems and leaves ± hispidulous ..... 12b. subsp. *scabricalyx*

**12a. *Adenophora polyantha* subsp. *polyantha***

石沙参(原亚种) shi sha shen (yuan ya zhong)

*Adenophora obovata* Kitamura; *A. polyantha* f. *densipila* Kitagawa; *A. polyantha* f. *eriocaulis* Kitagawa; *A. polyantha* var. *glabricalyx* Kitagawa.

Stems and leaves glabrous or puberulent. Calyx lobes mostly glabrous or sparsely hispidulous. Capsule 5–7 mm.  $2n = 34$ . Fl. and fr. Aug–Oct.

Sunny grassy slopes; below 2000 m. E Liaoning [NW Korea].

**12b. *Adenophora polyantha* subsp. *scabricalyx* (Kitagawa) J. Z. Qiu & D. Y. Hong, Acta Phytotax. Sin. 31: 39. 1993.**

毛萼石沙参 mao e shi sha shen

*Adenophora polyantha* var. *scabricalyx* Kitagawa in S. Tokunaga, Rep. First Sci. Exped. Manchoukuo 4(2): 112. 1935; *A. chanetii* (H. Léveillé) D. F. Chamberlain; *A. polyantha* var. *media* Nakai & Kitagawa; *A. scabridula* Nannfeldt; *A. scabridula* var. *viscida* P. C. Tsoong; *Campanula chanetii* H. Léveillé.

Stems and leaves ± hispidulous. Calyx lobes hispidulous, rarely glabrous. Capsule 6–12 mm. Fl. and fr. Aug–Oct.  $2n = 68^*$ .

• Sunny grasslands; below 1500 m. Anhui (Lu’an, Tongcheng), Gansu (Xifeng, Zhenyuan), Hebei, W Henan, Jiangsu (Changzhou, Xuyi), W Liaoning (Lingyuan), SE Nei Mongol, S Ningxia (Guyuan), Shaanxi (Huanglong Shan, Yijun), Shandong, Shanxi.

**13. *Adenophora contracta* (Kitagawa) J. Z. Qiu & D. Y. Hong, Acta Phytotax. Sin. 28: 399. 1990.**

缢花沙参 yi hua sha shen

*Adenophora polyantha* var. *contracta* Kitagawa in S.

Tokunaga, Rep. First Sci. Exped. Manchoukuo 4(2): 112. 1935; *A. kulunensis* Y. Z. Zhao; *A. urceolata* Y. Z. Zhao (2002), not C. Y. Wu (1965).

Stems 1–3 from a rootstock, 15–100 cm tall, glabrous to densely hispidulous. Basal leaves petiolate; blade reniform, base cordate, margin irregularly serrate. Cauline leaves sessile; blade ovate or lanceolate, sometimes linear-lanceolate, 1.5–8 × 0.5–3 cm, glabrous or sparsely hispidulous, margin serrate with teeth remote. Flowers in a pseudoraceme or with short branches forming a narrow panicle; pedicels usually less than 1 cm. Hypanthium obconic, densely or sparsely hispidulous, sometimes papillose, rarely glabrous; calyx lobes triangular-lanceolate, margin entire. Corolla purple or dark blue, campanulate, 1.2–2.2 cm, strongly constricted at throat (ratio of greatest in diam. to throat in diam. = 1.36); lobes only ca. 1/6 as long as tube, erect at first but later reflexed. Disk tubular, 2–4 mm, often puberulent. Style commonly exerted somewhat, less often equaling or shorter than corolla. Capsule obovoid, ca. 7 × 5 mm. Seeds ovoid-ellipsoid, ca. 1 mm. Fl. and fr. Aug–Oct.  $2n = 34^*$ .

• Open grassy slopes. W Liaoning, Nei Mongol.

**14. *Adenophora pinifolia* Kitagawa in S. Tokunaga, Rep. First Sci. Exped. Manchoukuo 4(2): 110. 1935.**

松叶沙参 song ye sha shen

Roots columnar. Stems erect, densely leafy. Cauline leaves sessile; blade linear, ca. 5 cm × 0.8 mm, slightly fleshy, margin entire, apex acute. Inflorescence a panicle. Hypanthium obconic, ca. 2.5 mm, glabrous; calyx lobes subulate, 1.5–2 mm, margin entire. Corolla campanulate, 18–19 mm; lobes 2–4 × 6–7 mm. Disk ca. 4.5 mm, glabrous. Style as long as corolla. Capsule obconic. Fl. Aug–Sep.  $2n = 34^*$ .

• Open grassy slopes. Liaoning (Dafangshen, Dalian, Heishan).

**15. *Adenophora micrantha* D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 185. 1983.**

小花沙参 xiao hua sha shen

*Adenophora suolunensis* P. F. Tu & X. F. Zhao.

Stems few to several dozen from a single caudex, erect, 30–40 cm tall, often simple, densely retrorsely hispidulous. Cauline leaves sessile; blade linear to oblong, 1.5–4 × 0.3–1 cm, both surfaces sparsely scaberulose or subglabrous. Cymes with only a terminal flower or with several flowers, forming a narrow panicle; pedicels less than 1 cm. Hypanthium obconic, 1.5–2 mm, glabrous; calyx lobes narrowly triangular, 2–2.5 × 0.7–0.9 mm, margin entire. Corolla blue, tubular-campanulate, 12–14 mm; lobes ovate-deltoid, 3.5–4 mm. Stamens much shorter than corolla. Disk large tubular, 2.5–3 mm, sparsely villous at apex. Style ca. 16 mm, obviously exerted. Capsule ovoid-globose, ca. 4 × 3.5 mm. Fl. Jul–Aug.

• Grassy or stony slopes. E Nei Mongol.

**16. *Adenophora palustris* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 18: 426. 1901.**

沼沙参 zhao sha shen

Stems erect, ca. 1 m tall, simple, glabrous. Cauline leaves sessile; blade oblong or ovate-orbicular, 5–7 × 1.5–3 cm, papery, lucid, glabrous, base rounded or obtuse, margin crenate or irregularly serrate, apex acute or rounded. Flowers several in a compact pseudoraceme. Hypanthium glabrous; calyx lobes ovate-lanceolate, ca. 5.5 × 2 mm, nearly 2 × as broad at middle as at base, distinctly reticulate veined, margin entire, apex obtuse or acute. Corolla broadly campanulate, ca. 2 cm in diam. Disk ca. 4 × 1.5 mm, glabrous. Style slightly longer than corolla. Capsule obovoid, 7–8 × 4–6 mm. Fl. and fr. Aug. *2n* = 102.

E Jilin [Japan, N Korea].

**17. *Adenophora himalayana*** Feer, Bot. Jahrb. Syst. 14: 618. 1890.

喜马拉雅沙参 xi ma la ya sha shen

Roots often thickened, up to 1 cm in diam. Stems often several from one root, 15–60 cm tall, simple, glabrous, less often retrorsely hispidulous or sparsely retrorsely hirsute. Basal leaves petiolate; blade deltoid or ovate. Cauline leaves sessile or lower ones shortly petiolate; blade ovate, lanceolate, narrowly elliptic, or linear, 3–14 × 0.1–2.5 cm, glabrous, very rarely hairy, margin entire or sparsely serrate. Flowers solitary, or several in a pseudoraceme, never in a panicle. Hypanthium obconic or obovoid, glabrous; calyx lobes subulate, 5–10 × 1–1.5(–2) mm. Corolla blue or blue-purple, campanulate, 1.7–2.2 cm; lobes ovate-deltoid, 4–7 mm. Disk broadly tubular, 3–8 × 2–3 mm. Style nearly as long as or slightly longer than corolla. Capsule obovoid-oblong, 5–10 × 4–7 mm. Fl. Jul–Sep, fr. Aug–Sep.

Meadows or grassy places at forest margins, alpine meadows or scrub; (1200–)2500–4700 m. C and SE Gansu, E and S Qinghai, Shaanxi, NW Sichuan, Xinjiang, Xizang [N India, E Kazakhstan, Kyrgyzstan, Nepal, Tajikistan].

- 1a. Calyx lobes entire, very occasionally margin with verrucose denticles; leaves usually broadly linear, less often narrowly elliptic to ovate-lanceolate ..... 17a. subsp. *himalayana*
- 1b. Calyx lobes rarely entire, usually margin with verrucose denticles; leaves mostly ovate to ovate-lanceolate, up to 2.5 cm wide, rarely broadly linear ..... 17b. subsp. *alpina*

**17a. *Adenophora himalayana*** subsp. ***himalayana***

喜马拉雅沙参(原亚种) xi ma la ya sha shen (yuan ya zhong)

*Adenophora smithii* Nannfeldt; *A. smithii* f. *crispa* Nannfeldt.

Leaves usually broadly linear, rarely narrowly elliptic to ovate-lanceolate. Calyx lobes entire, very occasionally with verrucose denticles on margins. Disk 2–3 mm in diam. Style usually slightly exserted.

Alpine meadows or scrub; 3000–4700 m (1200–3000 m in Xinjiang). C Gansu, E and S Qinghai, NW Sichuan, Xinjiang (Tian Shan, Wujia, Yecheng), Xizang [N India, E Kazakhstan, Kyrgyzstan, Nepal, Tajikistan].

**17b. *Adenophora himalayana*** subsp. ***alpina*** (Nannfeldt) D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 132. 1983.

高山沙参 gao shan sha shen

*Adenophora alpina* Nannfeldt, Acta Horti Gothob. 5: 14. 1930; *A. tsinlingensis* Pax & K. Hoffmann.

Leaves mostly ovate to ovate-lanceolate, up to 2.5 cm wide, less often broadly linear, abaxially often sparsely hispidulous. Calyx lobes often with verrucose denticles on margins, occasionally entire. Disk 1.5–2.5 mm in diam. Style often included.

Meadows or grassy places at forest margins; 2500–4200 m. SE Gansu (Lintao: Lianhua Shan), Shaanxi (Qin Ling), NW Sichuan (Pingwu, Shuajingsi, Songpan) [N India].

**18. *Adenophora amurica*** C. X. Fu & M. Y. Liu, Bull. Bot. Res. North-East. Forest. Inst. 6: 159. 1986.

阿穆尔沙参 a mu er sha shen

Stems 1–3 from a single root, erect, 35–105 cm tall, simple, densely retrorsely hirsute. Basal leaves long petiolate; blade ovate, base cordate. Cauline leaves sessile; blade narrowly ovate, lanceolate, or elliptic, 4–8 × 0.5–2.5 cm, abaxially densely retrorsely hirsute, adaxially glabrous or hispidulous along veins, margin serrate. Cymes with 1–5 flowers, in a narrow panicle or pseudoraceme; pedicels ca. 3 mm. Hypanthium ellipsoid, glabrous or hispidulous; calyx lobes narrowly lanceolate, 5–6 × 0.7–1.5 mm, margin entire or with 1 or 2 sometimes verrucose denticles. Corolla blue or blue-purple, campanulate, 1.2–2.1 cm; lobes broadly ovate-deltoid, Disk shortly tubular, 0.4–1.4 mm. Style as long as corolla. Capsule ellipsoid, 6–10 × 4–5.5 mm. Seeds brown-red, ellipsoid, slightly compressed, 1.4–1.9 mm. Fl. Jul–Aug, fr. Sep. *2n* = 68\*.

- Stony slopes. Heilongjiang (Da Hinggan Ling: Jingtao).

**19. *Adenophora gmelinii*** (Biehler) Fischer, Mém. Soc. Imp. Naturalistes Moscou 6: 167. 1823.

狭叶沙参 xia ye sha shen

Roots up to 40 cm. Stems single or several from one root, up to 80 cm tall, simple, usually glabrous, sometimes hispidulous. Basal leaf blade deltoid or rhombic-ovate, base shallowly cordate, margin crenate. Cauline leaves sessile; blade linear or less often lanceolate, 4–9 × 0.2–1.3 cm, glabrous, margin entire or serrate. Cymes single flowered, forming a pseudoraceme, or lower cymes several flowered, forming a very narrow panicle, or rarely with a solitary terminal flower. Hypanthium obovoid-oblong, glabrous or rarely scaberulose; calyx lobes linear-lanceolate, 4–10 × 1.5–2 mm. Corolla blue or pale purple, broadly campanulate, 1.6–2.8 cm; lobes ovate-triangular, 6–8 mm, less often deltoid and only ca. 4 mm. Disk cylindrical, 1.3–3.5 mm, glabrous or sparsely hairy. Style slightly shorter than, rarely as long as corolla. Capsule ellipsoid, 8–13 × 4–7 mm. Seeds yellow-brown, ellipsoid, ca. 1.8 mm. Fl. Jul–Sep, fr. Aug–Oct. *2n* = 34, 68.

Forests, thickets, communities of tall herbs, meadows, grassy slopes; below 2600 m. Hebei, Heilongjiang, W Jilin, Liaoning, E, N,



and SE Nei Mongol, C and N Shanxi [Korea, E Mongolia, Russia (Far East, SE Siberia)].

- 1a. Plants (incl. hypanthium) often hispidulous; leaf blade broadly linear to ovate-lanceolate, adaxially scabrous, margin serrate; stems often single; flowers usually several ..... 19c. subsp. *nystroemii*
- 1b. Plants (incl. hypanthium) glabrous, sometimes stems hispidulous at base; leaf blade narrowly linear, narrowly ovate, deltoid-ob lanceolate, or obovate, adaxially smooth, margin entire or serrate; stems several; flowers more numerous.
  - 2a. Plants mostly more than 1 m tall, commonly puberulent only on lower part of stems and lower leaves; leaf blade mostly broadly linear to narrowly ovate, serrate; calyx lobes 5–12 × 1.3–3 mm ..... 19b. subsp. *hailinensis*
  - 2b. Plants mostly less than 1 cm tall, glabrous or sparsely puberulent at base of stems; leaf blade commonly narrowly linear and entire; calyx lobes 4.5–6 × 1–1.6 mm ..... 19a. subsp. *gmelinii*

**19a. *Adenophora gmelinii* subsp. *gmelinii***

狭叶沙参(原亚种) xia ye sha shen (yuan ya zhong)

*Campanula gmelinii* Biehler, Pl. Nov. Herb. Spreng. 14. 1807; *Adenophora biloba* Y. Z. Zhao; *A. borealis* D. Y. Hong & Y. Z. Zhao; *A. borealis* var. *oreophila* Y. Z. Zhao; *A. communis* Fischer var. *coronopifolia* (Fischer ex Schultes) Trautvetter; *A. communis* var. *gmelinii* (Biehler) Trautvetter; *A. coronopifolia* (Fischer ex Schultes) Fischer; *A. coronopifolia* var. *erysimoides* (Vest ex Schultes) Steudel; *A. erysimoides* (Vest ex Schultes) Kitagawa; *A. gmelinii* var. *coronopifolia* (Fischer ex Schultes) Y. Z. Zhao; *A. gmelinii* var. *pachyphylla* (Kitagawa) Y. Z. Zhao; *A. gmelinii* var. *stylosa* A. Candolle; *A. pachyphylla* Kitagawa; *A. polyantha* Nakai var. *rhombica* Y. Z. Zhao; *A. polymorpha* Ledebour var. *coronopifolia* (Fischer ex Schultes) Trautvetter ex Herder; *A. polymorpha* var. *gmelinii* (Biehler) Trautvetter ex Herder; *A. wulingshanica* D. Y. Hong var. *alterna* Y. Z. Zhao; *Campanula coronopifolia* Fischer ex Schultes; *C. erysimoides* Vest ex Schultes; *C. fischeriana* Sprengel, nom. illeg. superfl.

Plants mostly less than 1 m tall, glabrous, sometimes sparsely puberulent at base of stems. Leaves usually linear and entire, less frequently lanceolate or lanceolate-ovate and serrate. Calyx lobes 4.5–6 × 1–1.6 mm. Fl. Jul–Sep, fr. Aug–Oct.  $2n = 34^*$ , 68.

Meadows; below 1800 m. Hebei (Kangbao, Weichang, Zhangbei), Heilongjiang (Anda), W Jilin (W of Fuyu, Qian'an), Liaoning (Zhangwu), E, N, and SE Nei Mongol [Korea, E Mongolia, Russia (SE Siberia)].

**19b. *Adenophora gmelinii* subsp. *hailinensis*** J. Z. Qiu & D. Y. Hong, Acta Phytotax. Sin. 31: 38. 1993.

海林沙参 hai lin sha shen

Plants mostly more than 1 m tall. Stems sometimes puberulent at base. Leaves often puberulent, mostly broadly linear to narrowly ovate, margin serrate. Calyx lobes 5–12 × 1.3–3 mm. Fl. and fr. Sep.  $2n = 68$ .

Communities of tall herbs, thickets, forests. Heilongjiang (Hailin, Huanan, Jiamusi) [Russia (Far East)].

**19c. *Adenophora gmelinii* subsp. *nystroemii*** J. Z. Qiu & D. Y. Hong, Acta Phytotax. Sin. 31: 38. 1993.

山西沙参 shan xi sha shen

Plants (including hypanthium) often hispidulous. Stems often single. Leaves broadly linear or ovate-lanceolate, adaxially scabrous, margin serrate. Flowers usually several. Fl. Jul–Sep, fr. Aug–Sep.  $2n = 34^*$ , 68\*.

• Grassy slopes, thickets; below 2600 m. Hebei (Neiqiu), SE Nei Mongol (Zhuozi), C and N Shanxi.

**20. *Adenophora potaninii*** Korshinsky, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 42(2): 39. 1894 [“*potanini*”].

泡沙参 pao sha shen

Stems often single, 30–100 cm tall, simple, usually densely, less often sparsely retrorsely hispidulous, very rarely subglabrous. Cauline leaves sessile or shortly petiolate; blade obovate, ovate-elliptic, or oblong (occasionally linear-elliptic or linear), 2–7 × 0.5–4 cm, both surfaces hispidulous, base obtuse or cuneate, margin with 2 to several large teeth, apex obtuse, acute, or shortly acuminate. Inflorescences usually with branches at base, forming a panicle, sometimes with only several flowers glomerate into a pseudoraceme; pedicels less than 1 cm. Hypanthium obovoid or globose-obovoid, glabrous, base rounded or ± obtuse; calyx lobes triangular-subulate, 3–9 mm, margin with 1 or 2 pairs of long denticles. Corolla purple, blue, or blue-purple, rarely white, campanulate, 1.5–2.5 cm; lobes ovate-deltoid, 5–8 mm. Disk tubular, 2–2.6(–3) mm, hairy at least at apex. Style nearly as long as or slightly longer than corolla. Capsule globose-ellipsoid or ellipsoid, 7–11 × 4–6 mm. Seeds brown-yellow, ellipsoid, ca. 1.4 mm, 1-ribbed. Fl. Jul–Oct, fr. Oct–Nov.  $2n = 34^*$ , 102\*.

• Sunny grassy slopes, among grasses on shaded slopes, scrub, sparse woods, stony places or rock crevices, less often forests; below 3100 m. Gansu, Hebei, Henan, SW Liaoning, SE Nei Mongol, Ningxia, E Qinghai, Shaanxi, Shanxi, W Sichuan.

- 1a. Cauline leaves sessile, lower ones rarely shortly petiolate ..... 20a. subsp. *potaninii*
- 1b. Cauline leaves usually petiolate, though sometimes very shortly so ..... 20b. subsp. *wawreana*

**20a. *Adenophora potaninii* subsp. *potaninii***

泡沙参(原亚种) pao sha shen (yuan ya zhong)

*Adenophora bockiana* Diels; *A. polydentata* P. F. Tu & G. J. Xu; *A. potaninii* var. *bockiana* (Diels) S. W. Liu.

Cauline leaves sessile, lower ones rarely shortly petiolate.

• Sunny grassy slopes, less often scrub or forests; 1000–3100 m. Gansu (E of Yongchang), Ningxia (Guyuan, Jingyuan), E Qinghai (Menyuan, Tongren, Xining), Shaanxi (Lüeyang, Mianxian, N part of province), SW Shanxi (W of Wuzhai, Xiaoyi, Yuncheng), W Sichuan.

**20b. *Adenophora potaninii* subsp. *wawreana*** (Zahlbruckner) S. Ge & D. Y. Hong, *J. Syst. Evol.* 48: 452. 2010.

多歧沙参 duo qi sha shen

*Adenophora wawreana* Zahlbruckner, *Ann. K. K. Naturhist. Hofmus.* 10 (Notizen): 56. 1895; *A. biformifolia* Y. Z. Zhao; *A. wawreana* f. *foliosa* Zahlbruckner; *A. wawreana* var. *lanceifolia* Y. Z. Zhao; *A. wawreana* f. *oligotricha* Kitagawa; *A. wawreana* f. *polytricha* Kitagawa.

Cauline leaves usually petiolate, though sometimes petiole very short; blades varying greatly, from linear to ovate, even on same individual.

• Among grasses on shaded slopes, scrub, sparse woods, mostly in stony places or rock crevices; below 2000 m. Hebei (N to Weichang), Henan (Song Shan), SW Liaoning, SE Nei Mongol (Hohhot, Liangcheng, Zhuozi), Shanxi (E of Jiaocheng, Wuzhai, Yuncheng).

**21. *Adenophora tricuspidata*** (Fischer ex Schultes) A. Candolle, *Monogr. Campan.* 355. 1830.

锯齿沙参 ju chi sha shen

*Campanula tricuspidata* Fischer ex Schultes, *Syst. Veg.* 5: 158. 1819; *Adenophora communis* Fischer var. *denticulata* (Fischer) Trautvetter; *A. denticulata* Fischer; *A. polymorpha* Ledebour var. *denticulata* (Fischer) Trautvetter ex Herder; *C. denticulata* (Fischer) Sprengel (1824), not Burchell (1822).

Stems single or sometimes 2 from one root, 70–100 cm tall, simple, glabrous. Cauline leaves sessile, glabrous; blade narrowly elliptic or ovate-elliptic, 2.5–8 × 0.6–2 cm, base obtuse or cuneate, margin serrate, apex acute. Inflorescence branches (cymes) extremely short, only 2–3 cm, with 2 to several flowers, several forming a narrow panicle; pedicels very short. Hypanthium globose-ovoid or globose-obconic, glabrous; calyx lobes often reflexed, ovate-deltoid, 3–6 × 1–2 mm, overlapping at base, margin with 2 or rarely 3 or 4 pairs of long denticles, apex acuminate. Corolla blue or purple-blue, broadly campanulate, 1–2 cm; lobes broadly ovate-deltoid, ca. 1/2 as long as tube, apex obtuse. Disk shortly tubular, 1–2 mm, glabrous. Style shorter than corolla. Capsule subglobose. Fl. Jul–Sep.  $2n = 34$ .

Wet meadows, forests of *Betula*, sunny grassy slopes. Heilongjiang (Luobei, Nenjiang, Yichun), N Nei Mongol (Xilin Gol Meng: Xi Ujimqin Qi) [Russia (Far East, S Siberia)].

**22. *Adenophora wilsonii*** Nannfeldt in Handel-Mazzetti, *Symb. Sin.* 7: 1075. 1936.

聚叶沙参 ju ye sha shen

Stems often 2 to several from one root, erect, 25–80 cm tall, simple or branched above, glabrous, densely leafy at middle during anthesis but basal leaves withered. Leaves shortly petiolate; blade linear-elliptic or lanceolate, 4–10 × 0.5–1.2 cm,

thickly papery, both surfaces glabrous, base attenuate into petiole, margin serrate or crenate. Inflorescence a panicle with long or short branches; pedicels up to 1 cm. Hypanthium obovoid or obconic, sometimes subglobose, glabrous; calyx lobes subulate or linear-lanceolate, 5–7 × ca. 1 mm, with 1 or 2 pairs of verrucose denticles. Corolla purple or blue-purple, funnelliform-campanulate, 1.5–2 cm; lobes ovate-deltoid, ca. 1/2 as long as tube. Disk annular or shortly tubular, less than 1.2 mm, glabrous. Style 2–2.5 mm, ca. 5 mm longer than corolla. Capsule globose-ellipsoid, 7–8 × 4–5 mm. Fl. Aug–Oct, fr. Sep–Oct.

• Thickets, rocks by streams; below 1600 m. Chongqing (Chengkou), Gansu (Kangxian, Wenxian), Guizhou (Renhuai), W Hubei (Hefeng, Shennongjia), Shaanxi (Nanzheng), Sichuan (Emei Shan, Jiange, Tianquan).

**23. *Adenophora stenophylla*** Hemsley, *J. Linn. Soc., Bot.* 26: 10. 1889.

扫帚沙参 sao zhou sha shen

*Adenophora mongolica* A. I. Baranov; *A. stenophylla* var. *denudata* Kitagawa.

Stems numerous from one root, 25–50 cm tall, often with slender branches, densely hispidulous or glabrous. Basal leaf blade ovate-orbicular, base rounded. Cauline leaves sessile; blade needlelike to linear-oblong, up to 6 × 0.5 cm, glabrous or hispidulous, margin entire or sparsely serrate. Inflorescence branches slender, erect, forming a narrow panicle, rarely only several flowers in a pseudoraceme; pedicels slender. Hypanthium obovoid-oblong, glabrous; calyx lobes subulate, 3–4 mm, margin entire or with 1 or 2 pairs of verrucose denticles. Corolla blue or purple-blue, campanulate, 8–13 mm; lobes ovate-triangular, 3–3.5 mm. Disk tubular, 1–1.5 mm, glabrous or sparsely puberulent. Style slightly shorter than corolla. Capsule ellipsoid, 4–8 × 2.3–5 mm. Seeds brown-yellow, ellipsoid, slightly compressed, ca. 1 mm. Fl. Jul–Sep, fr. Sep.  $2n = 34^*$ .

Dry grasslands. Heilongjiang (Anda), W Jilin, Nei Mongol (Jarud Qi) [Mongolia].

**24. *Adenophora elata*** Nannfeldt, *Acta Horti Gothob.* 5: 16. 1930.

狭长花沙参 xia chang hua sha shen

*Adenophora wutaiensis* Hurusawa.

Root carrotlike, 8–18 × 1.4–2.4 cm. Stems single, 20–120 cm tall, simple, glabrous or sometimes puberulent. Cauline leaves very rarely opposite, sessile or lower leaves sometimes with short winged petiole; blade broadly elliptic, elliptic, narrowly elliptic, lanceolate, or oblanceolate, 2–8 × 0.5–2.5 cm, glabrous, base rounded, obtuse, or cuneate, margin crenate or serrate, apex acute or less often acuminate. Flowers usually several in a pseudoraceme, sometimes solitary and terminal, or very rarely with short branches, forming a narrow panicle; pedicels usually less than 1 cm. Hypanthium narrowly obovoid or obconic, glabrous; calyx lobes narrowly triangular, 5–10 × 1–1.5 mm, margin with 1 or 2 pairs of denticles or entire. Corolla blue or purple-blue, narrowly campanulate or tubular-campanu-

late, less often campanulate, 2–3.5 cm; lobes deltoid, 5–10 mm. Disk tubular, 1.6–2.8 mm, glabrous. Style shorter than corolla. Capsule ellipsoid or oblong, 10–14 × 5–7 mm. Seeds yellow-brown, ellipsoid, ca. 1.5 mm. Fl. Jul–Sep, fr. Sep.  $2n = 68^*$ .

• Grassy slopes; 1700–3000 m. W Hebei, SE Nei Mongol (Zhuozhi), Shanxi (Wutai Shan).

**25. *Adenophora khasiana*** (J. D. Hooker & Thomson) Oliver ex Collett & Hemsley, J. Linn. Soc., Bot. 28: 80. 1890.

云南沙参 yun nan sha shen

*Campanula khasiana* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 2: 25. 1857; *Adenophora albescens* C. Y. Wu; *A. bulleyana* Diels; *A. bulleyana* var. *angustifolia* C. Y. Wu; *A. chionantha* C. Y. Wu; *A. dimorphophylla* C. Y. Wu; *A. diplodonta* Diels; *A. likiangensis* C. Y. Wu; *A. roseiflora* C. Y. Wu.

Root carrotlike, 7–8 × 1.5–1.6 cm. Stems often single or sometimes 2 from one root, up to 1 m tall, simple, usually hirsute. Cauline leaves sessile or shortly petiolate; blade ovate-orbicular, ovate, obovate, or elliptic, 3–9 × 1.5–6.5 cm, abaxially rather densely hirsute (sometimes only along veins), adaxially scaberulose, base cuneate, margin serrate or irregularly biserrate, apex acute or acuminate; petiole if present up to 2 cm. Inflorescence a narrow panicle with short branches or a pseudoraceme of several flowers; pedicels short. Hypanthium campanulate, glabrous or rather densely hispidulous; calyx lobes narrowly triangular, 5–7 × 1–1.5 mm, margin with 1–4 pairs of denticles. Corolla blue or pale blue, funnellform-campanulate, 1–2.4 cm; lobes ca. 1/2 as long as tube. Disk shortly tubular, less than 1 mm. Style slightly longer than corolla to obviously exerted. Fl. Aug–Oct.  $2n = 34$ .

Forests, scrub, grassy places; 1000–2800 m. SW Sichuan (Butuo, Muli, Puge), SE Xizang (Cona), Yunnan [Bhutan, NE India, N Myanmar].

**26. *Adenophora jasionifolia*** Franchet, J. Bot. (Morot) 9: 365. 1895.

甘孜沙参 gan zi sha shen

*Adenophora atuntzensis* C. Y. Wu; *A. forrestii* Diels; *A. forrestii* var. *handeliana* Nannfeldt; *A. forrestii* var. *intercedens* Pax & K. Hoffmann; *A. microcodon* C. Y. Wu; *A. pumila* P. C. Tsoong.

Root to 1 cm in diam. Caudexes sometimes with horizontal branches. Stems (1 or) 2 to several, leafy mostly in lower half, sparsely villous or rarely glabrous. Cauline leaves sessile or shortly winged-petiolate; blade ovate-orbicular, elliptic, lanceolate, or linear-lanceolate, 2–8 × 0.2–1.8 cm, both surfaces usually puberulent or rarely glabrous, base cuneate or attenuate, margin entire, crenulate, or serrate, apex acute or acuminate. Flowers terminal and solitary, or several in a pseudoraceme; pedicels short. Hypanthium obconic, base acute or sometimes obtuse, glabrous; calyx lobes narrowly triangular, 5–10 × 1.5–1.7 mm, margin with several verrucose denticles and sometimes sparsely ciliate. Corolla blue or purple-blue, bowl-shaped, 1.3–

2.2 cm; lobes deltoid-orbicular, 1/2–2/3 as long as tube. Disk annular, 0.5–1 mm high. Style 13–15 mm, shorter or sometimes longer than corolla. Capsule ellipsoid, 8–11 × 5–6.5 mm. Seeds yellow-brown, ca. 1 mm. Fl. Jul–Sep, fr. Sep.  $2n = 34^*$ .

• Meadows, grassy places at forest margins; 3000–4700 m. W Sichuan, E Xizang (Gonjo, Jomda), NW Yunnan (Dêqên, Zhongdian).

**27. *Adenophora coelestis*** Diels, Notes Roy. Bot. Gard. Edinburgh 5: 173. 1912.

天蓝沙参 tian lan sha shen

*Adenophora bulleyana* Diels var. *alba* C. Y. Wu; *A. coelestis* var. *stenophylla* Diels ex C. Y. Wu; *A. huangiae* C. Y. Wu; *A. megalantha* Diels; *A. ornata* Diels; *A. ornata* var. *alba* C. Y. Wu; *A. pachyrhiza* Diels; *A. raphanorrhiza* C. Y. Wu.

Caudexes sometimes with horizontal branches. Stems 1 or 2 from a rootstock, usually 50–80 cm tall, simple, usually densely leafy in lower half, glabrous to rather densely hispid. Cauline leaves sessile or sometimes lower ones shortly petiolate; blade ovate-rhombic, obovate, ovate, or linear-lanceolate, 2–10 × 0.5–3 cm, abaxially often hispidulous along veins, adaxially sparsely hispidulous, margin irregularly serrate. Flowers in a pseudoraceme, or sometimes inflorescence with branches of 1 to several flowers at top; pedicels short. Hypanthium globose-obovoid or obovoid-obconic, glabrous; calyx lobes narrowly triangular, 8–20 × 1–1.5(–2) mm, margin with 1 to several pairs of denticles. Corolla blue or blue-purple, campanulate, 1.5–4 cm; lobes ovate-deltoid, 6–11 mm, ca. 1/2 as long as tube. Disk (1.2–)2–3(–3.5) mm, glabrous or sometimes hairy. Style shorter than corolla. Fl. Aug–Oct.  $2n = 102^*$ .

• Forests, forest margins, glades; 1200–4000 m. SW Sichuan, Yunnan.

**28. *Adenophora hubeiensis*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 186. 1983.

鄂西沙参 e xi sha shen

Stems single, erect, 50–120 cm tall, simple, glabrous or puberulent. Cauline leaves sessile or shortly petiolate; blade lanceolate or elliptic-lanceolate, 5–12 × 1.5–3 cm, both surfaces ± puberulent or sometimes glabrous, base cuneate or obtuse, margin serrate, apex acuminate. Inflorescence branches ascending, long, slender, forming a panicle; pedicels slender, up to 1.5 cm. Hypanthium obovoid or obovoid-ellipsoid, glabrous; calyx lobes subulate, 4–8 × ca. 0.5 mm, margin with 2 or 3 pairs of denticles. Corolla blue-purple or pale blue, campanulate, 13–18 mm; lobes ovate-deltoid, 4–5 mm. Disk tubular, 1.8–3.2 mm, glabrous. Style 20–22 mm, exerted by 4–7 mm. Capsule ellipsoid, 7–8 × 3–4 mm. Fl. Aug–Sep, fr. Sep–Oct.

• Grassy slopes, scrub, rocks in forests; 1900–2600 m. W Hubei (Shennongjia).

**29. *Adenophora morrisonensis*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 165. 1911.

台湾沙参 tai wan sha shen

Caudexes with horizontal branches bearing alternate membranous scales. Stems 1 to several from one root, 10–30 cm tall,

simple, sometimes branched at middle, glabrous or sparsely hirsute. Basal leaf blade ovate-deltoid, base subtruncate. Cauline leaves sessile, lower ones with petiole up to 1 cm; blade linear-lanceolate or elliptic, 3–8 × 0.4–2.5 cm, both surfaces glabrous or sparsely puberulent, base cuneate, margin crenate or dentate, apex acuminate. Flowers 1 or 2 and terminal or more in a pseudoraceme, or several pseudoracemes forming a narrow panicle; pedicels elongate, 1.5–3 cm. Hypanthium obovoid or obconic, glabrous; calyx lobes subulate, 10–15 × 1–1.5 mm, margin with several pairs of denticles. Corolla blue-purple or light purple, campanulate, 2.8–3.5 cm; lobes deltoid, ca. 1/2 as long as tube. Disk annular, less than 1 mm high. Style shorter than corolla. Capsule ellipsoid, 10–16 × 6–7 mm. Seeds yellow-brown, ellipsoid, 1.2–1.5 mm, 1-ribbed. Fl. Jul–Nov, fr. Sep–Nov.  $2n = 34^*$ .

- Forest or thicket margins, shaded scree; 700–3500 m. Taiwan.

- 1a. Plants glabrous or sparsely pubescent; flowers in a pseudoraceme ..... 29a. subsp. *morrisonensis*  
 1b. Plants hirsute; flowers only  
 1 or 2 ..... 29b. subsp. *uehatae*

**29a. *Adenophora morrisonensis* subsp. *morrisonensis***

台湾沙参(原亚种) tai wan sha shen (yuan ya zhong)

Plants glabrous or sparsely pubescent. Flowers several to many, in a pseudoraceme or narrow panicle.

- Forest or thicket margins; 700–3000 m. Taiwan.

**29b. *Adenophora morrisonensis* subsp. *uehatae* (Yamamoto) Lammers, Bot. Bull. Acad. Sin. 33: 285. 1992.**

玉山沙参 yu shan sha shen

*Adenophora uehatae* Yamamoto, J. Trop. Agric. Soc. Formosa 4: 484. 1932; *A. coelestis* Diels var. *uehatae* (Yamamoto) Masamune.

Plants hirsute. Flowers 1 or 2, terminal.

- Shaded scree; 3000–3500 m. Taiwan.

**30. *Adenophora ningxianica* D. Y. Hong ex S. Ge & D. Y. Hong, Novon 9: 46. 1999.**

宁夏沙参 ning xia sha shen

Stems several from one root, erect, 30–50 cm tall, simple, glabrous or less often scaberulose. Basal leaves cordate or obovate; cauline leaves alternate, sessile or with petiole extremely short and cuneate; blade usually lanceolate, less often ovate-lanceolate or linear, 2–5 × 0.2–1.8 cm, both surfaces glabrous, margin dentate or irregularly serrate. Flowers several in a pseudoraceme, or numerous in a large panicle due to having long inflorescence branches; pedicels slender, 0.5–1.5 cm. Calyx glabrous; tube obovoid or obovoid-conical; lobes subulate or subulate-lanceolate, 2–6 × ca. 1 mm, margin mostly with 1 pair of verrucose denticles, very rarely entire. Corolla blue or blue-purple, narrowly campanulate, 1.4–1.6 cm; lobes ovate-deltoid, ca. 3.5 mm. Disk tubular, 2–2.5 mm, glabrous. Style 1.6–1.8 cm, slightly longer than corolla. Capsule narrowly ellipsoid, ca.

8 × 3 mm. Seeds yellow, ellipsoid, ca. 2 mm. Fl. Jul–Aug, fr. Sep.

- Shaded slopes, scrub in ravines, rock crevices; 1600–2400 m. Gansu (?Lanzhou), Nei Mongol (Ih Ju Meng: Qianli Shan), Ningxia (Helan Shan).

**31. *Adenophora pereskiifolia* (Fischer ex Schultes) Fischer ex G. Don in Loudon, Hort. Brit. 75. 1830 [“*pereskiaefolia*”].**

长白沙参 chang bai sha shen

*Campanula pereskiifolia* Fischer ex Schultes, Syst. Veg. 5: 116. 1819 [“*pereskiaefolia*”]; *Adenophora communis* Fischer var. *latifolia* (Fischer) Trautvetter; *A. curvidens* Nakai; *A. latifolia* Fischer; *A. pereskiifolia* subsp. *alternifolia* (P. Y. Fu ex Y. Z. Zhao) C. X. Fu & M. Y. Liu; *A. pereskiifolia* var. *alternifolia* P. Y. Fu ex Y. Z. Zhao; *A. pereskiifolia* var. *angustifolia* Y. Z. Zhao; *A. pereskiifolia* var. *curvidens* (Nakai) Kitagawa; *A. pereskiifolia* f. *puberula* Kitagawa; *A. pereskiifolia* subsp. *subalpina* A. I. Baranov; *A. polyantha* Nakai subsp. *subalpina* (A. I. Baranov) Kitagawa; *A. polymorpha* Ledebour var. *latifolia* (Fischer) Trautvetter; *A. polymorpha* var. *pereskiifolia* (Fischer ex Schultes) Makino.

Root carrot-shaped, 6–9 × 1.5–1.9 cm. Stems single, up to 1 m, simple, glabrous, less often retrorsely hispidulous. Cauline leaves (all or some) 3–5-verticillate or -subverticillate, rarely all alternate or nearly so, sessile or shortly petiolate; blade elliptic, ovate, lanceolate, or narrowly lanceolate, 3.5–16 × 0.6–4.2 cm, both surfaces glabrous, base cuneate or obtuse, margin coarsely serrate, apex acute or acuminate. Inflorescence pyramidal, with cymes alternate, short, and suberect, or flowers sometimes relatively few, forming a pseudoraceme. Hypanthium obovoid, obconic, or ellipsoid, glabrous or verrucose; calyx lobes lanceolate or narrowly triangular, 3–6 × 0.8–2 mm. Corolla blue-purple or blue, funnellform-campanulate, 1.3–2 cm; lobes deltoid or depressed triangular, 3–8 × 6–7.5 mm. Disk annular to shortly tubular, 0.5–1.5 mm. Style 1.5–2.4 cm, ± exerted. Capsule obovoid, ellipsoid, or subglobose, 6–8 × 4–5 mm. Seeds dark brown, glossy, ellipsoid, slightly compressed, 1.8–2 mm, smooth. Fl. Jul–Aug, fr. Aug–Sep.  $2n = 34, 68, 72$ .

Meadows, forest margins, grassy places in forests; below 1000 m. Heilongjiang, Jilin [Japan, Korea, E Mongolia, Russia (Far East, SE Siberia)].

**32. *Adenophora divaricata* Franchet & Savatier, Enum. Pl. Jap. 2: 423. 1879.**

展枝沙参 zhan zhi sha shen

*Adenophora divaricata* f. *angustifolia* A. I. Baranov; *A. divaricata* f. *manshurica* (Nakai) Kitagawa; *A. divaricata* var. *manshurica* (Nakai) Kitagawa; *A. manshurica* Nakai; *A. polymorpha* Ledebour var. *divaricata* (Franchet & Savatier) Makino.

Roots 1.5–3.5 cm in diam. Stems single, up to 1 m tall, simple, ± white villous, rarely glabrous. Cauline leaves 3–5-verticillate, sessile; blade rhombic, broadly elliptic, elliptic, elliptic-lanceolate, or lanceolate, 3.5–11 × 1.5–6 cm, both surfaces glabrous or hispidulous along veins, base obtuse or

cuneate, margin coarsely serrate, apex obtuse, acute, or acuminate. Inflorescence branches (each with 1 to several cymes) usually verticillate, or sometimes some (rarely all) alternate, forming a large panicle; peduncles of inflorescence branches 2–10 cm; pedicels 0.5–1 cm, glabrous. Hypanthium obconic or obovoid-obconic, glabrous; calyx lobes lanceolate, elliptic-lanceolate, or linear-lanceolate, 5–10 × 1–2.5 mm, margin entire. Corolla blue or light purple, campanulate, 15–22 mm; lobes deltoid-orbicular, 1/3–2/3 as long as tube, both surfaces glabrous. Disk tubular, 1.8–2.5 mm. Style as long as corolla or slightly exerted. Capsule obovoid or broadly ellipsoid, 5–7 × 3–6 mm. Seeds golden brown, ellipsoid, 2–2.5 mm, 1-ribbed. Fl. Jul–Sep, fr. Sep–Oct.  $2n = 34$ .

Forests, shrublands, grassy slopes; 400–1800 m. Hebei (Beijing, N of Yixian), Heilongjiang (E of Heihe), Jilin (E of Changchun, Jiutai), Liaoning, Shandong (Kunyu Shan), Shanxi (Wutai Shan) [Japan, Korea, Russia (Far East)].

**33. *Adenophora wulingshanica*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 187. 1983.

雾灵沙参 wu ling sha shen

*Adenophora elata* Nannfeldt f. *verticillata* Kitagawa.

Stems 1 or 2 from one root, 50–120 m tall, simple, glabrous or very sparsely hispidulous. Cauline leaves 3- or 4-verticillate or -subverticillate, shortly petiolate; blade ovate, elliptic, or elliptic-linear, 5–13 × 0.4–4.5 cm, both surfaces glabrous or sparsely hispidulous along veins, margin regularly or irregularly dentate or serrate. Inflorescence a panicle of cymes, branches sometimes almost verticillate; pedicels usually less than 1 cm. Hypanthium ellipsoid or obovoid-obconic, glabrous; calyx lobes filiform-subulate, 5–10 × less than 1 mm, margin with 1 or 2 pairs of denticles. Corolla blue or purple-blue, funnelform, 1.8–2.5 cm; lobes ovate-deltoid, 5–6 mm. Disk shortly tubular, 0.8–1.5 mm, glabrous. Style slightly shorter than corolla. Capsule oblong, ca. 10 × 4–5 mm. Seeds orange-yellow, ellipsoid, ca. 1.5 mm. Fl. Aug–Sep, fr. Sep–Oct.  $2n = 34^*$ .

• Thickets, grassy slopes, less often roadsides in forests, on limestone; 1200–1700 m. NE Beijing (Miyun).

**34. *Adenophora lobophylla*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 186. 1983.

裂叶沙参 lie ye sha shen

Stems erect, 20–100 cm tall, simple, sparsely retrorsely hirsute. Cauline leaves all or only lower and middle leaves petiolate; blade ovate or ovate-lanceolate, 2–5 × 1–2 cm, abaxially hirsute along veins, adaxially sparsely puberulent, margin pinatifid or rarely only dentate-lobed; petiole 0.5–2.5 cm. Inflorescence with slender and ascending branches, forming a panicle, or several flowers in a pseudoraceme, rarely flowers solitary and terminal; pedicels slender, 5–20 mm. Hypanthium oblong or obovoid, base obtuse or rounded, glabrous; calyx lobes subulate, 3–4 × less than 1 mm, margin with 1 or 2 pairs of verrucose denticles, rarely ciliate. Corolla blue or purple-blue, campanulate, 11–17 mm; lobes ovate-deltoid, 4–6 mm. Disk tubular, 2–3 mm, sparsely puberulent above. Style nearly as

long as or slightly longer than corolla. Capsule cylindrical, base rounded, 6–8 × ca. 3 mm. Seeds yellow, ellipsoid, ca. 0.8 mm. Fl. Jul–Oct, fr. Aug–Oct.  $2n = 34^*$ ,  $34+2B^*$ .

• Thickets, open woods, forest margins; 2000–3400 m. NW Sichuan (Barkam, Danba, Jinchuan).

**35. *Adenophora stenanthina*** (Ledebour) Kitagawa, Lin. Fl. Manshur. 418. 1939.

长柱沙参 chang zhu sha shen

Root carrotlike, up to 10 × 0.7–0.8 cm. Stems several, caespitose, 40–120 cm, sometimes branched above, usually finely scaberulose. Basal leaves petiolate; blade cordate or truncate at base, margin deeply and irregularly serrate. Cauline leaves sessile; blade filiform, linear, elliptic, lanceolate, or ovate, 2–10 × 0.1–2 cm, both surfaces scaberulose or subglabrous, margin entire or sparsely serrulate. Inflorescence a pseudoraceme or a panicle. Hypanthium obovoid, ellipsoid, or campanulate, glabrous; calyx lobes subulate or narrowly triangular, 1.5–5(–7) mm, margin entire or denticulate. Corolla pale to dark blue, blue-purple, or purple, subtubular or tubular-campanulate, 10–17 × 5–8 mm. Disk narrowly tubular, 4–7 mm, glabrous or villous. Style 1.8–2.2 cm. Capsule ellipsoid, 7–9 × 3–6 mm. Fl. Jul–Sep, fr. Aug–Sep.  $2n = 34$ .

Conifer forests, scrub, grasslands, grassy slopes, sandy places; below 4000 m. Gansu, Hebei, W Jilin, Nei Mongol, Ningxia, NE Qinghai, N Shaanxi, Shanxi [Mongolia, Russia (Far East, S Siberia)].

- 1a. Calyx lobes 1.5–3(–4) mm; corolla 10–13 mm, subtubular, lobes 1.5–3 mm; style 6–10 mm longer than corolla ..... 35a. subsp. *stenanthina*
- 1b. Calyx lobes 3–5(–7) mm; corolla 12–17 mm, tubular-campanulate, lobes 3–4.5 mm; style 3–7 mm longer than corolla ..... 35b. subsp. *sylvatica*

**35a. *Adenophora stenanthina* subsp. *stenanthina***

长柱沙参(原亚种) chang zhu sha shen (yuan ya zhong)

*Campanula stenanthina* Ledebour, Mém. Acad. Imp. Sci. St. Pétersbourg Hist. Acad. 5: 525. 1814; *Adenophora collina* Kitagawa; *A. collina* f. *latifolia* Kitagawa; *A. coronata* (Ker Gawler) A. Candolle; *A. crispata* (Turczaninow ex Kitagawa) Kitagawa; *A. marsupiiiflora* (Schultes) Fischer; *A. marsupiiiflora* var. *crispata* Turczaninow ex Kitagawa; *A. marsupiiiflora* var. *jaluensis* Komarov; *A. polymorpha* Ledebour var. *marsupiiiflora* (Schultes) Franchet; *A. pratensis* Y. Z. Zhao; *A. stenanthina* var. *angustilanceifolia* Y. Z. Zhao; *A. stenanthina* var. *collina* (Kitagawa) Y. Z. Zhao; *A. stenanthina* f. *crispata* (Turczaninow ex Kitagawa) Kitagawa; *A. stenanthina* var. *crispata* (Turczaninow ex Kitagawa) Y. Z. Zhao; *A. verticillata* Pallas ex Fischer var. *marsupiiiflora* (Schultes) Trautvetter; *C. coronata* Ker Gawler; *C. marsupiiiflora* Schultes.

Leaves up to 12 mm wide. Calyx lobes 1.5–3 mm. Corolla subtubular, 10–13 mm, ± constricted at throat; lobes 1.5–3 mm. Style 6–10 mm longer than corolla. Disk glabrous or hairy. Capsule narrowly ellipsoid.

Grassy slopes, sandy places; below 1800 m. Gansu (Huining), Hebei (Kangbao, Longguan, Zhangbei), W Jilin (Zhenlai), Nei Mongol, Ningxia (Guyuan, Yanchi), N Shaanxi, Shanxi (N of Taigu) [Mongolia, Russia (Far East, S Siberia)].

**35b. *Adenophora stenanthina*** subsp. *sylvatica* D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 187. 1983.

林沙参 lin sha shen

Leaves linear to ovate or oblong, up to 2 cm wide, entire or sparsely serrulate. Calyx lobes 3–5(–7) mm. Corolla tubular-campanulate, 12–17 mm; lobes 3–4.5 mm. Style only 3–7 mm longer than corolla. Disk all hairy. Capsule ellipsoid.

• Conifer forests, scrub, also among grasses; 2500–4000 m. Gansu (Qilian Shan, Tao He basin), NE Qinghai.

**36. *Adenophora liliifolioides*** Pax & K. Hoffmann, Repert. Spec. Nov. Regni Veg. Beih. 12: 499. 1922.

川藏沙参 chuan zang sha shen

*Adenophora gracilis* Nannfeldt.

Stems often single, 30–100 cm tall, simple, usually hirsute, less often glabrous. Basal leaves long petiolate; blade ovate, base cordate, margin coarsely serrate. Cauline leaves sessile; blade ovate, lanceolate, elliptic, or linear, 2–11 × 0.4–3 cm, abaxially hispidulous but hirsute along major veins (or less often glabrous throughout), adaxially glabrous or hispidulous, base cuneate or attenuate, margin entire or sparsely serrate, apex acuminate. Inflorescence a narrow panicle with short branches, sometimes only several flowers in a pseudoraceme. Hypanthium ellipsoid, glabrous; calyx lobes narrowly triangular, 2–6 × 0.6–1 mm, margin entire or very rarely with verrucose denticles. Corolla blue, purple-blue, or pale purple, rarely white, subtubular or tubular-campanulate, 8–12 mm. Disk narrowly tubular, 3–6.5 mm, usually glabrous. Style 1.5–2 cm, remarkably exerted. Capsule ovoid or ellipsoid, 6–9 × 3–4 mm. Seeds brownish yellow, ellipsoid, 1.2–1.5 mm, finely striate, 1-ribbed. Fl. Jul–Sep, fr. Sep–Oct.

• Meadows, scrub, among debris; 2400–4600 m. SE Gansu (Lintao, Xiahe), Shaanxi (Qin Ling), NW Sichuan, NE Xizang.

**37. *Adenophora capillaris*** Hemsley, J. Linn. Soc., Bot. 26: 10. 1889.

丝裂沙参 si lie sha shen

Stems single, 0.5–1 m tall, glabrous or hirsute. Cauline leaves usually sessile; blade ovate-lanceolate, elliptic-lanceolate, or sometimes linear, 3–19 × 0.2–5 cm, glabrous or hirsute, margin entire or serrate (denticulate when narrow), apex acuminate. Inflorescence with long branches, forming a large and lax panicle, sometimes with short branches, forming a narrow panicle, less frequently only several flowers in a pseudoraceme; main axis and branches filiform. Hypanthium ellipsoid or sometimes ovoid; calyx lobes spreading or reflexed, filiform, (3–)6–14(–20) mm, margin entire or sometimes with 1 to several verrucose denticles below. Corolla pale blue, pale purple, or white, subtubular, tubular-funnelform, or urceolate, 10–18 mm; lobes

narrowly triangular, 3–4 mm. Disk narrowly tubular, 2–5 mm, often glabrous. Style 15–25 mm, strongly exerted. Capsule globose, ellipsoid, or ovoid, 4–9 × 4–5 mm. Seeds brown, ellipsoid, 1–1.6 mm, 1-ribbed.

• Forests, forest margins, grasslands, grassy slopes; 1100–3600 m. Chongqing, Guizhou, Hebei, W Henan, W Hubei, SE Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, W Yunnan.

- 1a. Calyx lobes (2–)3–5(–7) mm, margin entire; capsule ovoid to ovoid-oblong ..... 37c. subsp. *paniculata*
- 1b. Calyx lobes (3–)6–14(–20) mm, margin sometimes lower part with 1 or 2 pairs of verrucose denticles; capsule globose, less often ovoid.
  - 2a. Calyx lobes (3–)6–9 mm, rarely up to 20 mm, margin usually entire; corolla 10–14 mm, very rarely up to 17 mm; stems and leaves mostly glabrous ..... 37a. subsp. *capillaris*
  - 2b. Calyx lobes (4–)9–14 mm, mostly with denticles; corolla 13–18 mm; stems and leaves mostly ± hirsute ..... 37b. subsp. *leptosepala*

**37a. *Adenophora capillaris*** subsp. *capillaris*

丝裂沙参(原亚种) si lie sha shen (yuan ya zhong)

*Adenophora capillaris* var. *tenuifolia* Diels; *A. longisepala* P. C. Tsoong.

Stems and leaves usually glabrous. Inflorescence branches up to 27 cm. Calyx lobes usually (3–)6–9(–20) mm. Corolla 10–14(–17) mm. Capsule globose, ellipsoid, or ovoid. Fl. Jul–Oct, fr. Aug–Oct.

• Forests, forest margins, grasslands; 1400–2800 m. Chongqing, Guizhou (Bijie, Nayong), W Hubei, Shaanxi (S of Qin Ling), Sichuan (Butuo, E of Kangding, Yuexi).

**37b. *Adenophora capillaris*** subsp. *leptosepala* (Diels) D. Y. Hong, Fl. Reipubl. Popularis Sin. 73(2): 136. 1983.

细萼沙参 xi e sha shen

*Adenophora leptosepala* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 175. 1912; *A. leptosepala* var. *linearifolia* C. Y. Wu; *A. urceolata* C. Y. Wu (1965), not Y. Z. Zhao (2002).

Stems and leaves usually hirsute. Calyx lobes (4–)9–14 mm, margin usually toothed. Corolla 13–18 mm. Capsule globose or ovoid. Fl. Jul–Oct, fr. Sep–Oct.

• Forests, forest margins, grasslands; 2000–3600 m. SW Sichuan (Muli), W Yunnan.

**37c. *Adenophora capillaris*** subsp. *paniculata* (Nannfeldt) D. Y. Hong & S. Ge, Novon 20: 426. 2010.

细叶沙参 xi ye sha shen

*Adenophora paniculata* Nannfeldt, Acta Horti Gothob. 5: 19. 1930; *A. paniculata* var. *dentata* Y. Z. Zhao; *A. paniculata* var. *petiolata* Y. Z. Zhao; *A. paniculata* var. *pilosa* Kitagawa; *A.*

*paniculata* var. *psilosa* Kitagawa.

Stems glabrous or hirsute. Leaves from linear, lanceolate, or broadly elliptic, 0.2–7.5 cm wide, glabrous, sometimes adaxially sparsely hispidulous, abaxially sparsely hirsute. Calyx lobes (2–)3–5(–7) mm, margin entire. Corolla 10–14 mm. Capsule narrowly obovoid, ellipsoid, or oblong, 7–11 × 3–5 mm. Seeds 1.4–1.6 mm. Fl. Jun–Sep, fr. Aug–Oct.

• Grassy slopes; 1100–2800 m. Hebei (S of Longguan, Wuling Shan), W Henan, SE Nei Mongol (Daqing Shan, Tumd Qi, Xinghe), Shaanxi (Qin Ling), Shanxi.

**38. *Adenophora tetraphylla*** (Thunberg) Fischer, Mém. Soc. Imp. Naturalistes Moscou 6: 169. 1823.

轮叶沙参 lun ye sha shen

*Campanula tetraphylla* Thunberg in Murray, Syst. Veg., ed. 14, 211. 1784; *Adenophora obtusifolia* Merrill; *A. polymorpha* Ledebour var. *rhombifolia* H. Léveillé; *A. polymorpha* var. *verticillata* Franchet & Savatier; *A. radiatifolia* Nakai, nom. illeg. superfl.; *A. radiatifolia* var. *abbreviata* (H. Léveillé) Nakai; *A. radiatifolia* var. *rhombifolia* (H. Léveillé) Nakai; *A. tetraphylla* var. *integrifolia* Y. Z. Zhao; *A. triphylla* (Thunberg) A. Candolle; *A. triphylla* f. *linearis* (Hayata) Kitamura; *A. triphylla* var. *tetraphylla* (Thunberg) Makino; *A. verticillata* Fischer; *A. verticillata* var. *abbreviata* H. Léveillé; *A. verticillata* f. *linearis* (Hayata) Matsumura; *A. verticillata* var. *linearis* Hayata; *A. verticillata* f. *triphylla* (Thunberg) Makino; *A. verticillata* var. *triphylla* (Thunberg) Regel; *Campanula triphylla* Thunberg; *C. verticillata* Pallas (1773), not Hill (1765).

Root carrotlike, 7–16 × 1.5–1.8 cm. Stems up to 1.5 m tall, simple, glabrous, less often white hispidulous. Cauline leaves 3–6-verticillate, sessile or subsessile; blade broadly to narrowly elliptic, linear-lanceolate, or linear, 1.8–10 × 0.2–3.2 cm, both surfaces sparsely puberulent or glabrous, base cuneate or attenuate, margin serrate or serrulate, apex acuminate, acute, or obtuse. Inflorescence a narrow panicle with branches (cymes) mostly verticillate. Hypanthium obconic or campanulate, glabrous; calyx lobes subulate, linear, or linear-triangular, 1.5–4 mm, margin entire. Corolla blue to purple, tubular or narrowly funnelform, sometimes slightly constricted at throat, 7–10 mm; tube 2.5–7 mm in diam.; lobes deltoid, 1–2 mm. Disk narrowly tubular, 2–4 mm. Style 14–20 mm, strongly exerted. Capsule obovoid or broadly obovoid, 5–8 × 3–6 mm. Seeds yellow-brown, oblong, slightly compressed, 1–1.5 mm. Fl. (Feb–)Mar–Nov, fr. May–Nov.  $2n = 34, 34+2B^*$ .

Grassy places, scrub; low elevations but up to 2000 m in south. Anhui, Fujian, N Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan (Lushi, Xinyang), Hunan (Xinning, Yizhang), Jiangsu, Jiangxi, Jilin, Liaoning, E Nei Mongol, Shandong (Muping), Shanxi (Lingkong Shan), Sichuan (Ebian, Emei Shan), Taiwan, Yunnan (Yanshan), Zhejiang [Japan (including Ryukyu Islands), Korea, Laos, Russia (Far East, E Siberia), N Vietnam].

