

23. PLEUROSPERMUM Hoffmann, Gen. Pl. Umbell. viii. 1814.

棱子芹属 leng zi qin shu

Pan Zehui (潘泽惠); Mark F. Watson

Aulacospermum Ledebour; *Hymenidium* de Candolle; *Hymenolaena* de Candolle; *Pterocyclus* Klotzsch.

Herbs perennial, rarely biennial. Root crown often surrounded with fibrous remnant sheaths. Stems erect, sometimes shortened. Leaves 1–4-pinnate or ternate-pinnate; ultimate segments serrate to incised or pinnate. Umbels terminal and lateral; bracts several, entire or pinnate, margin usually white scarious; rays often extending in fruit; bracteoles numerous, scarious, sometimes white margined. Calyx teeth conspicuous or obsolete. Petals oblong to broad-ovate, white or purple-red, base clawed, apex narrow, inflexed. Stylopodium conic or short-conic. Fruit oblong to broad-ovoid, slightly flattened laterally, glabrous, often with numerous, shining tubercules; ribs prominent and acute, sometimes undulate, cristate or narrowly winged; vittae 1(–3) in each furrow, 2(or 4 or 6) on commissure. Seed face concave. Carpophore 2-parted.

About 50 species: N Asia, E Europe, and especially diverse in the Himalayan region and W China; 39 species (22 endemic) in China.

This is a widespread, heterogeneous genus of complex and controversial taxonomy. Russian authors delimit *Pleurospermum sensu stricto* by only two species (the type, *P. austriacum* Linnaeus, and *P. uralense*), referring the other species to *Aulacospermum*, *Hymenidium*, *Hymenolaena*, *Physospermopsis*, and *Pterocyclus*. Other morphologically similar genera, where generic boundaries become indistinct, include *Trachydium* and *Pseudotrachydium* (Kljuykov et al.) Pimenov & Kljuykov. A full discussion of the Russian classification of *Pleurospermum* is presented by Pimenov and Kljuykov (Feddes Repert. 111: 499–515, 517–534, 535–552. 2000). As yet, this rather radical classification has not gained widespread acceptance, and the proponents admit that this is a taxonomic hypothesis, and (particularly for some groups) a more natural classification will only be possible following critical revision in the field and herbarium. A traditional treatment is adopted for the following account, with due influence from the work of the Russian taxonomists.

- 1a. Plants of high altitudes, (3500–)4000–5000 m, short and squat 5–20(–40) cm; stems usually much reduced, often thickened, unbranched.
 - 2a. Bracteole apex acute, acuminate or obtuse.
 - 3a. Fruit wings narrow, crisped; calyx teeth lanceolate; rays thickened, particularly at the distal ends; pedicels flattened and winged 1. *P. nubigenum*
 - 3b. Fruit wings narrow or broad, plane; calyx teeth triangular or obsolete; rays uniform thickness, pedicels terete.
 - 4a. Petals white; fruit thinly winged; calyx teeth triangular; vittae 3 per furrow 2. *P. pulszkyi*
 - 4b. Petals purple-red; fruit broadly winged; calyx teeth obsolete; vittae 2 per furrow 3. *P. lindleyanum*
 - 2b. Bracteole apex 1–2-pinnate/pinnatifid.
 - 5a. Bracteole apex 2-pinnate/pinnatifid; ultimate leaf segments linear, 0.3–0.5 mm broad; pedicels flattened 4. *P. heterosciadium*
 - 5b. Bracteole apex 1-pinnate/pinnatifid; ultimate leaf segments lanceolate, 0.5–5 mm broad; pedicels terete.
 - 6a. Compact rosette, stemless; inflorescence densely capitate, sessile; rays reduced, crowded; fruit wings broad and sinuate, not dentate 5. *P. hedinii*
 - 6b. Stems usually distinct; inflorescences not densely capitate, usually distinctly pedunculate; rays not reduced, lax; fruit ribs prominent or irregularly dentate or sinuate winged.
 - 7a. Umbels usually sessile; rays very unequal; fruit tuberculate, wings irregularly dentate 8. *P. astrantioideum*
 - 7b. Umbels distinctly pedunculate; rays subequal; if fruit winged then not tuberculate.
 - 8a. Plants with strong unpleasant odor; rays 14–30; fruit wings irregularly dentate 9. *P. foetens*
 - 8b. Plant without unpleasant odor; rays 5–15(–20); fruit ribs prominent to narrowly winged, wing margin entire.
 - 9a. Leaves 1–2-pinnate, ultimate segments ovate or orbicular; fruit ribs all broadly winged 6. *P. stellatum*
 - 9b. Leaves 2–3-pinnate, ultimate segments linear-lanceolate; fruit ribs prominent or narrowly sinuate-winged 7. *P. nanum*
 - 1b. Plants from varying altitudes and habitats, usually much larger (0.3–2 m), smaller specimens slender-stemmed.
 - 10a. Large, often robust plants, (0.5–)0.8–2 m, rarely shorter.
 - 11a. Leaflets of lower leaves broadly ovate, regularly serrate, base truncate or cordate.
 - 12a. Umbels 8–10 cm across; rays 15–20, 4–7 cm; fruit 8–10 × 4–6 mm 10. *P. rivulorum*
 - 12b. Umbels 2–4 cm across; rays 6–8(–15), 0.6–2 cm; fruit 7–8 × 3–4 mm 11. *P. rotundatum*
 - 11b. Leaflets of lower leaves variously lobed and dissected, often pinnatifid, not broadly ovate, bases usually cuneate to decurrent.
 - 13a. Plants usually very robust, thick-stemmed (except *P. stylosum*); umbels (7–)12–28 cm across; rays (15–)25–40.
 - 14a. Rays 15–35; fruit 4–6 mm; ribs sinuate-winged (Xinjiang) 12. *P. stylosum*
 - 14b. Rays 20–40(–60); fruit 6–10 mm; ribs cristate- or plane-winged.

- 15a. Ultimate leaf segments pinnatifid, lobes linear; calyx teeth conspicuous, triangular-ovate; fruit wings thick, cristate (NW China) 13. *P. uralense*
- 15b. Ultimate leaf segments coarsely dentate, lobes ovate; calyx teeth obsolete; fruit wings thin, broad and plane (SW China) 14. *P. aromaticum*
- 13b. Plants less robust, slender-stemmed; umbels 3–15 cm across; rays 7–28.
- 16a. Petioles of upper leaves expanded into auriculate sheaths; fruit oblong, 8–15 mm.
- 17a. Leaves irregularly serrate; bracteoles ca. 5 mm broad; seed face deeply concave 15. *P. angelicoides*
- 17b. Leaves regularly crenate; bracteoles ca. 1 mm broad; seed face slightly concave 16. *P. longicarpum*
- 16b. Petioles of upper leaves expanded or not, but not auriculate; fruit ovate to oblong-ovate, 3.5–8(–10) mm.
- 18a. Leaves 2–4-ternate/pinnate.
- 19a. Leaves with narrow ultimate segments 2–5 mm broad, hirtellous along the margins, lobes round, obtuse; primary umbel overtopped by laterals; bracteoles oblong to obovate, entire to 3-lobed at apex, lobes obtuse; petals white; fruit 4–5 mm 19. *P. franchetianum*
- 19b. Leaves with ultimate segments 0.3–1 mm broad, margin glabrous, lobes lacerate, acute; primary umbel not overtopped by laterals; bracteoles oblanceolate, 3-lobed to pinnate/pinnatifid at apex, apex acute; petals white to pink; fruit 6–10 mm 20. *P. benthamii*
- 18b. Leaves 1–2-ternate/pinnate (3–5-partite to 2-ternate).
- 20a. Leaves 3–5-partite (sometimes to 2-ternate).
- 21a. Leaves 3–5-partite (sometimes to 2-ternate); leaf bases and veins with coarse white hairs reminiscent of those of *Heracleum*; rays 2–4 cm; petals white 17. *P. heracleifolium*
- 21b. Leaves always 3-partite, without white hairs; rays 5–6 cm; petals pink 18. *P. macrochlaenum*
- 20b. Leaves 2-ternate/pinnate.
- 22a. Rays 10–18, 2–7 cm; bracteoles lanceolate, acute or 3-lobed; fruit smooth, wings sinuate but not irregularly dentate 21. *P. decurrens*
- 22b. Rays 7–13. 1–2.5 cm; bracteoles linear-lanceolate, entire; fruits tuberculate with irregularly dentate wings 22. *P. cristatum*
- 10b. Small, slender plants, 20–40(–50) cm rarely taller.
- 23a. Petiole wings greatly expanded, white with purple veining, upper leaves and bracts enveloping the inflorescence 23. *P. amabile*
- 23b. Petiole wings not greatly expanded, not purple veined.
- 24a. Leaves 1-pinnate to 2-pinnatifid; rays 2–4; bracteoles broadly ovate, entire 24. *P. bicolor*
- 24b. Leaves 2–4-ternate/pinnate; rays (4–)6–25; bracteoles entire or more usually pinnatifid at apex.
- 25a. Stems, petioles and leaf rachis conspicuously white pubescent 26. *P. pilosum*
- 25b. Plants essentially glabrous, bases of umbels and/or petioles sometimes puberulent.
- 26a. Calyx teeth conspicuous, triangular to lanceolate.
- 27a. Ultimate leaf segments 5–20 mm broad, irregularly serrate or incised 25. *P. yunnanense*
- 27b. Ultimate leaf segments finely dissected, 1–8(–10) mm broad.
- 28a. Calyx teeth linear-lanceolate; sheaths of upper leaves and bracts broadly auriculate; bracteoles silvery white with a narrow green midrib, apex acuminate to 3-lobed 27. *P. album*
- 28b. Calyx teeth triangular or rounded; leaf sheaths somewhat expanded but not auriculate; bracteoles usually white margined, but not conspicuously silvery white, apex usually pinnatifid.
- 29a. Rays 4–7, very unequal; bracteoles entire, apex acuminate 29. *P. rupestre*
- 29b. Rays (6–)8–20(–30), subequal (but see *P. szechenyii*); bracteole apex pinnatifid (rarely acuminate).
- 30a. Rays (15–)20–30.
- 31a. Plant without unpleasant odor when crushed; rays very unequal; fruit wings broad, sinuate but not dentate 30. *P. szechenyii*
- 31b. Plant with a strong unpleasant odor when crushed; rays subequal; fruit wings broad, irregularly dentate 9. *P. foetens*
- 30b. Rays 6–12(–15).
- 32a. Leaf blades oblong-lanceolate in outline, approaching 2–3-ternate/pinnate; fruit wings broad, sinuate 31. *P. wilsonii*
- 32b. Leaf blades broadly ovate in outline, 3–4-ternate/pinnate; fruit ribs prominent to winged, but not sinuate.
- 33a. Ultimate leaf segments ca. 2 mm; calyx teeth ca. 1 mm, green 32. *P. hookeri*
- 33b. Ultimate leaf segments 3–5 mm; calyx teeth ca. 0.3 mm, dark purple 33. *P. tsekuense*
- 26b. Calyx teeth obsolete or minute.
- 34a. Rays 5–9(–11); bracts and bracteoles entire, acuminate.
- 35a. Stems and leaf sheaths purple-red, rays subequal; bracteoles broad, longer than the flowers 35. *P. apiolens*

- 35b. Stems and leaf sheaths green, rays very unequal; bracteoles linear-lanceolate, shorter than the pedicels 28. *P. simplex*
- 34b. Rays (9–)11–25; bracts and bracteoles pinnate/pinnatifid at apex, rarely acuminate.
- 36a. Larger plants, 30–60 cm; rays 10–25; fruit wings broad, sinuate or irregularly cristate/dentate.
- 37a. Rays subequal; fruit wings sinuate 37. *P. linearilobum*
- 37b. Rays very unequal; fruit wings irregularly cristate/dentate 39. *P. wrightianum*
- 36b. Small slender plants, 20–35(–45) cm; rays 9–15; fruit ribs prominent to narrowly winged, but not sinuate or dentate.
- 38a. Rays 1.5–2.5 cm 34. *P. giraldii*
- 38b. Rays 4–12 cm.
- 39a. Stem branches often opposite or whorled; leaf rachis glabrous; ovary smooth 36. *P. handellii*
- 39b. Stem branches usually alternate; leaf rachis tuberculate on abaxial surface; ovary tuberculate 38. *P. calcareum*

1. *Pleurospermum nubigenum* H. Wolff, Repert. Spec. Nov. Regni Veg. Beih. 12: 448. 1922 [*"nubigena"*].

皱果棱子芹 *zhou guo leng zi qin*

Hymenidium nubigenum (H. Wolff) Pimenov & Kljuykov.

Plants dwarf, to 15 cm, near rosette. Root stout, 0.5–1 cm across. Stem greatly reduced, rarely branched. Petioles 2–4 cm, sheaths oblong, membranous; blades oblong, 4–6 cm, 2-ternate-pinnate; pinnae 4–5 pairs, only the basal petiolulate, ca. 1 cm; ultimate segments linear or linear-lanceolate, ca. 5 × 1–2 mm. Primary umbels 10–15 cm across; peduncle very short; bracts several, small, leaf-like; rays 6–15, 5–10 cm, stout, somewhat unequal, ribbed, thickening especially at distal parts; umbellules borne above leaves; bracteoles 10–15, obovate to oblong, 5–10 × 3–4 mm, margin broad, white, membranous, apex acute; pedicels numerous, 3–5 mm, flattened and winged. Calyx teeth triangular-lanceolate, ca. 0.5 mm. Petals white, spatulate, ca. 1.5 mm, apex obtuse. Fruit ellipsoid, dark gray-green, 3–4 mm; ribs crisped-winged; vittae 3 in each furrow, 5–6 on commissure. Fl. and fr. Jul–Aug.

• Alpine grasslands; ca. 4900 m. W Sichuan, E Xizang, NW Yunnan.

This rather poorly known taxon is recorded only from a few collections.

2. *Pleurospermum pulszkyi* Kanitz in Szechenyi, Wiss. Erg. Reise Griechenl. 2: 701. 1898.

青藏棱子芹 *qing zang leng zi qin*

Hymenidium pulszkyi (Kanitz) Pimenov & Kljuykov; *Pleurospermum kansuense* H. Wolff.

Plants 8–40 cm, usually tinged purplish-red. Root stout, dark brown, branched. Stem stout, often reduced. Basal and lower stem leaves long-petiolate, sheaths ovate; blades oblong or ovate, 3–10 × 1–3 cm, 1–2-pinnate; ultimate segments oblong or linear, 3–10 × 1–3 mm. Umbels 15–20 cm across; bracts 5–8, ovate or lanceolate, 2–5 × 0.3–1 cm, margin white or purplish-red, apex acute or pinnate; rays 5–10, 5–12 cm, slightly unequal; bracteoles 10–15, ovate or lanceolate, 1–2 cm, acuminate, longer than flowers; pedicels numerous, 5–8 mm. Calyx teeth conspicuous, triangular-ovate, ca. 0.8 × 0.5 mm. Petals obovate, white. Anthers dark purple. Fruit oblong-ovoid, 5–6 × 2–3.5 mm; ribs narrowly sinuate winged; vittae 3 in each furrow, 6 on commissure. Fl. Jun–Jul, fr. Aug–Sep.

• Alpine meadows, stony slopes; 3600–4600 m. Gansu, Qinghai, Xizang, NW Yunnan.

3. *Pleurospermum lindleyanum* (Klotzsch) B. Fedtschenko, Rastit. Turkest. 604. 1915.

天山棱子芹 *tian shan leng zi qin*

Hymenolaena lindleyana Klotzsch in Klotzsch & Garcke, Bot. Ergebn. Reise Waldemar, 150. 1862; *Hymenidium nanum* (Ruprecht) Pimenov & Kljuykov; *Hymenolaena nana* Ruprecht; *Pleurospermum stellatum* (D. Don) C. B. Clarke var. *lindleyanum* (Klotzsch) C. B. Clarke.

Plants dwarf, near rosette, 5–30 cm. Root long-conic, 3–5 mm across. Stem inconspicuous, elongating in fruit, tinged purple-red, papery remnant sheaths at base. Petioles 3–6 cm, sheaths oblong; blades oblong-elliptic, 3–8 × 0.8–3 cm, 2–3-ternate-pinnate; pinnae short-petiolulate; ultimate segments oblong to linear, 2–10 × 1–2.5 mm, entire, apex obtuse. Umbels 3–5 cm across; bracts 2–4, oblong-ovate, 2–3 cm, shorter than rays, margin purple-red, 1–2-pinnate at apex; rays 4–7, 1–4 cm, unequal; bracteoles 8–12, oblong-ovate or obovate, 5–11 × 4–7 mm, slightly longer than flowers, mid band purple-red, margin broad, white, apex entire or 3-lobed, membranous; pedicels numerous, 4–5 mm, winged. Calyx teeth obsolete. Petals broad-obovate, purplish-red, ca. 1.2 mm. Anthers dark purple. Fruit broad-ovoid, purple-red, 4–5 mm; ribs all broadly sinuate-winged; vittae 2 in each furrow, 4 on commissure. Fl. and fr. Aug.

Alpine grasslands; ca. 4000 m. W Xinjiang, Xizang [NW India, Kashmir, Pakistan].

4. *Pleurospermum heterosciadium* H. Wolff, Repert. Spec. Nov. Regni Veg. 21: 243. 1925.

异伞棱子芹 *yi san leng zi qin*

Hymenidium heterosciadium (H. Wolff) Pimenov & Kljuykov; *Physospermopsis fuscopurpurea* (Handel-Mazzetti) Pimenov & Kljuykov; *Trachydium fuscopurpureum* Handel-Mazzetti.

Plants dwarf, near rosette, 10–25 cm. Root stout, 5–8 mm across, branched. Stem greatly reduced, ribbed, sparingly branched, base clothed with dense, brown fibrous remnant sheaths. Basal petiole sheaths oblong, membranous; blades oblong to narrowly ovate, 1.8–6 cm, 3-pinnate; pinnae 5–7 pairs, nearly sessile; ultimate segments linear to oblanceolate, 2–4 ×

ca. 0.5 mm. Peduncle greatly reduced; bracts several, small, leaf-like; rays 8–15, 10–20 cm, unequal; bracteoles 10–15, broadly obovate in outline, 4–10 mm, pale green, margin white in lower half, apex 2-pinnate; pedicels numerous, flattened, 3–5 mm. Calyx teeth triangular, obtuse, minute, ca. 0.3 mm. Petals broad-ovate to broad-oblong, white, apex purple-red with incurved tip. Anthers dark purple-red. Ovary black-gray. Young fruit slightly crisped-winged (mature fruit not known). Fl. Aug.

- Alpine grasslands; 3500–4500 m. W Sichuan, SE Xizang.

This incompletely known taxon is recorded from very few collections.

5. *Pleurospermum hedinii* Diels in Hedin, S. Tibet 6(3): 52. 1922.

垫状棱子芹 dian zhuang leng zi qin

Cortiella hedinii (Diels) C. Norman; *Hymenidium hedinii* (Diels) Pimenov & Kljuykov.

Plants dwarf, rosette, 4–8 cm. Stem very short, 1–1.5 cm thick, fleshy. Basal petioles 3–5 cm, flattened, winged, sheaths narrow, oblong; blades oblong, 3–5 × 1–1.5 cm, 2-pinnate; pinnae 5–7 pairs, sessile; ultimate segments obovate, 1.5–3 × 0.5–1.7 mm, apex small-toothed. Umbel densely capitate, terminal, 5–12 cm across; peduncles greatly reduced; bracts numerous, leaf-like, 2.5–3 cm; rays 40–50, thick, fleshy, outer rays up to 2–3 cm, central rays shorter; bracteoles 8–12, obovate or oblanceolate, 4–10 mm, pale green margin broad, white, apex 3-lobed; pedicels numerous, thick, fleshy, 1–2 mm. Calyx teeth triangular, ca. 0.5 mm. Petals rounded, white to purplish-red. Anthers black-purple. Stylopodium short-conic. Fruit broad-ovoid, 4–5 × 3–3.5 mm; ribs broadly sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Aug, fr. Aug–Sep.

- Alpine grasslands; 4200–5000 m. S and W Qinghai, E Xizang, NW Yunnan.

This species is considered closely related to, and is sometimes treated as conspecific with, *Pleurospermum stellatum*.

6. *Pleurospermum stellatum* (D. Don) C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 705. 1879.

尖头棱子芹 jian tou leng zi qin

Selinum stellatum D. Don, Prodr. Fl. Nepal. 185. 1825; *Hymenolaena govaniana* de Candolle; *H. stellata* (D. Don) Lindley; *Pleurospermum govanianum* (de Candolle) Bentham ex C. B. Clarke.

Plants dwarf, 3–20(–40) cm, essentially glabrous, sometimes apex of peduncles and rays scaberulous. Root stout, branched. Stem shortened or elongated, simple or 1-branched above; base with papery remnant sheaths. Basal petioles slender, 1–8 cm, sheaths oblong; blades oblong to oval, 2–10 × 1–3 cm, 1–2-pinnate; ultimate segments sessile, ovate to orbicular, 3–20 mm, incised-pinnatifid, mucronulate. Umbels 2.5–4 cm across; peduncle stout, up to 10 cm; bracts 2–8, oblong to orbicular, 1–6 cm, pinnatifid, margin broad, white-scarious; rays 2–10(–20), spreading-ascending, 2–20 cm; bracteoles 8–12, oblong to obovate, ca. 1 cm, longer than flowers, entire, 3-lobed to pinnatifid, margin broad white-scarious; umbellules 15–40-flowered, pedicels unequal. Calyx teeth ovate, minute. Petals

obovate, white, apex inflexed. Stylopodium short-conical. Fruit oblong-ovoid, 4–6 × 2.5–3 mm, papillate; ribs all broadly winged; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Jun–Aug.

Open grassy slopes; ca. 3500 m. SW Xizang [NW India, Kashmir, C and W Nepal, Pakistan].

7. *Pleurospermum nanum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 140. 1894.

矮棱子芹 ai leng zi qin

Physospermopsis nana (Franchet) Pimenov & Kljuykov; *Physospermopsis purpurascens* (Franchet) Pimenov & Kljuykov; *Trachydium purpurascens* Franchet.

Small plants, 5–15 cm, glabrous. Stem reduced, slender, ribbed. Basal leaves petiolate; petioles 2–5 cm; sheaths broadly oblong-lanceolate, membranous-margined; blades ovate-oblong, 3–5 cm, 2–3-pinnate; pinnae 4–5 pairs, only the basal pinnules petiolulate; ultimate segments linear-lanceolate, 1–3 × 0.5–1 mm, entire or 3-toothed at apex. Stem leaves gradually reduced upwards, petioles short or wholly sheathing. Umbels 5–7 cm across; peduncles very short; bracts 5–7, leaf-like, 2–3 cm; rays 5–15, slightly unequal, 3–6 cm; bracteoles 6–10, oblong-ovate to broadly obovate, 1–2-pinnate, 6–10 × 4–8 mm, about equal to flowers, pale green, margin whitish in lower half; pedicels 15–20, 3–5 mm. Calyx teeth small, triangular-ovate, 0.15–0.3 mm. Petals white or purplish-red, obovate, ca. 1.2 mm. Anthers dark purple. Stylopodium short-conic. Fruit broad-ovoid, ca. 2.5 × 1.5 mm, sparsely pimples; ribs prominent, narrowly sinuate-winged, dark purple-black; vittae large, 1 per furrow, 2 on commissure. Fl. Jul–Sep, fr. Oct–Nov.

- Dwarf *Rhododendron* scrub, marshy meadows; (2600–)3500–4600 m. SE Xizang, NW Yunnan.

This is an enigmatic species, rarely collected in fruit, and is here retained within *Pleurospermum* (on account of the white scarious margins of the bracts and bracteoles), but is possibly better placed in *Physospermopsis*. Some authors treat *Physospermopsis purpurascens* as a separate species, distinguished by the short or sometimes obsolete calyx teeth.

8. *Pleurospermum astraintioideum* (H. de Boissieu) K. T. Fu & Y. C. Ho in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(1): 178. 1979.

雅江棱子芹 ya jiang leng zi qin

Trachydium astraintioideum H. de Boissieu, Bull. Soc. Bot. France 53: 422. 1906; *Hymenidium astraintioideum* (H. de Boissieu) Pimenov & Kljuykov.

Plants dwarf, 8–20 cm, often tinged purple-red. Root gray-brown, conic, 1–1.5 cm thick. Stem strongly reduced, 3–5 cm. Petioles short, flattened, winged, 3–5 cm, sheaths oblong; blades ovate-lanceolate, 4–6 × 1.5–2.5 cm, 3–4-pinnate; pinnae 5 pairs, petiolulate; ultimate segments linear-lanceolate, 1–2.5 × 0.5–1.5 mm, midrib channelled. Umbels usually almost sessile (sometimes pedunculate in mesic conditions), 15–18 cm across; bracts few, leaf-like; rays stout, 15–25, 3–15 cm, very unequal, ribbed; bracteoles 12–14, obovate, 5–12 mm, just longer than flowers, apex pinnate, pedicels numerous, 0.5–1 cm, narrowly

winged/ribbed. Calyx teeth minute, ca. 0.2 mm, ovate. Petals oblanceolate, white or greenish-white. Stylopodium short-conic, dark purple. Fruit broadly ovoid, 3.5–6 × 3–5 mm, pale brown, tuberculate; ribs all broadly triangular-dentate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Aug, fr. Sep–Oct.

- Alpine grasslands; 4000–4600 m. SW Sichuan.

9. *Pleurospermum foetens* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 140. 1894.

丽江棱子芹 li jiang leng zi qin

Hymenidium foetens (Franchet) Pimenov & Kljuykov;
Pleurospermum dielsianum Fedde ex H. Wolff, p.p.

Plants dwarf, 8–40 cm high, with characteristic strong unpleasant odor. Rootstock stout, vertical. Stem reduced, ribbed, scabrous, to 1.5 cm thick at base. Basal and lower petioles 3–6 cm, flattened, winged, sheaths narrow to broad, oblong; blades oblong, 3–6 × 1–3 cm, 3–4-ternate-pinnate; pinnae 4–6 pairs, subsessile; ultimate segments linear or lanceolate, 1–3 × 0.5–1.5 mm, hirtellous along veins and margins, apex entire, rarely 2–3-lobed. Primary umbels 10–15 cm across; peduncle 3–5 cm, scabrous; bracts 6–8, obovate, 3–6 cm, apex pinnate; rays 14–30, 3–9 cm, unequal, hispidulous; bracteoles ca. 10, obovate, 1–2 × 0.5–1 cm, apex pinnate-pinnatifid, pale green, margin broad, white, membranous; pedicels numerous, 0.4–1 cm, flattened, winged. Calyx teeth minute, triangular. Petals obovate, white or pinkish, ca. 2 mm, acute, clawed at base. Anthers purple-black, filaments white. Stylopodium short-conic. Fruit ovoid, purple-black, dark red-brown, 7–9 × 3–4 mm; ribs all broadly-sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jun–Sep, fr. Jul–Sep.

- Open alpine meadows, rocky slopes, loose screes; 3600–4500 m. Gansu, Sichuan, SE Xizang, NW Yunnan.

10. *Pleurospermum rivulorum* (Diels) M. Hiroe, Umbell. World, 747. 1979.

心叶棱子芹 xin ye leng zi qin

Angelica rivulorum Diels, Notes Roy. Bot. Gard. Edinburgh 5: 288. 1912; *Pterocyclus rivulorum* (Diels) H. Wolff.

Plants 50–100(–150) cm. Root stout, dark brown, 1–2 cm across, aroma strong, like that of *Angelica* or *Apium*. Stem to 1 cm thick at base, thinly ribbed, branching. Basal petioles 7–16 cm; sheaths oblong; blades 1–2-ternate/pinnate; ultimate segments broadly ovate, 5–11 × 4–8 cm, setose along nerves, regular-serrate, apex acute to acuminate, base cordate. Stem leaves gradually reduced upwards; uppermost with inflated, often bladeless sheaths. Umbels 8–10 cm across; peduncle 15–25 cm; bracts 3–4, linear-lanceolate, 2–4 × 0.2–0.4 cm; rays 15–20, 4–7 cm, scabrous; bracteoles 6–8, linear-lanceolate, 1–2.5 cm, greenish-white with dark green median stripe.; pedicels 14–20, 8–10 mm. Calyx teeth inconspicuous. Petals greenish-white, obcordate, ca. 3 mm. Stylopodium conic. Fruit dark brown, ovoid-oblong, 8–10 × 4–6 mm; ribs all narrowly winged; vittae 1 in each furrow, 2 on commissure. Fl. Aug, fr. Aug–Sep. $2n = 22^*$.

- Damp grasslands, gravelly stream banks, frequently collected; 3100–4000 m. NW Yunnan.

This species is used in Yunnan as a regional substitute for the medicine “qiang huo” (*Notopterygium franchetii* and *N. incisum*).

11. *Pleurospermum rotundatum* (de Candolle) C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 703. 1879.

圆叶棱子芹 yuan ye leng zi qin

Hymenolaena rotundata de Candolle, Prodr. 4: 245. 1830;
Pterocyclus rotundatus (de Candolle) Pimenov & Kljuykov.

Plants (30–)50–60(–80) cm. Root brown, long-cylindric, ca. 1.5 cm thick, unbranched. Stem purple-green, thinly ribbed, base covered by remnant fibrous sheaths. Basal petioles 5–15 cm; sheaths broadly ovate; blades broadly ovate, 12–20 × 10–15 cm, 1–2-ternate; ultimate segments petiolulate, broadly ovate to orbicular, 3–8 × 2.5–8.5 cm, simple or 3-lobed, margin cuspidate crenate-dentate. Stem leaves few, tripartite. Umbels 2–4 cm across; peduncles 15–29 cm, thinly ribbed; bracts absent or 1–2, long-lanceolate, scarious, 0.5–2 cm, apex long-cuspidate; rays 6–8(–15), 0.6–2 cm, about as long as bracts; bracteoles 5–8, lanceolate, about as long as flowers; umbellules 8–12-flowered; pedicels unequal, 5–10 mm. Calyx teeth ovate, minute, apex obtuse. Petals yellowish-green or purplish, obovate, clawed. Stylopodium conic. Fruit oblong, 7–8 × 3–4 mm; ribs narrowly winged; vittae 1–2 in each furrow, ca. 4 on commissure. Fl. & fr. Aug–Sep.

Forest margins, roadsides; 3300–3800 m. S Xizang (Nyalam) [Nepal].

12. *Pleurospermum stylosum* C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 704. 1879.

新疆棱子芹 xin jiang leng zi qin

Aulacospermum pulchrum (Aitchison & Hemsley) K. H. Rechinger & Riedl; *A. stylosum* (C. B. Clarke) K. H. Rechinger & Riedl; *Pleurospermum pulchrum* Aitchison & Hemsley.

Plants (20–)60–150 cm, robust. Taproot thick. Stem branched, scaberulous or puberulent base with fibrous remnant sheaths. Basal petioles slender, 3–8 cm, sheaths very narrow; blades oblong-ovate or triangular-ovate, 3–8 × 2–6 cm, 2-pinnate or ternate-pinnate; ultimate segments lanceolate, ovate or obovate, 5–20 × 2–5 mm, base winged, margin serrate to pinnatifid, usually scaberulous. Leaves gradually reduced upwards. Umbels terminal and lateral, 8–15 cm across; peduncles 4–18 cm; bracts 5–8, lanceolate or oblong, 1–3 cm, like upper leaves, becoming reflexed; rays 15–35, 3–10 cm, about equal, thick, scaberulous; bracteoles 6–10, lanceolate or ovate-lanceolate, 5–12 mm, longer than flowers, reflexed, margin broad, white, scarious; umbellules 20–30-flowered; pedicels 7–12 mm, angled, scaberulous. Calyx teeth ovate, minute. Petals obovate, white or flushed pink, apex inflexed. Fruit oblong ovoid or ellipsoid, 4–6 × 2–4 mm; ribs all narrowly sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jun–Aug, fr. Aug–Oct.

Open stony ground, streamsides; ca. 3800 m. NW Xinjiang [Afghanistan, NW India, Kashmir, Pakistan].

13. *Pleurospermum uralense* Hoffmann, Gen. Pl. Umbell. ix. 1814

棱子芹 *leng zi qin*

Pleurospermum camtschaticum Hoffmann.

Plants 1–2 m, robust. Root dark brown, 2–3 cm across, branched, strongly aromatic. Stem hollow, ribbed, scabrous to glabrous. Basal and lower petioles 15–30 cm, sheaths ovate, broad; blades broadly triangular-ovate, 15–30 cm, 2–3-ternate-pinnate; ultimate segments narrowly ovate or lanceolate, 2–6 × 0.5–2.5 cm, irregular-pinnatifid, veins and margin hirtellous. Leaves reduced upwards. Umbels large, 10–20 cm across; bracts numerous, linear or lanceolate, 2–8 cm, apex entire or pinnate, reflexed; rays 20–40(–60), unequal, hirtellous; bracteoles 6–9, linear-lanceolate, 5–10 × 1–3 mm, apex entire or pinnate; pedicels 10–12 mm, scabrous. Calyx teeth triangular-ovate. Petals broad-obovate, white, 2–2.5 mm. Stylopodium short-conic. Fruit broad-ovoid, 6–10 × 3–6 mm; ribs all thickly cristate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jun–Jul, fr. Jul–Aug. *n* = 11.

Stream banks in forests or mountain ravines. Hebei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Japan, Mongolia, SE Russia].

This species has reputed medicinal value. Chinese material previously recorded as *Pleurospermum austriacum* Linnaeus is referable to *P. uralense*.

14. *Pleurospermum aromaticum* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 341. 1915.

芳香棱子芹 *fang xiang leng zi qin*

Oreocomopsis aromatica (W. W. Smith) Pimenov & Kljuykov.

Plants 40–100 cm high, robust, strongly aromatic. Root brownish, cylindric, branched, crown stout, 1–2 cm across, annular ringed. Stem purple-tinged at base. Basal and lower petioles 10–30 cm, sheath oblong; blades broad-ovate, 15–30 cm, 3–4-pinnate; pinnae 3–5 pairs, long-petiolulate; ultimate segments ovate or obovate, 1–3 × 0.7–2.3 cm, irregularly coarse-dentate, scabrous on rachis, nerves and margins. Leaves reduced upwards. Umbels large, 10–28 cm across; peduncle up to 20 cm; bracts 6–8, very variable, similar to uppermost leaves, 4–10 cm, margin densely scabrid with flattened hairs, apex entire, 3-lobed or pinnate; rays 20–40, 4–12 cm; bracteoles ca. 10, linear-lanceolate, 1.5–3 cm, densely scabrid with flattened hairs, margin narrow, white; pedicels numerous, ca. 1 cm. Calyx teeth obsolete. Petals obovate, white. Stylopodium short-conic. Fruit oblong, 0.7–1 × 0.5–0.6 mm; ribs all broadly thick-winged; vittae 2–3 in each furrow, 6–7 on commissure. Fl. Jul–Aug, fr. Aug–Sep.

• Near ditches in forests, open dwarf scrub, alpine meadows; 3800–4100 m. SW Sichuan, Xizang, NW Yunnan.

This species has reputed medicinal value.

15. *Pleurospermum angelicoides* (Wallich ex de Candolle) C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 703. 1879.

归叶棱子芹 *gui ye leng zi qin*

Angelica forrestii Diels; *Hymenolaena angelicoides* Wallich ex de Candolle, Prodr. 4: 245. 1830; *Pterocyclus angeli-*

coides (Wallich ex de Candolle) Klotzsch; *Pterocyclus forrestii* (Diels) Pimenov & Kljuykov.

Plants 80–120 cm or more, robust. Root dark brown, long-conic, 3–4 cm across. Stem thinly ribbed, glabrous. Basal leaves with long petioles, 20–40 cm, sheath narrow-oblong, 4–5 cm; blades oblong, 3–4-ternate-pinnate; ultimate segments oblong or ovate-oblong, 4–10 × 2.5–4 cm, scabrous along nerves abaxially, cuneate, irregularly serrate or 3-lobed, apex acute. Stem leaves reduced upwards, sheaths strongly inflated and auriculate, membranous. Umbels 8–10 cm across, peduncle ca. 30 cm; bracts 5–8, linear-lanceolate, 2–3 × ca. 0.8 cm, apex caudate, deciduous; rays 15–25, 5–8 cm in flower, to 15 cm in fruit; bracteoles 5–8, narrow-lanceolate, 1–2 × 0.3–0.5 cm, membranous, green, margin sometimes pale; pedicels ca. 25, 1–1.5 cm. Calyx teeth obsolete. Petals ovate, white or tinged purplish-red, 2–2.75 × ca. 1.75 mm. Anthers dark purple. Fruit oblong, dark brown, 8–14 × 3–4 mm; dorsal ribs prominent, lateral ribs narrowly winged; vittae 1–2 in each furrow, 2–3 on commissure. Seed face concave. Fl. Jun–Aug, fr. Aug–Sep. *2n* = 22*.

Stream banks in forests, alpine meadows; 3000–4000 m. SW Sichuan, SE Xizang, NW Yunnan [Bhutan, Kashmir, Myanmar, Nepal, Sikkim].

16. *Pleurospermum longicarpum* R. H. Shan & Z. H. Pan in C. Y. Wu, Fl. Xizang. 3: 426. 1986.

长果棱子芹 *chang guo leng zi qin*

Pterocyclus wolffianus Fedde ex H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 321. 1930, not *Pleurospermum wolffianum* Fedde ex H. Wolff (1929).

Plants 80–100 cm. Stem ribbed, branched. Basal and lower petioles 10–30 cm; sheaths very broad, auriculate; blades broad-ovate in outline, 30–40 × 15–25 cm, 3–4-ternate-pinnate, pinnae long-petiolulate, ultimate segments oblong-ovate to broad-ovate, 5–15 × 2.5–7 cm, oblique-cuneate, regular-crenate, apiculate, sparse-setose along nerves abaxially. Leaves reduced upwards; sheaths inflated, conspicuous. Umbel 8–10 cm across; peduncle 10–15 cm; bracts 3–8, linear, 2–3.5 × 1–3 mm; rays 20–25, subequal, 5–8 cm in fruit, scabrous; bracteoles ca. 8, linear, 10–15 × ca. 1 mm, uniform green; pedicels numerous, 7–10 mm, flattened, slightly scabrous. Calyx teeth obsolete. Petals broad-obovate, white. Stylopodium short-conic. Fruit narrow-oblong, dark brown, 10–15 × ca. 4 mm; ribs all narrowly winged; vittae 1 in each furrow, 2 on commissure. Seed face slightly concave. Fl. and fr. Jul–Sep.

• Near ditches in coniferous forests, shrubby thickets; ca. 3100 m. SE Xizang, NW Yunnan.

This incompletely known taxon is recorded only from a few collections. It is superficially similar to *Angelica*, and is closely related to *P. angelicoides*, from which it differs by its regularly crenate leaves, narrower bracts and bracteoles (less than 4 mm), and slightly concave seed face.

17. *Pleurospermum heracleifolium* Franchet ex H. de Boissieu, Bull. Soc. Bot. France 53: 433. 1906.

芷叶棱子芹 *zhi ye leng zi qin*

Hymenidium heracleifolium (Franchet ex H. de Boissieu) Pimenov & Kljuykov.

Plants 40–80 cm. Root dark brown, long-conic. Stem ribbed. Basal and lower petioles to 20 cm, flattened, membranous-winged, sheaths narrow-oblong; blades broadly triangular-ovate, 8–12 × 8–12 cm, 3–5-lobed or 2-ternatifid; ultimate segments ovate or narrow-ovate, 2–5 × 1–2.5 cm, irregular-serrulate, acute, white-hispid abaxially and on adaxial veins, abaxial surface gray-green. Leaves reduced upwards. Umbels 10–15 cm across; peduncle 5–10 cm; bracts 7–9, oblanceolate to obovate, 3–6 × 0.5–2 cm, white-hispidulous along nerves on both sides, apex entire or 3–5-lobed, margin coarse-dentate; rays 10–15, 2–4 cm, densely hispidulous; bracteoles 5–9, lanceolate, 1–2 cm, similar to bracts; pedicels 10–15, 8–15 mm, hispidulous, elongating in fruit to 20 mm. Calyx teeth obsolete. Petals elliptic, white, ca. 1.5 mm. Stylopodium conic. Fruit oblong-ovoid, 7–10 × 1.8–2.5 mm; ribs all narrow-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Sep, fr. Aug–Oct.

• Open dwarf scrub, grasslands; 3000–3900 m. Xizang, NW Yunnan.

This species is closely related to, and not always easy to distinguish from, *P. benthamii*. The presence of coarse, white hairs (reminiscent of those seen in *Heracleum*) on the leaf sheath and main veins is usually diagnostic, as is the gray-green underside of the leaves and the densely hispidulous rays and pedicels.

18. *Pleurospermum macrochaenum* K. T. Fu & Y. C. Ho in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(1): 298. 1979.

大苞棱子芹 da bao leng zi qin

Hymenidium macrochaenum (K. T. Fu & Y. C. Ho) Pimenov & Kljuykov.

Plants 40–60 cm. Root stout conic. Stem ribbed and branched. Basal and lower petioles 4–6 cm, flattened, membranous-winged, sheaths broad, oblong, membranous; blades broadly triangular-ovate, tripartite; median lobes ovate, 1.5–3 × ca. 1.5 cm, larger than narrowly ovate lateral lobes, serrate. Leaves reduced upwards, with petioles becoming wholly sheathing. Umbels ca. 10 cm across; bracts 7–10, oblanceolate, 3–5 × ca. 1 cm, pilose along veins, apex 3–5-lobed; rays 10–25, 5–6 cm; bracteoles 6–8, elliptic-obovate, 1–1.5 × 0.3–0.5 cm, apex 3–5-lobed, median stripe green, margins white; pedicels numerous, ca. 8 mm. Calyx teeth obsolete. Petals broad-ovate or rounded, pinkish. Stylopodium short-conic. Immature fruit ellipsoid; ribs all broadly sinuate-winged; vittae 1 in each furrow, 2 on commissure (mature fruit not known). Fl. Jun–Jul.

• Grassy slopes in mountains; ca. 3500 m. SW Xizang.

This incompletely known taxon is recorded only from the type gatherings. It is closely allied to *P. benthamii*.

19. *Pleurospermum franchetianum* Hemsley, J. Linn. Soc., Bot. 29: 307. 1892.

松潘棱子芹 song pan leng zi qin

Pleurospermum longipetiolatum H. Wolff; *P. pilgerianum* Fedde ex H. Wolff; *P. rockii* Fedde ex H. Wolff.

Plants 40–70 cm. Root conic, branched. Stem hollow, ribbed, base 5–12 mm thick. Basal and lower leaves long-petiolate, sheaths narrow-oblong; blades ovate, 7–18 × 5–15 cm, 3-ternate-pinnate; pinnae 5–7 pairs, proximal pinnae petiolulate; ultimate segments oblong-lanceolate, 10–25 × 2–5 mm, hirtellous along nerves and margins otherwise glabrous, irregularly incised. Leaves gradually reduced upwards. Terminal umbels fertile, 8–17 cm across, peduncle 2–4 cm, overtopped by the sterile lateral umbels (when present), peduncles to 14 cm; bracts 8–12, oblong-ovate to spatulate, 1.5–3 cm, broadly white-margined to the first lobes, apex 3–5-lobed; rays 12–28, 3.5–7 cm, unequal, smooth; bracteoles 8–10, oblong-elliptic to spatulate, 10–15 mm, apex entire or shortly 3-lobed; pedicels numerous, 6–10 mm. Calyx teeth obsolete. Petals obovate, white, ca. 1 mm. Anthers dark purple. Stylopodium short-conic. Fruit oblong-ovoid, 4–6 × ca. 3 mm; dorsal ribs sinuate-winged, lateral ribs plane-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Aug, fr. Sep.

• Alpine grasslands, river banks; 2500–4300 m. Gansu, Hubei, Ningxia, Qinghai, Shaanxi, Sichuan.

This species is similar to, and sometimes treated as conspecific with, *Pleurospermum davidii* (here a synonym of *P. benthamii*). It is here distinguished by the more finely divided leaves (ultimate segments to 5 mm wide), hirtellous along the margin, the smaller fruits (less than 6 mm), and the terminal umbel overtopped by the staminate lateral umbels. It has reputed medicinal value (in Sichuan).

20. *Pleurospermum benthamii* (Wallich ex de Candolle) C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 703. 1879.

宝兴棱子芹 bao xing leng zi qin

Hymenolaena benthamii Wallich ex de Candolle, Prodr. 4: 246. 1830; *Hymenidium benthamii* (Wallich ex de Candolle) Pimenov & Kljuykov; *H. davidii* (Franchet) Pimenov & Kljuykov; *Pleurospermum davidii* Franchet.

Plants (25–)45–150 cm. Root cylindrical, ca. 2.2 cm thick, annular ringed at apex. Stem hollow, thinly ribbed, base ca. 2 cm thick, often tinged purple. Basal and lower petioles 10–18 cm, sheaths narrow-oblong; blades broadly triangular-ovate, 8–15 cm, 2–3-ternate-pinnate, glabrous; pinnae 3–4 pairs, short-petiolulate; ultimate segments narrow-ovate or lanceolate, 1–2.5 × 0.3–1 cm, base decurrent, serrate-pinnatifid. Umbels (5–)10–15 cm across; peduncle 4–12 cm; bracts 5–9, oblanceolate, 3–9 × 1–2 cm, margin white-scarious, apex pinnate; rays 10–25, 5–10 cm (in fruit), scabrous-ribbed; bracteoles 6–9, oblanceolate, 8–20 × 3–5 mm, margin white-scarious, apex 3-lobed, pedicels 15–20, 5–15 mm (to 35 mm in fruit), flattened, scabrous. Calyx teeth obsolete. Petals obovate, white, rarely pink, 2–3 mm, acute. Stylopodium conic. Fruit ovoid-ellipsoid, 6–10 × 2.5–4.5 mm; ribs all sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jun–Jul, fr. Aug–Sep.

Open scrub, alpine pastures, riversides; 2200–4300 m. W Sichuan, SE Xizang, NW Yunnan [Bhutan, N Myanmar, E Nepal, Sikkim].

This species has reputed medicinal value (in Yunnan).

21. *Pleurospermum decurrens* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 138. 1894.

异叶棱子芹 yi ye leng zi qin

Hymenidium decurrens (Franchet) Pimenov & Kljuykov.

Plants 40–100 cm high. Root dark brown, 7–10 cm across. Stem slender, 4–7 mm thick at base, ribbed. Basal and lower petioles 10–30 cm; sheaths oblong, membranous; blades broad-ovate, 5–12 cm, 2-ternate/pinnate, hirtellous along the main veins on both surfaces, otherwise glabrous; ultimate segments oblong-ovate, 1–3 × 0.8–2 cm, base cuneate-decurrent, pinnately incised distally. Stem leaves gradually reduced upwards. Umbels 6–10(–18) cm across; peduncles 5–13 cm; bracts 6–10, pale green, oblong-lanceolate, 1.2–2.2 × 0.4–1.2 cm, less than half length of rays, margin white membranous, apex acute or 3-lobed; rays 10–15(–20), 2–4.5 cm, scabrous; bracteoles 6–8, 7–15 mm, equal to flowers, linear-lanceolate, entire or occasionally 3-lobed; pedicels numerous. Calyx teeth obsolete. Petals ovate-lanceolate, white, ca. 2 mm. Anthers violet, filaments white. Stylopodium conic, cream. Fruit ovoid, 4–8 × 2.5–3.3 mm; ribs narrowly sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Aug, fr. Aug–Sep.

• Shady areas in *Pinus* and mixed forests, alpine grasslands; 3000–4000 m. NW Yunnan.

22. *Pleurospermum cristatum* H. de Boissieu, Bull. Soc. Bot. France 53: 434. 1906.

鸡冠棱子芹 *ji guan leng zi qin*

Hymenidium cristatum (H. de Boissieu) Pimenov & Kljuykov.

Plants 60–120 cm, glabrous. Root gray-brown, conic. Stem slender, hollow, simple or branched. Basal and lower leaves long-petiolate, sheaths ovate; blades broadly triangular-ovate, 15–28 × 10–14 cm, 2-ternate-pinnate; ultimate segments rhomboid-ovate, 1.5–6 × 0.8–2.8 cm, cuneate, irregular-incised or pinnate, acuminate. Leaves reduced upwards. Umbels 3–5 cm across; bracts 3–7, obovate-oblong, 1–2.5 cm, apex entire; rays 7–13, 1–2.5 cm, subequal; bracteoles 4–6, linear-lanceolate, 1–2.3 cm, almost as long as rays; pedicels 15–25, 3–5 mm. Calyx teeth obsolete. Petals ovate, white, ca. 1 mm. Stylopodium conic. Fruit ovoid, brownish, 3.5–5 × 3–4.5 mm, tuberculate; ribs all broadly cristate-keeled/narrowly winged; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Jul–Sep.

• Forest margins, grasslands near ditches; 1000–2600 m. Anhui, Gansu, Henan, Hubei, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan.

23. *Pleurospermum amabile* Craib & W. W. Smith, Trans. Bot. Soc. Edinburgh 26: 154. 1913.

美丽棱子芹 *mei li leng zi qin*

Hymenidium amabile (Craib & W. W. Smith) Pimenov & Kljuykov.

Plants 15–50 cm high. Root stout, dark brown, 1–1.5 cm across. Stem solitary, stout 1–2 cm broad, violet-green, unbranched. Basal petioles 3–6 cm, sheaths broad-ovate, 2–3 cm across; blades triangular-ovate, 6–15 cm, 3–4-ternate-pinnate; ultimate segments linear, 1–2 mm. Stem leaves gradually reduced upwards, sheaths greatly expanded, 3–5 cm broad, very pale almost white, nerves tinged purple, membranous, margins erose. Umbel 5–12 cm across, usually solitary; peduncles 2.5–4

cm; bracts 3–8, 3–5 cm, similar to upper leaves; rays 20–30, 2–4 cm, subequal; bracteoles ca. 12, oblong or oblanceolate, 6–10 × 4–8 mm, membranous, silvery white, main veins dark purple; pedicels 20–25, ca. 5 mm. Calyx teeth obsolete. Petals obcordate, white to dark purple, 1–1.5 mm. Anthers dark purple. Stylopodium depressed, purple-black; style yellow-green. Fruit ovoid-oblong, 3–5 × ca. 1.5 mm; ribs very narrowly sinuate-winged; vittae 3 in each furrow, 4–6 on commissure. Fl. Jul–Sep, fr. Sep–Oct.

Open scrub, high-altitude alpine turf, semi-stable screes; (3000–) 4000–5100 m. SE Xizang, NW Yunnan [Bhutan, Sikkim].

The plants are used in traditional medicine in Xizang.

24. *Pleurospermum bicolor* (Franchet) C. Norman ex Z. H. Pan & M. F. Watson, Acta Phytotax. Sin. 42: 564. 2004.

二色棱子芹 *er se leng zi qin*

Pleurospermum govianum (de Candolle) Benth. ex C. B. Clarke var. *bicolor* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 137. 1894, not *P. govianum* var. *bicolor* H. Wolff (1929); *Hymenidium bicolor* (Franchet) Pimenov & Kljuykov.

Plants 10–40 cm. Root long-conic, simple. Stem purple-green, often simple, ribbed. Basal and lower petioles 2–8 cm, sheaths narrowly oblong, membranous; blades oblong, 4–10 × 2–6 cm, 1-pinnate to 2-pinnatifid; pinnae 4–5 pairs, only basal pinnae shortly petiolulate; ultimate segments oblong, 1.2–2.5 cm, serrate to pinnatifid. Stem leaves gradually reduced upwards. Umbels terminal, 5–9 cm across; bracts 3–8, narrowly oblanceolate, 1.5–2.5 cm; rays 2–4, 1.5–3.5 cm, unequal; bracteoles 6–8, broadly ovate, 7–12 × 6–8 mm, median stripe broad, purple-green, margin broad white-membranous, apex 1–3-lobed, slightly exceeding flowers; pedicels ca. 2 mm. Calyx teeth narrowly triangular, ca. 1 mm. Petals white, purple-red distally, apex rounded. Anthers dark purple. Stylopodium dark purple. Fruit narrowly obovoid, 2.5–3 × 1.8–2 mm; ribs sinuate-winged; vittae 2 in each furrow, 4 on commissure. Fl. Aug–Sep, fr. Sep–Oct.

• Open mixed woodlands, dwarf *Rhododendron* scrub, alpine pastures; 3500–4300 m. SW Sichuan, SE Xizang, NW Yunnan.

This species is similar to, and sometimes confused with, the Himalayan unspecific genus *Pleurospermopsis*.

25. *Pleurospermum yunnanense* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 137. 1894.

云南棱子芹 *yun nan leng zi qin*

Hymenidium yunnanense (Franchet) Pimenov & Kljuykov; *Pleurospermum pseudoyunnanense* H. Wolff.

Plants 30–60(–100) cm. Taproot stout, dark brown. Stem hollow, distally ribbed and branched. Basal and lower petioles up to 20 cm; sheaths broad oblong, extended to first pinnae in mid and upper leaves, puberulous along veins; blades broadly triangular-ovate, 10–20 cm, 2–3-ternate/pinnate, glabrous; ultimate segments ovate or oblong, 1–2.8 × 0.5–2 cm, acutely serrate to lacerate. Umbels 7–10(–15) cm across; peduncles 7–12 cm; bracts 6–8, oblong to broadly lanceolate, 2–4 × 1–2 cm, divided at apex; rays 12–25, 3–5 cm, brown-hirtellous along

ribs; bracteoles 6–10, oblong-obovate, 10–15 mm, membranous except midribs, cuneate, 3–5-lobed to pinnatifid at apex; pedicels numerous, 6–8 mm in fruit. Calyx teeth conspicuous, lanceolate-triangular, ca. 0.5 mm. Petals obovate, greenish-white, occasionally flushed pink. Anthers dark purple-black. Fruit broad-ovoid, 3–4 × 2.5–3.2 mm; ribs narrowly winged; vittae 2 in each furrow, 4 on commissure. Fl. Jun–Sep, fr. Aug–Oct.

Woodland margins, dwarf *Rhododendron* scrub, valley sides, rocky slopes; 3600–4100 m. W Sichuan, NW Yunnan [NE Myanmar].

26. *Pleurospermum pilosum* C. B. Clarke ex H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 117. 1929.

疏毛棱子芹 *shu mao leng zi qin*

Hymenidium pilosum (C. B. Clarke ex H. Wolff) Pimenov & Kljuykov.

Plants 20–40 cm, white-setose throughout. Root stout and branched. Stem ribbed, lower parts purple-red. Stem leaves petiolate, petioles ca. 10 cm; sheaths broadly ovate, 2.5–4 cm, purple-red adaxially, densely white-setose abaxially; blades triangular-oblong, 10–15 × 5–7 cm, 3-pinnate; pinnae 5–7 pairs, only basal pinnae short-petiolate; ultimate segments obovate or oblanceolate, 3–5 × 2–3 mm, setose along nerves abaxially, entire or 2–3 toothed, cuspidate at apex. Umbels 3–15(–20) cm across (in fruit); bracts 1–3, 1–3 cm, white-setose abaxially, apex acute or pinnate; rays 6–17, 8–10 cm; bracteoles 8–10, broadly cuneate-obovate, 6–15 mm, mottled purple-green, pubescent along nerves, abruptly acuminate to a short point; umbellules many-flowered. Calyx teeth obsolete. Petals obcordate, white, often purplish on reverse, ca. 2 × 1.2 mm. Fruit oblong, 3–6 × 1.5–2 mm; ribs narrowly winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Oct, fr. Sep–Nov.

Damp meadows, streamsides; ca. 4100 m. S Xizang (Yadong) [Bhutan, Sikkim].

This species has reputed medicinal use.

27. *Pleurospermum album* C. B. Clarke ex H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 113. 1929.

白苞棱子芹 *bai bao leng zi qin*

Hymenidium album (C. B. Clarke ex H. Wolff) Pimenov & Kljuykov.

Plants 16–40(–70) cm, essentially glabrous. Stem solitary, 5–8 mm across at base, little branched. Lower petioles flattened; sheaths ovate, white-margined; blades broadly rhomboid, 3–4-ternate/pinnate; pinnae 6–8 pairs remote, proximal pinnae long-petiolate; leaflets broadly ovate, 8–10 mm, pinnatifid; ultimate segments 2–3-toothed. Stem leaves reduced upwards, sheaths greatly inflated, broadly white-margined. Umbels 3.5–13 cm across; bracts 5–6, broadly obovate, 2–3.5 × 0.8–1.5 cm, scabrous along nerves, apex slightly pinnate; rays 8–10, unequal, ca. 1.5 cm in flower, extending to 7 cm in fruit; bracteoles numerous, broadly cuneate, ca. 10 × 6 mm, unequal, exceeding umbellules, margin broad silver-white, apex acuminate or trifid, margin irregularly serrulate; umbellules 12–20 mm across. Calyx teeth linear-lanceolate, 0.5–0.75 mm. Petals white, yellowish or greenish, oblanceolate to obovate, unequal. Anthers

dark purple-black. Style dark violet. Mature fruit not known. Fl. and fr. Jul–Sep.

Open wet grasslands, streamsides; 3900–4900 m. S Xizang (Yadong) [Bhutan, Nepal, Sikkim].

28. *Pleurospermum simplex* (Ruprecht) Benth. & J. D. Hooker ex Drude in Engler & Prantl, Nat. Pflanzenfam. 3(8): 172. 1898.

单茎棱子芹 *dan jing leng zi qin*

Aulacospermum simplex Ruprecht in Osten-Sacken & Ruprecht, Sert. Tianschan. 49. 1869; *Albertia commutata* Regel & Schmalhaus. *Trachydium commutatum* (Regel & Schmalhaus.) M. Hiroe.

Plants 20–40 cm, glabrous. Stem solitary, ribbed, branched. Basal and lower petioles 8–15 cm, flattened, sheaths narrow-oblong, 3–5 cm broad; blades ovate or oblong-ovate, 4–7 × 1.5–3.5 cm, 2–3-ternate-pinnate; pinnae 4–6 pairs, sessile; ultimate segments linear-lanceolate, 4–18 × 1–4 mm, acute. Leaves gradually reduced upwards. Umbels 5–7 cm across; bracts 4–7, lanceolate, 1–1.5 cm; rays 5–11, 1–5 cm, very unequal; bracteoles 5, 5–8 mm, lanceolate, pale green, apex entire acute, pedicels 7–16, 2–5 mm. Calyx teeth conspicuous, broad-triangular. Petals broad-ovate, purplish, margin white. Anthers yellow-green. Stylopodium green, short-conic. Fruit broad-ovoid or subglobose, 3–4 × 2.5–3.5 mm; ribs all broadly sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul, fr. Aug.

Grasslands in mountains; ca. 2500 m. NW Xinjiang [Turkmenistan].

29. *Pleurospermum rupestre* (Popov) K. T. Fu & Y. C. Ho in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(1): 163. 1979.

岩生棱子芹 *yan sheng leng zi qin*

Aulacospermum rupestre Popov, Byull. Moskovsk. Obšč. Isp. Prir., Otd. Biol. 44: 129. 1935.

Plants 20–50 cm, glabrous. Root conic. Stem simple or little-branched. Basal and lower petioles 8–18 cm, flattened, sheaths narrow-oblong; blades ovate, 3–5 × 1.5–3 cm, 2–3-pinnate; pinnae 3–5 pairs, sessile; ultimate segments linear-lanceolate, 2–5 × 1–2.5 mm, acute. Leaves reduced upwards. Umbels 5–10 cm across; bracts 4–7, linear-lanceolate, 1–2 cm; rays 4–7, 2–5 cm, unequal; bracteoles 4–6, lanceolate, 5–10 mm, pale green, apex entire, acute; pedicels 10–20, 3–5 mm. Calyx teeth small, triangular. Petals ovate-obovate, white, ca. 1 mm. Stylopodium yellow-brown, short-conic. Fruit broad-ovoid, 3–5 × mm; ribs all broadly sinuate-winged; vittae 3 in each furrow, 6 on commissure. Fl. Jul, fr. Aug.

Rocky mountain slopes; 2500–3500 m. NW Xinjiang [Turkmenistan].

This rather poorly known taxon is possibly conspecific with *Pleurospermum simplex*.

30. *Pleurospermum szechenyii* Kanitz in Szechenyi, Wiss. Erg. Reise Griechenl. 2: 701. 1898.

青海棱子芹 *qing hai leng zi qin*

Hymenidium szechenyii (Kanitz) Pimenov & Kljuykov;
Pleurospermum dielsianum Fedde ex H. Wolff, p.p.

Plants 15–40 cm. Root dark brown, conic. Stem stout, simple or branched, base with papery remnant sheaths. Basal and lower leaves long-petiolate, petioles flattened, sheaths narrow-oblong; blades ovate or ovate-lanceolate, 5–8 × 2–4 cm, 2–3-ternate-pinnate; pinnae 6–9 pairs, sessile; ultimate segments lanceolate, 2–3 × ca. 1 mm, acute. Leaves gradually reduced upwards. Umbels 10–15 cm across; bracts 7–11, oblanceolate, 3–4 cm, apex 1–2-pinnate, base narrowly scarious margined; rays 15–25, 5–8 cm, unequal; bracteoles 9–13, obovate or oblanceolate, 6–8 mm, apex pinnate; pedicels 6–8 mm, flattened, membranous-winged. Calyx teeth small, triangular. Petals obovate, reddish, ca. 2.5 mm. Anthers dark purple. Stylopodium short-conic. Fruit oblong-ovoid, 5–6 × 3–4 mm; ribs all sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul, fr. Aug.

• High-altitude grasslands; 3700–4200 m. N Gansu, E Qinghai, E Xizang.

31. *Pleurospermum wilsonii* H. de Boissieu, Bull. Soc. Bot. France 53: 433. 1906.

粗茎棱子芹 *cu jing leng zi qin*

Hymenidium wilsonii (H. de Boissieu) Pimenov & Kljuykov; *Physospermopsis lalabhduriana* Farille & S. B. Malla; *Pleurospermum cnidifolium* H. Wolff; *P. crassicaule* H. Wolff; *P. lecomteanum* H. Wolff; *P. tanacetifolium* H. Wolff; *P. thalictrifolium* H. Wolff

Plants 10–40 cm. Root brown, long-conic. Stem purplish-tinged, ribbed, fibrous remnant sheaths at base. Basal and lower petioles 3–5 cm, flattened, winged, sheaths narrow-oblong; blades oblong-lanceolate, 3–15 cm, 2–3-ternate-pinnate; pinnae 5–9 pairs, basal pinnae petiolulate; ultimate segments narrow-ovate or lanceolate, 3–5 × 1.5–2 mm, entire or 2–3-lobed. Leaves reduced upwards, petioles becoming wholly sheathing. Umbels 4–6 cm across; peduncle 3–4 cm; bracts 5–8, leaf-like, 1.5–4 cm, apex 2-pinnate, margin broadly white-membranous; rays 7–15, 2–5 cm, subequal; bracteoles 5–8, broad-ovate, 7–11 mm, similar to bracts; pedicels numerous, 2–4 mm. Calyx teeth small, triangular-ovate, ca. 0.3 mm. Petals white, yellowish-green or purplish, ca. 1.5 mm. Anthers purple-red. Fruit oblong-ovoid, ca. 3 × 2 mm, dark purple; ribs all broadly crisped-winged; vittae 1–2 in each furrow, 2 on commissure. Fl. and fr. Aug–Oct.

High-altitude open grasslands; 3000–4500 m. S Gansu, SE Qinghai, W Sichuan, E Xizang, NW Yunnan [Nepal].

32. *Pleurospermum hookeri* C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 705. 1879.

喜马拉雅棱子芹 *xi ma la ya leng zi qin*

Plants 10–40 cm, glabrous. Root dark brown, 4–6 mm across. Stem ribbed. Basal and lower petioles 3–8 cm, sheaths narrowly oblong, membranous margined; blades triangular-ovate, 5–13 cm, 3–4-ternate-pinnate; pinnae 7–9 pairs, ovate-lanceolate, 3–5 × 1.5–2.5 cm; ultimate segments linear, ca. 2 mm. Leaves gradually reduced upwards, petioles becoming wholly sheathing. Umbels 5–7 cm across; peduncles 6–12 cm;

bracts 5–7, obovate-lanceolate or linear-lanceolate, 1.5–2.5 cm, margin membranous, white or tinged brown, apex long-caudate or occasionally pinnatifid; rays 6–12, 2–4 cm, subequal, ribbed; bracteoles 6–10, ca. 5 mm, similar to bracts, pedicels numerous, ca. 5 mm, flattened. Calyx teeth narrowly triangular, ca. 1 mm. Petals rounded, 1–1.2 mm, white. Anthers dark purple. Fruit ovoid, 3–4 mm; ribs narrowly winged; vittae 3 in each furrow, 6 on commissure. Fl. and fr. Aug–Oct.

Open pastures by streams, grassy slopes; 2700–5400 m. Gansu, Qinghai, Sichuan, SE Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

This highly variable and complex taxon is wide-ranging in distribution and leaf form across the Himalayan region and SW China. Two varieties are currently recorded from China, but further revision of the taxon, together with *P. giraldii* and *P. tsekuense*, is needed.

- 1a. Bracteoles obovate-lanceolate, margin broad, white, apex long-caudate 32a. var. *hookeri*
- 1b. Bracteoles linear-lanceolate, margin narrow, tinged brown, apex pinnatifid 32b. var. *thomsonii*

32a. *Pleurospermum hookeri* var. *hookeri*

喜马拉雅棱子芹(原变种) *xi ma la ya leng zi qin* (yuan bian zhong)

Aulacospermum hookeri (C. B. Clarke) Farille & S. B. Malla; *Hymenidium hookeri* (C. B. Clarke) Pimenov & Kljuykov; *Pleurospermum wolffianum* Fedde ex H. Wolff.

Bracteoles obovate-lanceolate, margin broad, white, apex long-caudate.

Open pastures by streams; 4100–5400 m. SE Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

32b. *Pleurospermum hookeri* var. *thomsonii* C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 705. 1879.

西藏棱子芹 *xi zang leng zi qin*

Hymenidium chloroleucum (Diels) Pimenov & Kljuykov; *Pleurospermum affine* H. Wolff; *P. likiangense* H. Wolff (1930), not H. Wolff (1929); *P. markgrafianum* H. Wolff; *P. pseudo involucratum* H. Wolff; *P. tibeticum* H. Wolff; *Trachydium chloroleucum* Diels.

Bracteoles linear-lanceolate, margin narrow, tinged brown, apex usually pinnatifid.

• Grassy slopes; 2700–4500 m. Gansu, Qinghai, Sichuan, SE Xizang, NW Yunnan.

This variety has reputed medicinal value (in Xizang). Some authors consider *Hymenidium* (*Trachydium*) *chloroleucum* (including *Pleurospermum likiangense*) to be a separate taxon, differentiated by the less dissected leaflets and bracteoles with a pinnate apex. Further work is needed on this complex group.

33. *Pleurospermum tsekuense* R. H. Shan, Fl. Reipubl. Popularis Sin. 55(1): 298. 1979.

泽库棱子芹 *ze ku leng zi qin*

Hymenidium tsekuense (R. H. Shan) Pimenov & Kljuykov.

Plants 30–50 cm, glabrous. Root stout, ribbed and branch-

ing. Basal and lower petioles 5–8 cm, sheaths ovate; blades broadly triangular, 6–10 × ca. 8 cm, 3–4-ternate-pinnate; petiolules of proximal pinnae 1.5–2 cm; ultimate segments linear-lanceolate, 3–5 × ca. 1 mm. Leaves gradually reduced upwards with short or wholly sheathing petioles. Umbels 4–6 cm across; bracts 3–5, lanceolate, 1.5–2.5 cm, apex pinnate; rays 7–10, 2.5–4 cm, subequal; bracteoles 8–10, narrow-lanceolate, 0.6–1 cm, apex pinnate/pinnatifid; pedicels ca. 5 mm, flattened. Calyx teeth conspicuous, ovate, dark purple, ca. 0.3 mm. Petals broad-ovate or rounded, purplish to white, ca. 1 mm. Anthers black-purple. Stylopodium black-purple, low-conic. Immature fruit ovoid, narrow-winged (mature fruit unknown). Fl. Aug.

- Grassy slopes; 3400–3500 m. Qinghai.

This incompletely known taxon is recorded only from a few collections and is part of the *Pleurospermum hookeri* complex.

34. *Pleurospermum giraldii* Diels, Bot. Jahrb. Syst. 29: 492. 1900.

太白棱子芹 tai bai leng zi qin

Hymenidium giraldii (Diels) Pimenov & Kljuykov; *Pleurospermum limprichtii* H. Wolff; *P. meoides* Diels.

Plants 20–35 cm, glabrous. Root dark brown, 0.5–1 cm across, branched. Stem tinged purple, ribbed, simple or little branched. Basal and lower leaves long-petiolate, sheaths membranous; blades triangular-ovate, 5–8 cm, 3–4-ternate-pinnate; ultimate segments linear, 1.5–3 × 0.3–0.5 mm. Leaves gradually reduced upwards, petioles becoming almost wholly sheathing. Umbel often 1, rarely 2–3, 3.5–4.5 cm across; bracts 5–7, ovate-elliptic or obovate, 15–20 × 5–8 mm, white or tinged purple, membranous; rays 9–15, 1.5–2.5 cm; bracteoles 5–7, obovate, longer than flowers, margin white membranous to first lobes, apex pinnatisect; pedicels 18–30, 2.5–3.5 mm. Calyx teeth minute, triangular. Petals obcordate, white, ca. 1 mm. Stamens longer than petals, anthers purple-black. Fruit oblong, 3.5–4 mm; ribs winged; vittae 3 in each furrow, 6 on commissure. Fl. Jul–Aug, fr. Sep–Oct.

- Grassy mountain slopes; 3000–3600 m. Gansu, Hubei, Shaanxi, Sichuan.

This taxonomic boundaries between this species and *Pleurospermum hookeri* var. *thomsonii* are unclear as the character of obsolete calyx teeth is not reliable and the degree of dissection of the bracteoles is somewhat variable. All parts of the plant are used medicinally to cure stomach ache (in Shaanxi).

35. *Pleurospermum apiolens* C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 705. 1879.

紫色棱子芹 zi se leng zi qin

Hymenidium apiolens (C. B. Clarke) Pimenov & Kljuykov; *Pleurospermum apiolens* var. *nipaulense* Farille & S. B. Malla; *P. atropurpureum* K. T. Fu & Y. C. Ho.

Plants 30–40 cm. Stem ribbed, branched, lower parts dark purple-red. Basal and lower petioles 10–12 cm, sheaths narrow-oblong; blades oblong-ovate, 10–15 cm, 2-ternate-pinnate; pinnae 5–6 pairs, petiolulate; ultimate segments ovate to obovate, 1–2 × 0.5–1 cm, cuneate, incised-dentate. Leaves gradually reduced upwards. Umbels ca. 7 cm across; bracts 3–6,

oblong-ovate, 1–2 × ca. 0.5 cm, margin purple-red, serrate, apex cuspidate; rays 5–7, ca. 3 cm, subequal, scabrous-ribbed; bracteoles 6–10, ovate to broad-ovate, ca. 10 × 4–6 mm, longer than flowers, similar to bracts; pedicels numerous, ca. 4 mm. Calyx teeth obsolete. Petals broad-ovate, white. Stylopodium short-conic. Fruit oblong, 3.5–5 × 2–3 mm; ribs all broadly sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Jul–Sep.

High-altitude grassy slopes; 3800–4700 m. SW Xizang [Bhutan, Nepal, Sikkim].

36. *Pleurospermum handelii* H. Wolff in Handel-Mazzetti, Symb. Sin. 7: 710. 1933.

高山棱子芹 gao shan leng zi qin

Physospermopsis handelii (H. Wolff) Pimenov & Kljuykov.

Plants 30–45 cm, slender, glabrous. Taproot stout. Stem branched, branches often opposite or cyclic. Basal petioles ca. 15 cm; sheaths narrow, 1–2 cm; blades triangular-lanceolate, 6–8 × ca. 2.5 cm, 3-pinnate; pinnae 5–6 pairs, broadly triangular, petiolules ca. 3 mm; ultimate segments shortly petiolulate or sessile, pinnatifid, colored-mucronate. Stem leaves gradually reduced upwards. Terminal umbel, peduncle 10–15 cm, often exceeding by the lateral umbels; bracts 5–10, obovate-lanceolate, 2–4.5 cm, leaf-like; rays slender, 6–12 cm, unequal; bracteoles rhomboid, about equaling the flowers, apex pinnate; pedicels 15–30, up to 10 mm, unequal. Calyx teeth minute. Petals white, rounded, ca. 1 mm. Anthers dark purple. Young fruit broad-ovoid, sparsely tuberculate; ribs narrowly sinuate-winged (mature fruit not known). Fl. Aug, fr. Sep.

Alpine meadows; 2900–4100 m. NW Yunnan [NE Myanmar].

This incompletely known and problematic species is recorded only from a few collections (none bearing mature fruit). It is possibly better placed in *Physospermopsis* on account of the fibrous stem base, long slender rays, and green young fruit, but is here retained in *Pleurospermum* pending further research.

37. *Pleurospermum linearilobum* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 342. 1915.

线裂棱子芹 xian lie leng zi qin

Hymenidium linearilobum (W. W. Smith) Pimenov & Kljuykov.

Plants 30–60 cm. Root dark brown, conic, ca. 2.5 cm thick. Stem thinly ribbed, glabrous. Basal and lower petioles 8–12 cm, sheaths small, narrow; blades oblong-ovate, 6–13 × 4–8 cm, 3–4-pinnate; ultimate segments linear, 3–6 × 0.5–1 mm, acute. Leaves reduced upwards, petiole becoming entirely sheathing. Umbels 10–18 cm across; peduncle 8–15 cm; bracts 7–10, 3–4 cm, like upper leaves; rays 20–25, 5–9 cm, unequal, hispidulous; bracteoles 6–8, lanceolate to oblanceolate, 5–10 mm, green with narrow white margin, apex entire or pinnate; pedicels 10–20, 8–10 mm, hispidulous. Calyx teeth obsolete. Petals obovate, white. Anthers dark purple. Stylopodium short-conic. Fruit ovoid, 4–5 × 3.5–4.5 mm; ribs all broadly sinuate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jun–Jul, fr. Jul–Aug.

• Mixed woodland margins, open low scrub, rocky slopes, screes; 2400–3000 m. W Sichuan, NW Yunnan.

38. *Pleurospermum calcareum* H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 114. 1929.

疣叶棱子芹 you ye leng zi qin

Plants 20–30 cm. Taproot brown, conic. Stem stout, purplish-tinged, glabrous or tuberculate at nodes. Lower petioles 4–9 cm, flattened, tuberculate; sheaths oblong; blades triangular-ovate, 6–9 cm, 3–4-ternate/pinnate, rachis tuberculate; pinnae 5–6-paired, shortly petiolulate; ultimate segments ovate, 3–5 × 2.5–4 mm, 3–5-lobed, tuberculate along nerves abaxially. Stem leaves reduced upwards; peduncles ca. 4 cm; bracts 5–6, leaf-like, 4–6 cm, 1–2 pinnate at apex; rays 10–15, 4–7 cm, unequal, slightly scabrous; bracteoles ca. 10, broadly lanceolate,

ca. 1 cm, entire or apex pinnate, green with narrow white margin; pedicels numerous, 5–6 mm. Calyx teeth obsolete. Petals pinkish-white, oblong-obovate. Ovary tuberculate along ribs; stylopodium conic. Fruit unknown. Fl. Jun–Jul.

• Alpine grasslands; 3200–4200 m. NW Yunnan (Lijiang).

This incompletely known taxon is recorded only from the type gathering. It is possibly conspecific with *Pleurospermum linearilobum*.

39. *Pleurospermum wrightianum* H. de Boissieu, Bull. Herb. Boissier, sér. 2, 3: 847. 1903.

瘤果棱子芹 liu guo leng zi qin

Hymenidium wrightianum (H. de Boissieu) Pimenov & Kljuykov; *Pleurospermum prattii* H. Wolff.

Plants (15–)30–60 cm, tuberculate. Root brown, 1–2 cm thick. Stem tinged purple-red, ribbed and branched. Basal and proximal petioles 5–8 cm, flattened, winged, sheaths narrow, oblong; blades narrowly oblong-ovate, 4–9 × 2.5–5 cm, 2–3-ternate-pinnate; pinnae 5–7 pairs, proximal pinnae petiolulate; ultimate segments linear-lanceolate, 3–5 × 0.5–1 mm, acute. Umbels 15–20 cm across; peduncle 2–3 cm; bracts 7–9, linear-lanceolate, 2–3 cm, apex pinnatifid, deciduous; rays 10–20, 3–10 cm (10–13 cm in fruit), very unequal; bracteoles ca. 10, oblanceolate, 7–15 × 3–7 mm, apex pinnate; pedicels 10–15, 5–12 mm. Calyx teeth minute, triangular. Petals obovate, white or purplish-reddish. Stylopodium short-conic. Fruit narrowly elliptic-ovoid, 5–6 × 2.5–3.2 mm, usually tuberculate; ribs all broadly cristate-winged; vittae 1 in each furrow, 2 on commissure. Fl. Jul–Aug, fr. Sep–Oct.

• Alpine grasslands; 3600–4600 m. SE Qinghai, SW Sichuan, SE Xizang, NW Yunnan.

The following species have been described from Chinese material, but are imperfectly known as no specimens have been seen or the specimens are inadequate.

Hymenidium pachycaule Pimenov & Kljuykov (Edinburgh J. Bot. 53: 275. 1996), described from NW Gansu (“Lienhuo Shan,” *J. F. C. Rock 12703*, holotype, E; isotype, NAS). It is possibly referable to *Pleurospermum*, but further research is required.

Pleurospermum albimarginatum H. Wolff (Repert. Spec. Nov. Regni Veg. 21: 243. 1925), described from W Sichuan (“Tongolo,” *J. A. Soulié 2618*, holotype, P).

Pleurospermum grandifolium H. Wolff (Repert. Spec. Nov. Regni Veg. 21: 244. 1925), described from W Sichuan (“Tatsienlu” [Kangding], *J. A. Soulié 2182*, holotype, P). It has possible affinities with *P. benthamii*.

Pleurospermum microphyllum H. Wolff (Repert. Spec. Nov. Regni Veg. 21: 242. 1925), described from W Sichuan (“Tongolo,” *J. A. Soulié 2605*, holotype, P).

Pleurospermum microsciadium H. Wolff (Repert. Spec. Nov. Regni Veg. 21: 241. 1925), described from W Sichuan (“Tongolo,” *J. A. Soulié 2614*, holotype, P).

Pleurospermum souliei H. Wolff (Repert. Spec. Nov. Regni Veg. 19: 309. 1924), described from W Sichuan (Kangding, *J. A. Soulié 2196*, holotype, P).

