

45. SINOCARUM H. Wolff ex R. H. Shan & F. T. Pu, Acta Phytotax. Sin. 18: 374. 1980.

小芹属 xiao qin shu

Pu Fading (溥发鼎 Pu Fa-ting); Mark F. Watson, Ingrid Holmes-Smith

Carum Linnaeus sect. Dactylaea Franchet; Dactylaea (Franchet) Farille.

Herbs, perennial, slender, glabrous (except S. filicinum). Rootstock fusiform or elongate, usually slender. Stems erect, solitary or 2–4, caespitose. Basal leaves petiolate; petiole sheath usually broad, ovate or oblong-ovate at base; blade ternate-1–3-pinnate or 1–3-pinnate. Leaves reduced upwards. Inflorescence branching, umbels compound, terminal; bracts mostly absent, occasionally 1–4, linear or similar to uppermost leaf; rays few, usually 5–15; bracteoles present (rarely absent), usually linear, entire, apex rarely lobed; umbellules usually many-flowered. Calyx teeth obsolete, or conspicuous, triangular or subulate-lanceolate. Petals white or purple, ovate, oblong-ovate or obovate, base clawed, apex acute or slightly obtuse, rarely 2–3-lobed or palmately 3–5-lobed. Stylopodium flat, rarely low-conic; styles short. Fruit oblong-ovoid, slightly laterally compressed, smooth; ribs 5, filiform; vittae 1–3 in each furrow, 2–6 on commissure. Seed face plane. Carpophore 2-fid or 2-parted.

About 20 species: high-altitude Sino-Himalayan region from Nepal to SW China; eight species (four endemic) in China.

This taxonomically complex genus is closely related to, and sometimes difficult to distinguish from, Acronema. Sinocarum is usually circumscribed by a suite of characters: rhizome elongate, petiole sheaths expanded, petals obtuse at apex, clawed at base, flowers radiant, and fruit oblong-ovoid. By contrast, Acronema is characterized by having tuber globose or oblong, petiole sheaths narrow, petals acute to filiform at apex, cuneate at base, flowers symmetric, and fruit usually ovoid or broadly so, slightly cordate at base. However, within each genus there are species that deviate in one or more of these characters, and the generic boundaries are blurred. Revision of these two genera is hampered by a lack of complete material: specimens are usually collected in flower, and mature fruits are unknown for an alarmingly high proportion of the taxa. Initial results from molecular sequence data on Himalayan species suggest that these two genera should be combined, but further work and more collections are needed to clarify the situation across the whole geographic range.

Sinocarum pseudocruciatum H. Wolff (Repert. Spec. Nov. Regni Veg. 27: 182. 1929) was described from Sichuan (“Washan,” A. Henry 7067, holotype, K). However, it is not treated in this account as it is imperfectly known.

Pimenov and Kljuykov (pers. comm.) consider the following imperfectly known taxa to be conspecific and a species of Sinocarum: Trachydium souliei H. de Boissieu (Bull. Soc. Bot. France 53: 422. 1906), described from Xizang (J. A. Soulié 1049, holotype, P), and T. dielsianum H. Wolff (Acta Horti Gothob. 2: 300. 1926), described from Sichuan (SE of “Matang,” 4800 m, K. A. H. Smith 4375, holotype, unlocalized).

- 1a. Bracteole apex usually 2–3-lobed or pinnatifid, rarely entire; calyx teeth conspicuous, ca. 0.5 mm, triangular-lanceolate ..... 8. *S. dolichopodum*
- 1b. Bracteole apex entire; calyx teeth minute or obsolete.
  - 2a. Petal apex 2–3-lobed or palmately 4–5-lobed (or entire in *S. coloratum*).
    - 3a. Stem purple, at least at base; calyx teeth subulate; petal apex usually entire, occasionally 2–3-lobed ..... 6. *S. coloratum*
    - 3b. Stem green; calyx teeth obsolete; petal apex palmately 4–5-lobed ..... 7. *S. schizopetalum*
  - 2b. Petals always entire.
    - 4a. Calyx teeth obsolete; bracteoles absent.
      - 5a. Plants 3–5 cm; basal leaves trifoliolate; rays 2–3 ..... 4. *S. pauciradiatum*
      - 5b. Plants 40–70 cm; basal leaves 3-pinnate; rays 10–20 ..... 5. *S. pityophilum*
    - 4b. Calyx teeth minute, subulate; bracteoles present or absent.
      - 6a. Basal leaves 2-pinnate, petioles pubescent, ultimate segments oblong-ovate, abaxially pubescent; bracteoles 5–8 ..... 3. *S. filicinum*
      - 6b. Basal leaves ternate-1–3-pinnate, petioles glabrous, ultimate segments linear-lanceolate or elongate-linear, glabrous; bracteoles absent.
        - 7a. Basal leaves ternate-1–2-pinnate, ultimate segments linear-lanceolate or elongate-linear, 3–15 × 1–2 mm; rays 4–7(–10); petals violet or greenish-white ..... 1. *S. cruciatum*
        - 7b. Basal leaves ternate-2–3-pinnate, ultimate segments elongate-linear, 10–30 × 0.5–2 mm; rays 8–15; petals white ..... 2. *S. vaginatum*

1. *Sinocarum cruciatum* (Franchet) H. Wolff ex R. H. Shan & F. T. Pu in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(2): 33. 1985.

钝瓣小芹 dun ban xiao qin

Plants 10–30 cm, slender, glaucous throughout. Rootstock

short, thick, ca. 2 × 0.5 mm. Stems 1–3 or numerous, 1–2-branched or unbranched. Basal leaves petiolate, petioles 5–7 cm; blade triangular in outline, 4–10 × 4–8 cm, ternate-1–2-pinnate; pinnae 3–5 pairs; ultimate segments linear-lanceolate, 3–15 × 1–2 mm. Cauline leaves elongate-linear, 5–35 × 0.5–1 mm, reduced upwards becoming 1-pinnate or 3-lobed. Umbels

1.5–2 cm across; bracts and bracteoles absent, occasionally 1; rays 4–7(–10), 1–3 cm, subequal; umbellules ca. 5 mm across, 10–15-flowered; pedicels ca. 2 mm. Calyx teeth minute, triangular, ca. 0.1 mm. Petals violet or greenish-white, entire, apex

obtuse to subacute. Young fruit oblong-ovoid (mature fruit unknown); vittae 1 in each furrow, 2 on commissure. Fl. and fr. Jul–Oct.

Forests, open alpine scrub, riparian grasslands; 2800–4200 m. W Sichuan, SE Xizang, NW Yunnan [N Myanmar].

This species and *Sinocarum vaginatum* form a group of narrow-leaved taxa with unclear taxonomic limits: flower color and leaflet dimensions are particularly variable. Further work with new collections will be needed to clarify the situation.

- 1a. Ultimate segments of basal leaves linear-lanceolate, 3–5 × ca. 1 mm; petal apex obtuse-rounded, not inflexed ..... 1a. var. *cruciatum*
- 1b. Ultimate segments of basal leaves linear, 5–15 × 1–2 mm; petal apex slightly incurved ..... 1b. var. *linearilobum*

**1a. *Sinocarum cruciatum* var. *cruciatum***

钝瓣小芹(原变种) *dun ban xiao qin* (*yuan bian zhong*)

*Carum cruciatum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 124. 1894; *Ligusticum cruciatum* (Franchet) M. Hiroe.

Basal leaves 2–3-pinnate; ultimate segments linear lanceolate, 3–5 × ca. 1 mm. Petals violet, apex obtuse-rounded, not inflexed.

• Forests, open alpine scrub, riparian grasslands; 2800–4200 m. W Sichuan, SE Xizang, NW Yunnan.

**1b. *Sinocarum cruciatum* var. *linearilobum*** (Franchet) R. H. Shan & F. T. Pu in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(2): 35. 1985.

尖瓣小芹 *jian ban xiao qin*

*Carum cruciatum* var. *linearilobum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 124. 1894; *Carum forrestii* M. Hiroe; *Sinocarum caespitosum* H. Wolff.

Stems numerous. Basal leaves 1–2-pinnate; ultimate segments elongate-linear, 5–15 × 1–2 mm. Petals greenish-white, apex obtuse, slightly incurved.

Open alpine scrub; 3500–4200 m. W Sichuan, SE Xizang, NW Yunnan [N Myanmar].

**2. *Sinocarum vaginatum*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 183. 1929.

阔鞘小芹 *kuo qiao xiao qin*

*Carum vaginatum* (H. Wolff) M. Hiroe.

Plants 10–25 cm. Rootstock short, thick, ca. 4.5 × 0.8 cm. Stems 1–2, 1–2-branched or unbranched. Basal petioles 5–18 cm, sheath ovate; blade triangular, 5–13 × 5–8 cm, ternate-2–3-pinnate; pinnae 4–6 pairs; ultimate segments elongate-linear, 10–30 × 0.5–2 mm. Cauline leaves 1–2-pinnate, reduced upwards. Umbels 3–4 cm across, often subtended by uppermost leaf with broad sheath; bracts absent or occasionally 1; rays 8–15, 1–2 cm, unequal; bracteoles absent; umbellules 8–12 mm, 10–20-flowered; pedicels 1–5 mm. Calyx teeth minute triangular, ca. 0.2 mm. Petals white, entire, apex acute, radiant. Young fruit oblong-ovoid (mature fruit unknown); vittae 1 in each

furrow, 2 on commissure. Fl. and fr. Jul–Sep.

- Forest margins, brushy alpine meadows; 3200–4300 m. W Sichuan, SE Xizang, NW Yunnan.

See the taxonomic comment under *Sinocarum cruciatum*.

**3. *Sinocarum filicinum*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 182. 1929.

蕨叶小芹 jue ye xiao qin

*Carum chinense* M. Hiroe.

Plants 15–30 cm. Rootstock 2.5–5 × 0.5–1.8 mm, stout, often branched. Stems 1–3, 1–3-branched or unbranched. Basal petioles 8–15 cm, sparsely pubescent, sheaths broadly ovate; blade triangular in outline, 2–9 × 3–10 cm, 2-pinnate; pinnae 3–7 pairs, basal pinnae petiolulate; ultimate segments oblong-ovate, 5–10 × 3–5 mm, margins serrate, abaxially sparsely pubescent along veins. Upper leaves 1-pinnate. Umbels 1.5–5 cm across; bracts 1–4, linear-lanceolate, 2–4 mm, or absent; rays 2–8, 1–3 cm, subequal; bracteoles 5–8, 1–2 mm, similar to bracts; umbellules 2–12 mm across, 10–15(–20)-flowered; pedicels 2–4 mm, unequal. Calyx teeth subulate, ca. 0.2 mm. Petals white, apex subacute. Young fruit oblong, ca. 1 × 0.6 mm (mature fruit unknown). Fl. Jul–Aug.

- Alpine meadows, among rocks; 2500–4500 m. SW Sichuan (Mianning), SE Xizang (Mainling, Zayü), NW Yunnan (Binchuan, Dali).

**4. *Sinocarum pauciradiatum*** R. H. Shan & F. T. Pu, Acta Phytotax. Sin. 18: 374. 1980.

少辐小芹 shao fu xiao qin

Plants 3–5 cm. Rootstock slender, 2–10 × 0.2–0.3 mm, often swollen at nodes. Stems 1–2, sometimes tinged purple, unbranched or occasionally 1-branched. Basal petioles 1–1.5 cm, sheaths narrowly lanceolate, tinged purple; blade triangular in outline, ca. 8 × 7 mm, trifoliolate; leaflets 3-lobed; ultimate segments 1–1.5 × 0.5–1 mm. Cauline leaves 1–2, palmate. Umbels 9–18 mm across; bracts absent or occasionally 1, linear, apex 3-lobed, leaf-like; rays 2–3, 5–8 mm; bracteoles absent; umbellules 4–6 mm across, 3–10-flowered; pedicels 1–2 mm. Calyx teeth obsolete. Petals purplish-red or white, entire. Fruit ovoid-ellipsoid, ca. 2 × 1.4 mm (mature fruit unknown). Fl. and fr. Jul–Sep.

Brushy alpine meadows, limestone rock crevices; 3200–4500 m. SW Sichuan (Daocheng, Muli, Xiangcheng), SE Xizang (Cona, Médog), NW Yunnan (Gongshan) [Bhutan].

**5. *Sinocarum pityophilum*** (Diels) H. Wolff in Engler Pflanzenz. 90(IV. 228): 166. 1927.

松林小芹 song lin xiao qin

*Carum pityophilum* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 228. 1912.

Plants 40–70 cm. Rootstock fusiform, 3–3 × ca. 0.5 mm. Stem solitary, 1–2-branched. Basal petioles 1.5–3 cm, sheath broadly ovate; blade triangular in outline, ca. 5 × 5 cm, 3-pinnate; pinnae 6–9 pairs; ultimate segments linear, 2–5 × 0.3–1 mm. Umbels 3.5–6 cm across; bracts absent, occasionally 1, linear, 1–1.5 cm; rays 10–20, 2–4 cm, unequal; bracteoles ab-

sent; umbellules 1–1.5 cm across, 12–15-flowered; pedicels 3–5 mm, unequal. Calyx teeth obsolete. Petals white, entire, apex obtuse, outer petals in umbellule slightly radiant. Fruit unknown. Fl. Oct.

- Sunny slopes in *Pinus* forests; 3000–3300 m. NW Yunnan (Lijiang).

This poorly known taxon is recorded only from the type gathering (G. Forrest 3078).

**6. *Sinocarum coloratum*** (Diels) H. Wolff ex R. H. Shan & F. T. Pu in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(2): 33. 1985.

紫茎小芹 zi jing xiao qin

*Carum coloratum* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 287. 1912.

Plants 8–25 cm. Taproot elongate, 3–15 × 0.5–1 cm, thickened at apex, branched. Stems 1–4, characteristically purplish, unbranched or 1–2-branched. Basal petioles 2–7 cm, sheaths oblong-ovate, purplish; blade ovate-lanceolate in outline, 2–8 × 1–3 cm, 1–2-pinnate; pinnae 4–5 pairs; ultimate segments linear-lanceolate, 3–10 × 0.5–2 mm. Umbels 2.5–6 cm across; bracts absent, occasionally 1–2, linear, occasionally leaf-like; rays 5–8(–12), 1–3 cm; bracteoles absent, rarely 1, linear, ca. 2 mm; umbellules 8–16 mm, 8–15-flowered; pedicels 3–5 mm, unequal. Calyx teeth subulate, 0.2–0.4 mm, unequal. Petals white, apex usually entire, occasionally 2–3-lobed. Young fruit oblong-ovoid, ca. 1.5 × 1 (mature fruit unknown). Fl. and fr. Jul–Oct.

Brushy alpine meadows, limestone rock crevices; 2900–4600 m. W Sichuan, S Xizang, NW Yunnan [NE India].

**7. *Sinocarum schizopetalum*** (Franchet) H. Wolff ex R. H. Shan & F. T. Pu in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(2): 33. 1985.

裂瓣小芹 lie ban xiao qin

Plants 10–30 cm. Rootstock a short, thick rhizome, 3–5 × 0.5–0.8 cm. Stems 1 or 2–4, branching. Basal petioles 5–8 cm, sheaths broadly lanceolate; blade triangular in outline, 1.5–3 × 1.5–3 cm, ternate to 1- or 2-pinnate, basal pinnae petiolulate; ultimate segments oblong-lanceolate, 3–5 × 1–1.5 mm. Umbels 2.5–4 cm across; bracts absent or occasionally 1, linear-lanceolate; rays (3–)5–6(–8), 1–2 cm; bracteoles 3–5, similar to the bract; umbellules 6–10(–15)-flowered; pedicels 2–4 mm, unequal. Calyx teeth obsolete. Petals white or violet, apex palmately 3–4-lobed, lobes lanceolate or oblanceolate. Stylopodium deep purple. Young fruit oblong-ovoid, ca. 1.5 × 1 mm (mature fruit unknown); vittae 2–3 in each furrow, 4 on commissure. Fl. and fr. Jul–Sep.

Shady forests, alpine meadows; 2400–4000 m. E and S Xizang, NW Yunnan [NE Myanmar].

- 1a. Rootstock fusiform; leaf blade ternate to 1- or 2-pinnate; petals 3–4-lobed, lobes lanceolate or ovate-lanceolate ..... 7a. var. *schizopetalum*
- 1b. Rootstock tuberous; leaf blade trifoliolate; petals 3-lobed, lobes lanceolate ..... 7b. var. *bijiangense*

**7a. *Sinocarum schizopetalum* var. *schizopetalum***

裂瓣小芹(原变种) lie ban xiao qin (yuan bian zhong)

*Carum schizopetalum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 118. 1894; *Dactylaea schizopetala* (Franchet) Farille.

Leaf blade ternate to 1- or 2-pinnate. Petals palmately 3–4-lobed, lobes ovate or lanceolate.

- Shady forests; 2400–4000 m. E and S Xizang, NW Yunnan.

**7b. *Sinocarum schizopetalum* var. *bijiangense*** (S. L. Liou) X. T. Liu in C. Y. Wu et al., Fl. Yunnan. 7: 521. 1997.

碧江小芹 bi jiang xiao qin

*Sinocarum bijiangense* S. L. Liou, Acta Phytotax. Sin. 28: 149. 1990; *Dactylaea wolffiana* Fedde ex H. Wolff; *S. wolffianum* (Fedde ex H. Wolff) R. H. Shan & F. T. Pu (1993), not (Fedde ex H. Wolff) P. K. Mukherjee & Constance (1991).

Leaf blade trifoliate. Petals palmately 3-lobed, lobes linear-lanceolate.

Alpine meadows; ca. 2400 m. NW Yunnan (Bijiang) [NE Myanmar].

This incompletely known taxon is recorded only from a few collections. In the protologue of *Dactylaea wolffiana* the type specimen was wrongly cited from Xizang (Tibet); in fact it was collected in NE Myanmar (Imaw Bum).

**8. *Sinocarum dolichopodum*** (Diels) H. Wolff ex R. H. Shan & F. T. Pu in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(2): 38. 1985.

长柄小芹 chang bing xiao qin

*Carum dolichopodum* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 287. 1912.

Plants 8–15 cm. Rootstock slender, horizontal, 5–20 × 0.2–0.5 cm. Stem solitary, purplish, usually unbranched. Basal petioles 3–6 cm, sheaths ovate, purplish; blade triangular in outline, 3–6 × 2–3 cm, 2–3-pinnate; pinnae 3–5 pairs, basal pinnae petiolate; ultimate segments ovate, 10–15 × 5–8 mm, margins 3-lobed or pinnatifid. Umbels 4–7 cm across, sometimes subtended by a reduced, 3-lobed leaf; bracts absent; rays 4–6, 4–5 cm, stout; bracteoles 2–6, linear-oblongate or obovate in outline, 4–7 mm, apex usually 2–3-lobed, or pinnatifid, rarely entire; umbellules 10–18 mm across, 10–15-flowered; pedicels 4–8 mm. Calyx teeth conspicuous, triangular-lanceolate, ca. 0.5 mm. Petals white or purplish, apex obtuse. Young fruit oblong-ovoid, ca. 2 × 1.5 mm (mature fruit unknown); vittae 3 in each furrow, 6 on commissure. Fl. and fr. Jul–Sep.

- Alpine meadows, rocks; 3000–4000 m. W Sichuan, NW Yunnan.

This species has reputed medicinal value. The long rhizome, leaf morphology, and divided bracteoles are rather uncharacteristic of *Sinocarum*, and this species may be better placed elsewhere.

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