

### 48. PIMPINELLA Linnaeus, Sp. Pl. 1: 263. 1753.

茴芹属 hui qin shu

Pu Fading (溥发鼎 Pu Fa-ting); Mark F. Watson

*Pimpinella* subsect. *Spuriopimpinella* H. de Boissieu; *Spuriopimpinella* (H. de Boissieu) Kitagawa.

Herbs, perennial, rarely biennial or annual. Root fibrous or a taproot. Stems erect, branching, base without fibrous remnant sheaths. Basal leaves petiolate, sheathing at base; blade 1–3-ternate, 1–4-pinnate or ternate-1–3-pinnate, sometimes simple. Cauline leaves often heteromorphic. Inflorescence branching, umbels terminal and lateral; bracts and bracteoles present or absent, usually linear, apex entire; rays few to numerous. Calyx teeth usually obsolete, sometimes conspicuous, lanceolate, minute. Petals white, rarely purple, glabrous or hairy abaxially. Stylopodium conic or low-conic, rarely depressed; styles short or long, spreading or reflexed (best observed in young or mature fruit). Fruit cordate-ovoid or oblong-ovoid, slightly laterally compressed, constricted at the commissure, glabrous or variously hairy; ribs 5, filiform, sometimes obscured by the indumentum; vittae 1–3(–4) in each furrow, 2–4(–8) on commissure. Seed face plane, rarely slightly concave. Carpophore 2-fid or 2-parted.

About 150 species: disjunct between Africa, Asia, and Europe; 44 species (28 endemic, one introduced) in China.

This large, widespread, and taxonomically complex genus is generally characterized by the small, rather featureless fruits. In China, *Pimpinella* can be divided into two groups: those species with hairy, puberulent, or distinctly roughened fruits and obsolete calyx teeth; and those with smooth, glabrous fruits and obsolete or conspicuous calyx teeth. Plants falling within the former group should be also be compared with *Trachyspermum*. Several groups of allied species can be recognized within Chinese *Pimpinella* where species boundaries are indistinct; the *P. candolleana* complex is a typical example. As these groups are often widespread across Asia, full resolution of the nomenclatural and taxonomic problems can only be achieved with a broad revision across many countries.

- 1a. Calyx teeth obsolete; fruit usually ornamented, hairy, papillose or granular, occasionally smooth.
  - 2a. Annuals or biennials; bracteoles absent, rarely 1–4.
    - 3a. Stylopodium conic; fruit oblong-ovoid ..... 1. *P. anisum*
    - 3b. Stylopodium low-conic; fruit ovoid-globose or cordate-ovoid.
      - 4a. Rays 15–20, 15–40 mm; bracteoles absent (Xinjiang) ..... 2. *P. puberula*
      - 4b. Rays 3–5, 5–10 mm; bracteoles 2–4 (Sichuan, Yunnan) ..... 3. *P. silvatica*
  - 2b. Perennials; bracteoles present.
    - 5a. Basal and cauline leaves homomorphic, ternate or 1-pinnate, pinnae 2 pairs; flowers fertile in terminal umbels, mainly sterile in lateral umbels ..... 4. *P. kingdon-wardii*
    - 5b. Basal and cauline leaves heteromorphic, simple, ternate or 1–2-pinnate; flowers fertile in terminal and lateral umbels.
      - 6a. Root fibrous.
        - 7a. Petals dark purple, glabrous, base shortly clawed ..... 5. *P. atropurpurea*
        - 7b. Petals white, hairy abaxially, base cuneate ..... 6. *P. diversifolia*
      - 6b. Taproot cylindrical or fusiform.
        - 8a. Basal and lower leaves 1–2-pinnate or ternate-1–2-pinnate, rarely ternate.
          - 9a. Rays and pedicels extremely unequal, rays 2–70 mm ..... 14. *P. smithii*
          - 9b. Rays and pedicels subequal or slightly unequal, rays 5–25(–30) mm.
            - 10a. Styles 2–4 × stylopodium; fruit sparsely pubescent to glabrous; basal leaves 1–2-pinnate ..... 15. *P. fargesii*
            - 10b. Styles 1–1.5 × stylopodium; fruit densely or sparsely pubescent; basal leaves 1-pinnate, or ternate, 1–2-pinnate.
              - 11a. Rays 4–10, slightly unequal; fruit densely pubescent, basal leaves 1-pinnate, rarely ternate ..... 16. *P. chungdienensis*
              - 11b. Rays 8–16, subequal; fruit sparsely pubescent, basal leaves ternate-1–2-pinnate ..... 17. *P. tonkinensis*
        - 8b. Basal and lower leaves simple, 1-pinnate or ternate.
          - 12a. Basal and lower leaves ternate, rarely simple.
            - 13a. Bracteoles equal to or longer than pedicels; vittae 1 in each furrow ..... 12. *P. tibetanica*
            - 13b. Bracteoles equal to or shorter than pedicels; vittae 1–4 in each furrow ..... 13. *P. bisinuata*
          - 12b. Basal and lower leaves usually simple.
            - 14a. Leaf blade reniform-rotund, cordate-lanceolate or long triangular, rarely cordate-ovate.
              - 15a. Styles 1–1.5 × stylopodium; basal and lower leaves cordate-lanceolate or long triangular (Sichuan, Yunnan) ..... 10. *P. yunnanensis*
              - 15b. Styles ca. 3 × stylopodium; basal and lower leaves reniform-rotund (Hubei) ..... 11. *P. renifolia*
            - 14b. Leaf blade cordate-ovate.
              - 16a. Rays 6–15, 1–3 cm; bracteoles equal to or longer than flowers, densely hirsute ..... 7. *P. rockii*
              - 16b. Rays (6–)10–25, 1.5–4(–6) cm; bracteoles shorter than or longer than flowers, glabrous.

- 17a. Styles 1–1.5 × stylopodium; fruit papillose-rugose ..... 8. *P. coriacea*  
17b. Styles 2–3 × stylopodium; fruit finely granulate ..... 9. *P. candolleana*
- 1b. Calyx teeth conspicuous or obsolete; fruit glabrous.
- 18a. Calyx teeth conspicuous.
- 19a. Basal and lower leaves ternate-2-pinnate, 1–3-ternate or 3–4-pinnate; rays glabrous or hirsute.
- 20a. Fruit oblong-ovoid; ultimate leaf segments linear ..... 41. *P. valleculosa*  
20b. Fruit ovoid or cordate-ovoid; ultimate leaf segments ovate-lanceolate, ovate, broad-ovate or suborbicular.
- 21a. Ultimate leaf segments broad-ovate or suborbicular, 1–2 × 1–1.5 cm; styles ca. 1 × stylopodium;  
vittae 1 in each furrow ..... 42. *P. xizangensis*  
21b. Ultimate leaf segments ovate-lanceolate or rhombic, 2–8 × 1–4 cm; styles 2–3 × stylopodium; vittae  
3 in each furrow.
- 22a. Rays 2–7 cm; fruit ca. 4 × 3 mm; leaflets acuminate or caudate at the apex ..... 43. *P. arguta*  
22b. Rays 2–3.5 cm; fruit ca. 2 × 1.5–2 mm; leaflets acuminate at the apex ..... 44. *P. komarovii*
- 19b. Basal and lower leaves 1–2-ternate or 1–2-pinnate; rays glabrous or pubescent.
- 23a. Petals purple, base shortly clawed.
- 24a. Plants 30–80 cm; seed face slightly concave (Yunnan) ..... 35. *P. purpurea*  
24b. Plants 10–30 cm; seed face flat (Xizang) ..... 36. *P. pimpinellisimulacrum*
- 23b. Petals white, base cuneate; seed face plane.
- 25a. Root fusiform; petals without incurved apex (Yunnan) ..... 37. *P. liana*  
25b. Roots fibrous; petals with an incurved apex (NE China).
- 26a. Leaves ternate, leaflets ovate or broad-ovate ..... 38. *P. brachycarpa*  
26b. Leaves 1–2-ternate, leaflets ovate, oblong-ovate, or rhombic.
- 27a. Bracts absent, occasionally 2–3; fruit cordate-ovoid, ca. 1 × 0.8 mm ..... 39. *P. koreana*  
27b. Bracts persistent, 3–5; fruit oblong-ovoid, ca. 5 × 2 mm ..... 40. *P. calycina*
- 18b. Calyx teeth obsolete, rarely minute.
- 28a. All leaves simple or ternate; umbels 0.5–1 cm across, mostly lateral ..... 18. *P. rubescens*  
28b. Basal and lower leaves 1–2-ternate, ternate-2–3-pinnate or 1–3-pinnate; umbels 2–10 cm across, terminal  
and lateral.
- 29a. Basal and lower leaves 1–2-ternate or 1–2-pinnate.
- 30a. Rays 2–6; umbellules 2–8-flowered; basal leaves 1–2-ternate or 1-pinnate, pinnae 2 pairs.
- 31a. Bracteoles 2–3; pedicels 10–15 mm in fruit (Anhui) ..... 19. *P. serra*  
31b. Bracteoles 0; pedicels 1–10 mm in fruit (Guizhou, Sichuan, Xizang, Yunnan).
- 32a. Plants glabrous; umbels 3–5 cm across, very lax; fruit ca. 2 mm, usually only one mericarp matures  
..... 20. *P. refracta*  
32b. Plants sparsely puberulent or pubescent; umbels 1–3.5 cm across, compact or open; fruit ca. 1 mm,  
both mericarps mature.
- 33a. Plants little-branched above; rays 2–6; style ca. 1 × stylopodium ..... 21. *P. flaccida*  
33b. Plants several- or much-branched above; rays 4–5; style ca. 2 × stylopodium ..... 22. *P. grisea*
- 30b. Rays 5–25; umbellules 5–25-flowered; basal leaves 1–3-pinnate, pinnae 3–6 pairs.
- 34a. Bracts and bracteoles present; fruit cordate-ovoid; basal leaves 1-pinnate (Taiwan) ..... 23. *P. niitakayamensis*  
34b. Bracts and bracteoles absent; fruit oblong-ovoid; basal leaves 1–3-pinnate-pinnatifid.
- 35a. Basal leaves 1-pinnate, pinnae incised or lacerate-pinnatifid, ultimate segments ovate-lanceolate  
or ovate ..... 24. *P. thellungiana*  
35b. Basal leaves 2–3-pinnate, ultimate segments linear or lanceolate.
- 36a. Styles ca. 3 × stylopodium; seed face plane; basal leaves 2-pinnate (NE China) ..... 25. *P. cnidioides*  
36b. Styles ca. 1 × stylopodium; seed face slightly concave; basal leaves 2–3-pinnate (Xizang) .. 26. *P. filipedicellata*
- 29b. Basal and lower leaves 1–3-ternate or ternate-2–3-pinnate.
- 37a. Root fibrous; basal and lower leaves ternate-2–3-pinnate ..... 27. *P. helosciadoidea*  
37b. Taproot cylindrical or fusiform; basal and lower leaves 2-ternate or ternate-1–3-pinnate.
- 38a. Styles ca. equal to stylopodium.
- 39a. Rays 4–6(–8), extremely unequal; pedicels 2–3 mm in fruit ..... 28. *P. brachystyla*  
39b. Rays 4–10(–13), subequal; pedicels 10–20 mm in fruit ..... 29. *P. acuminata*
- 38b. Styles 2–3 × stylopodium.
- 40a. Rays 5–8, 1.5–2.5 cm; basal leaves ternate-2–3-pinnate ..... 30. *P. nyingchiensis*  
40b. Rays (5–)10–25, 3–6(–8) cm; basal leaves 2–3-ternate.
- 41a. Petals obcordate, apex incurved; basal leaves 2-ternate ..... 31. *P. caudata*  
41b. Petals oblong-ovate, apex not incurved; basal leaves 2–3-ternate.
- 42a. Rays 5–7, 4–5 cm; basal leaves 3-ternate ..... 32. *P. triternata*  
42b. Rays 10–25, 0.5–4(–6.5) cm; basal leaves 2-ternate.

- 43a. Bracteoles 1–2, or 0; terminal leaflets oblong-ovate or oblong-rhombic ..... 33. *P. henryi*  
43b. Bracteoles 2–5; terminal leaflets broad-ovate or rhombic ..... 34. *P. rhomboidea*

**1. *Pimpinella anisum*** Linnaeus, Sp. Pl. 1: 264. 1753.

茴芹 hui qin

*Anisum vulgare* Gaertner; *Apium anisum* (Linnaeus) Crantz; *Carum anisum* (Linnaeus) Baillon; *Selinum anisum* (Linnaeus) E. H. L. Krause; *Sison anisum* (Linnaeus) Sprengel; *Tragium anisum* (Linnaeus) Link.

Plants annual, 10–50 cm, sparsely shortly pubescent throughout, strongly aromatic. Taproot slender. Stem much-branched. Leaves heteromorphic. Basal leaves simple; petioles 2–5 cm; blade reniform or broad-ovate, 1–3 × 1.2–2.8 cm, puberulent along veins, margin serrate. Cauline leaves 1–2-pinnate; ultimate segments ovate or ovate-lanceolate, 6–17 × 2–7 mm, 3-lobed margin serrate or lacerate. Leaves reduced upwards, becoming 3-lobed; lobes lanceolate or linear-lanceolate. Umbels 1.5–6 cm across; bracts 1 (or 2) or absent, linear-lanceolate, 1–2 mm; rays 7–15, 1–4 cm, unequal; bracteoles 1 (or 2) or absent, linear, 2–3 mm; umbellules 5–10 mm across, ca. 10-flowered; pedicels 2–6 mm, extending to 10 mm in fruit. Calyx teeth obsolete. Petals white, obcordate, abaxially pubescent, apex with incurved lobule. Stylopodium conic; styles ca. 3 × stylopodium, ca. 0.5 × fruit, spreading or reflexed. Fruit oblong-ovoid, 3–5 × 2–2.5 mm, densely appressed setose-hairy; vittae 2–4 in each furrow, 4–8 on commissure, nearly forming a continuous ring around seed. Seed face plane. Fl. Jun–Jul, fr. Aug–Sep. *2n* = 20.

Cultivated. Xinjiang [possibly native to SW Asia, but now known only in cultivation].

This species is widely cultivated in mild-temperate regions (especially C and SW Asia and C and S Europe) for its aromatic fruit (anise), which is used in perfume and to flavor alcoholic drinks and confectionary. The species has reputed medicinal value in China.

**2. *Pimpinella puberula*** (de Candolle) Boissier, Ann. Sci. Nat., Bot. 3: 129. 1844.

微毛茴芹 wei mao hui qin

*Ptychotis puberula* de Candolle, Prodr. 4: 109. 1830.

Plants annual, 30–50 cm, densely pubescent throughout. Taproot slender. Stem slender, little-branched. Leaves heteromorphic. Basal petioles 3–5 cm; blade simple or ternate; ultimate segments ovate-orbicular, cordate, 1–3 × 1–3 cm, margin serrate or incised-dentate. Cauline leaves 1–2-pinnate; ultimate segments linear or lanceolate, 5–15 × 1–2 mm. Umbels 2–5 cm across; bracts and bracteoles 0; rays (4–)15–20, very unequal, 1.5–4 cm, pubescent; umbellules 5–8 mm across, 15–25-flowered; pedicels 0.5–2 mm, unequal. Calyx teeth obsolete. Petals white, obovate, pilose abaxially, apex with incurved lobule. Stylopodium low-conic; styles 2(–3) × stylopodium, spreading. Fruit ovoid-globose, 1–1.5 × 0.9–1.2 mm, densely hairy; vittae 2–3 in each furrow, 4–8 on commissure. Seed face plane. Fl. May–Jun, fr. Jul–Sep.

Stony slopes in shaded valleys; 1000–1800 m. E Xinjiang (Hami) [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, S Russia, Tajikistan, Turkmenistan, Uzbekistan].

**3. *Pimpinella silvatica*** Handel-Mazzetti, Symb. Sin. 7: 714. 1933.

木里茴芹 mu li hui qin

Plants annual, 50–70 cm, slender, pubescent. Taproot slender. Stem solitary, little-branched. Basal and lower petioles 5–7 cm; blade 1–2-ternate; ultimate segments oblong-ovate, 1.5–4 × 1–2 cm, abaxially pubescent, adaxially pubescent along veins. Upper leaves smaller, 3-lobed, lobes lanceolate, 10–20 × ca. 5 mm. Umbels ca. 2 cm across; bracts 0, occasionally 1, linear; rays 3–5, 0.5–1 cm, unequal; bracteoles 2–4, linear, ca. 3 mm, longer than pedicels; umbellules ca. 6 mm across, 5–8-flowered; pedicels ca. 1 mm. Calyx teeth obsolete. Petals white, broad-ovate, apex slightly notched, with incurved lobule. Stylopodium low-conic; styles ca. 2 × stylopodium. Immature fruit ovoid, base cordate, surface pubescent (mature fruit unknown). Fl. and fr. Jul–Sep.

• Moist valleys, grassy river banks; 2500–3400 m. W Sichuan, NW Yunnan.

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

**4. *Pimpinella kingdon-wardii*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 184. 1929.

德钦茴芹 de qin hui qin

*Pimpinella asianensis* M. Hiroe; *P. engleriana* Fedde ex H. Wolff (1930), not H. Wolff (1927); *P. feddei* W. C. Wu & C. Y. Wu, nom. illeg. superfl.; *P. thyrsoiflora* H. Wolff; *P. weishanensis* R. H. Shan & F. T. Pu.

Plants perennial, 30–100 cm, pubescent throughout. Roots fibrous or fascicled. Stem solitary, branching above. Basal petioles 3–10(–20) cm including sheaths; blade ternate or 1-pinnate; leaflets 3–5, ovate or broad-ovate, 3–9 × 2–6 cm, rarely undivided, cordate, pubescent on both surfaces, especially along veins. Cauline leaves homomorphic with the basal, ternate; leaflets oblong-ovate or lanceolate, 10–20 × 5–10 mm. Umbels 2.5–11 cm across; bracts usually absent, sometimes 1–5, linear, often similar to reduced uppermost leaves; rays 9–25, 1–4 cm, unequal; bracteoles 1–4, linear, 2–4 mm, unequal, ca. equal to or shorter than pedicels; umbellules 5–13 mm across, 10–25-flowered, only the terminal umbels or only outer umbellules in lateral umbels with fertile flowers, lateral umbels with sterile flowers; pedicels 1–4 mm, unequal, extending to 11 mm in fruit. Calyx teeth obsolete. Petals white, tinged purple or dark purple, apex with incurved lobule. Stylopodium short-conic; styles 1–1.5 × stylopodium, spreading. Fruit ovoid, ca. 1 × 0.8 mm, base cordate, surface shortly papillose-pubescent; vittae 3 in each furrow, 6 on commissure. Seed face plane. Fl. and fr. Jun–Sep.

• Forests, forest margins, among shrubs, grassy slopes, alpine meadows, streamsides; 1700–4000 m. W Sichuan, S Xizang, NW Yunnan.

**5. *Pimpinella atropurpurea*** C. Y. Wu ex R. H. Shan & F. T. Pu, Acta Phytotax. Sin. 21: 81. 1983.

深紫茴芹 shen zi hui qin

Plants perennial, 30–40 cm, yellowish pubescent throughout. Root fibrous. Stems 1–2, striate, 3–4-branched. Basal petioles 5–15 cm; blade simple, ovate-cordate, 2.5–4.5 × 2–4 cm, margins crenate. Upper leaves heteromorphic, smaller, sessile, nearly 1-pinnate or 3-lobed, lobes lanceolate. Umbels 2.5–5 cm across; bracts 1–3, linear or linear-lanceolate, 0.8–1.5 cm, apex entire or 3-lobed; rays 8–12, 2–3 cm, densely yellowish pubescent; bracteoles 4–5, linear, 4–8 mm, ca. equal to or longer than flowers; umbellules 6–10 mm across, 10–15-flowered; pedicels 3–5 mm. Calyx teeth obsolete. Petals dark purple, abaxially glabrous, base shortly clawed, apex plane, without incurved lobule. Stylopodium low-conic; styles ca. equal to stylopodium, spreading. Young fruit ovoid, base cordate, surface sparsely puberulent (mature fruit unknown). Fl. and fr. Jul–Sep.

- Grassy slopes, alpine meadows; 2900–3500 m. W Yunnan.

This poorly known taxon is recorded only from a few collections. It has reputed medicinal value.

**6. *Pimpinella diversifolia*** de Candolle, Prodr. 4: 122. 1830.

异叶茴芹 *yi ye hui qin*

Plants perennial, 30–200 cm, pubescent throughout. Roots fibrous. Stem solitary, branched. Basal petioles 2–13 cm; blade ternate, leaflets ovate-cordate, 1.5–6 × 1–5 cm, margins coarsely serrate, rarely simple or 1-pinnate. Cauline leaves reduced upwards, 1-pinnate or 3-lobed, lobes narrow, lanceolate, often lacerate. Umbels 3–7 cm across; bracts 1–5, lanceolate, or absent; rays 6–15(–30), 1–4 cm; bracteoles 1–8, linear, 1–2 mm, shorter than pedicels; umbellules 3–6 mm across, 6–20-flowered; pedicels 1–3 mm, unequal. Calyx teeth obsolete. Petals white, obovate, hairy abaxially, base cuneate, apex with incurved lobule. Stylopodium conic; styles ca. 2–3 × stylopodium. Fruit ovoid, 1.3–1.6 × 1.3–1.6 mm, base cordate, surface shortly papillose-pubescent; vittae 2–3 in each furrow, 4–6 on commissure. Seed face plane. Fl. May–Sep, fr. Aug–Nov.

Forests, forest margins, montane thickets, montane scrub and grasslands, grassy slopes, streamsides; 200–3300 m. Fujian, Gansu, Guangdong, Guangxi, Hainan, Henan, Hubei, Hunan, Qinghai, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Afghanistan, Bhutan, Cambodia, India, Japan, Kashmir, Nepal, Pakistan, Sikkim, Vietnam].

This widespread and very variable species has reputed medicinal value in C China.

- 1a. Plants stoloniferous ..... 6c. var. *stolonifera*
- 1b. Plants without stolons.
  - 2a. Petals obovate, apex notched with incurved lobule ..... 6a. var. *diversifolia*
  - 2b. Petals ovate-lanceolate, apex mucronate, slightly incurved ... 6b. var. *angustipetala*

**6a. *Pimpinella diversifolia* var. *diversifolia***

异叶茴芹(原变种) *yi ye hui qin (yuan bian zhong)*

*Helosciadium pubescens* de Candolle; *Pimpinella diversifolia* var. *divisa* C. B. Clarke; *P. diversifolia* var. *simplicifolia* Kuntze; *P. sinica* Hance; *Platyrhapha japonica* Miquel.

Plants without stolons. Petals obovate, apex notched with small incurved lobule.

Forests, forest margins, montane scrub and grasslands, streamsides; 200–3300 m. Fujian, Gansu, Guangdong, Guangxi, Hainan, Henan, Hubei, Hunan, Qinghai, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [Afghanistan, Cambodia, India, Japan, Kashmir, Nepal, Pakistan, Vietnam].

**6b. *Pimpinella diversifolia* var. *angustipetala*** R. H. Shan & F. T. Pu, Acta Phytotax. Sin. 21: 81. 1983.

尖瓣异叶茴芹 *jian ban yi ye hui qin*

Plants without stolons. Petals ovate-lanceolate, apex mucronate, slightly incurved, but not notched and without incurved lobule.

- Forests, grassy slopes. SC Sichuan (Emei Shan).

**6c. *Pimpinella diversifolia* var. *stolonifera*** Handel-Mazzetti, Symb. Sin. 7: 714. 1933.

走茎异叶茴芹 *zou jing yi ye hui qin*

*Pimpinella diversifolia* var. *sermentifera* Goel & U. C. Bhattacharyya.

Plants with stolons. Petals obovate, with an incurved lobule.

Montane forests and thickets; 1800–3300 m. W Sichuan, NW Yunnan [Bhutan, Nepal, Sikkim].

**7. *Pimpinella rockii*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 191. 1929.

丽江茴芹 *li jiang hui qin*

*Pimpinella wolffiana* Fedde ex H. Wolff.

Perennial, 10–40 cm, pubescent throughout. Root fusiform, slender, 3–20 × 0.3–0.5 cm. Stems 1–8, slender, 1–3-branched. Basal and lower petioles 2–10 cm; blade simple, cordate-ovate or rounded, 1.5–10 × 1–9 cm, margin serrate-crenate, hirsute pubescent on both surfaces. Upper leaves heteromorphic, smaller, sessile, sheaths oblong-ovate; blade 1–2-pinnate or 3-lobed; lobes lanceolate. Umbels 2.5–7 cm across; bracts 1–2, lanceolate, 1.5–3 cm, apex entire or 2–3-lobed, like uppermost leaf; rays 6–15, 1–3 cm, densely hirsute; bracteoles 1–4, linear-lanceolate, 5–9 mm, ca. equal to or longer than flowers, hirsute; umbellules 7–11 mm across, 10–15-flowered; pedicels 1.5–4 mm. Calyx teeth obsolete. Petals white or purplish, base shortly clawed, apex notched with incurved lobule. Stylopodium conic; styles 1–1.5 × stylopodium, spreading. Fruit ovoid, ca. 1.5 × 1 mm, base cordate, surface puberulent with short dense papillae; vittae 1 in each furrow, 2 on commissure. Seed face plane. Fl. Jul–Aug, fr. Aug–Sep.

- Forest margins, alpine meadows, rock crevices; 2800–4500 m. NW Yunnan.

See the taxonomic note under *Pimpinella candolleana*.

**8. *Pimpinella coriacea*** (Franchet) H. de Boissieu, Bull. Soc. Bot. France 56: 351. 1909.

革叶茴芹 *ge ye hui qin*

*Carum coriaceum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 127. 1894.

Plants perennial, 30–70 cm, sparsely pubescent. Root fusiform, ca. 5 × 0.4 cm. Stems solitary, rarely 2–3. Basal and lower leaves simple, cordate-ovate, (1–)2–5 × 1–3 cm, both surfaces pubescent, margins coarsely serrate. Upper leaves smaller, sessile, 1-pinnate or 3-lobed, lobes lanceolate. Umbels 2–5 cm across; bracts 1–2, linear, 4–8 mm, or absent; rays (8–)15–20, 2–4(–6) cm, unequal, pubescent; bracteoles 1–3, linear, 1.5–3 mm, shorter than pedicels, glabrous; umbellules ca. 8 mm across, 15–25-flowered; pedicels 0.7–3 mm, unequal. Calyx teeth obsolete. Petals white, obcordate, base cuneate, apex notched with incurved lobule, abaxially hairy. Stylopodium conic; styles 1–1.5 × stylopodium, spreading. Fruit ovoid, ca. 1.5 × 1 mm, base cordate, surface densely papillose-rugose; vittae 1–3 in each furrow, 2–4 on commissure. Seed face plane. Fl. May–Aug, fr. Aug–Nov.

• Forests, grassy streambanks; 900–3200 m. Guangxi, Guizhou, Sichuan, Yunnan.

This species has reputed medicinal value. See the taxonomic note under *Pimpinella candolleana*.

**9. *Pimpinella candolleana*** Wight & Arnott, Prodr. Fl. Ind. Orient. 1: 369. 1834.

杏叶茴芹 xing ye hui qin

*Carum candolleianum* (Wight & Arnott) Franchet.

Plants perennial, 10–100 cm, pubescent throughout. Root cylindrical or fusiform, 5–15 × 0.5–1 cm. Stems 1–2, little-branched. Basal petioles 2–20 cm; blade simple (rarely ternate), cordate-ovate, (1–)3–8 × (1–)2–7 cm, margins coarsely serrate. Cauline leaves few, ternate, 3-lobed or 1-pinnate, rarely entire. Umbels 3–6 cm across; bracts absent or 1–7, linear, 3–8 mm; rays (6–)10–25, 1.5–4 cm, unequal, pubescent or scabrous; bracteoles 1–6, linear, 2.5–4 mm, ca. equal to or longer than pedicels, glabrous; umbellules 9–12 mm across, 10–20-flowered, usually central flowers subsessile and sterile; pedicels 0.5–3.5 mm. Calyx teeth obsolete. Petals white or purplish, obcordate, apex with incurved lobule. Stylopodium conic; styles ca. 2–3 × stylopodium. Fruit cordate-ovoid, ca. 1.5–2 × 1–1.5 mm, surface granulate with dense, short papillae; vittae 2–3 in each furrow, 2–4 on commissure. Seed face plane. Fl. Apr–Aug, fr. Aug–Oct.  $2n = 18^*$ .

*Pinus* forest margins, among shrubs, grassy slopes, streambanks; 1300–3500 m. Guangdong, Guangxi, Guizhou, Sichuan, Yunnan [S India].

This species has reputed medicinal value in China. The Chinese species *Pimpinella bisinuata*, *P. candolleana*, *P. coriacea*, *P. renifolia*, *P. rockii*, *P. tibetana*, and *P. yunnanensis* form part of a species complex with papillose or granular fruits and heteromorphic leaves: basal leaves are simple or ternate (sometimes pinnate with 5 leaflets), compared to the more dissected upper leaves with more leaflets and narrower segments. These, together with similar species in India and SE Asia, are often difficult to distinguish and their species boundaries are unclear. *Pimpinella candolleana* is generally known from peninsular India, and so the application of this name to Chinese plants is controversial. However, this and other problems with these Chinese taxa cannot be resolved in isolation, and must wait for a broad revision of allied taxa in China, India, Indonesia, and SE Asia.

**10. *Pimpinella yunnanensis*** (Franchet) H. Wolff in Engler, Pflanzenz. 90(IV. 228): 266. 1927.

云南茴芹 yun nan hui qin

*Carum yunnanense* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 128. 1894; *Pimpinella pseudocandolleana* H. Wolff.

Plants perennial, 30–60 cm, sparsely hirsute, especially above. Root cylindrical, 10–15 cm. Stems solitary, rarely 2–3, slender, 2–3-branched. Basal petioles 2–10 cm; blade simple, cordate-lanceolate or narrowly triangulate, rarely cordate-ovate, 1.5–7 × 1–5 cm, base faintly cordate or truncate, margins serrate, apex acute. Cauline leaves few, usually 1-pinnate or 3-lobed, lobes lanceolate. Umbels 3–7 cm across; bracts 1–4, linear, or absent; rays 8–20, 2–5 cm, unequal, pubescent; bracteoles 1–10, 1.5–4 mm, ca. equal to or shorter than pedicels; umbellules 7–12 mm across, 10–15-flowered; pedicels 1–5 mm, very unequal. Calyx teeth obsolete. Petals white, obovate or obcordate, apex with incurved lobule. Stylopodium conic; styles 1–1.5 × stylopodium, reflexed. Fruit ovoid, ca. 2 × 1.7 mm, base cordate, surface sparsely pubescent with short papillae; vittae 1–3 in each furrow, 2–4 on commissure. Seed face plane. Fl. May–Jul, fr. Aug–Oct.

• Valley forests, scrub by streams, alpine meadows; 1400–3200 m. SW Sichuan, N and S Yunnan.

This species has reputed medicinal value. See the taxonomic note under *Pimpinella candolleana*.

**11. *Pimpinella renifolia*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 191. 1929.

肾叶茴芹 shen ye hui qin

Plants perennial, 30–75 cm, glabrous. Root fusiform. Stem solitary, 2–3-branched. Basal leaves simple; blade reniform-rotundate, broad-ovate, 5–8 × 4–6 cm, base cordate or truncate, margins coarsely serrate, apex obtuse or 3-lobed. Cauline leaves ternate, leaflets ovate or broad-ovate. Upper leaves smaller, sessile, 3-lobed, lobes lanceolate. Umbels ca. 5 cm across; bracts absent; rays 8–12, 1.5–2 cm, unequal, pubescent; bracteoles numerous, linear, nearly as long as pedicels; umbellules ca. 8 mm across, 10–20-flowered. Calyx teeth obsolete. Petals white, obovate, base cuneate, apex notched with incurved lobule. Stylopodium short conic; styles ca. 3 × stylopodium, reflexed. Fruit ovoid-ellipsoid, base cordate, surface minute granulate. Fl. Jun–Jul, fr. Aug–Sep.

• Shady forests; ca. 1800 m. W Hubei (Yichang).

This incompletely known taxon is recorded only from a few collections (possibly only the type). See the taxonomic note under *Pimpinella candolleana*.

**12. *Pimpinella tibetana*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 319. 1930.

藏茴芹 zang hui qin

Plants perennial, 20–100 cm, sparsely hirsute. Root fusiform or cylindrical, 3–10 × 0.3–0.8 cm. Stems 1–3, 1–2(–5)-branched. Basal leaves few, petioles 5–15 cm; blade ternate (rarely simple); leaflets cordate-ovate, 1.5–5 × 1–3.5 cm. Cauline leaves similar to basal, 3-lobed, lobes ovate or lanceolate.

Umbels 3–5 cm across; bracts 1–5, linear, 6–16 mm, or absent; rays 8–15(–20), 1–3(–4) cm, unequal; bracteoles 3–7, linear, 2–4 mm, ca. equal to or longer than pedicels; umbellules 6–8 mm across, 10–20-flowered; pedicels 0.5–2.5 mm. Calyx teeth obsolete. Petals white, obcordate, abaxially hairy, apex notched with small incurved lobule. Stylopodium conic; styles 1.5–2 × stylopodium, reflexed. Fruit ovoid-ellipsoid, 1.7–2 × 1–1.5 mm, base cordate, surface granulate with minute papillae; vittae 1 in each furrow, 2 on commissure. Seed face plane. Fl. Jun–Jul, fr. Aug–Oct.

Forest margins, grassy slopes; 1200–3000 m. W Sichuan, S Xizang, NW Yunnan [Bhutan, Nepal, Sikkim].

This species has reputed medicinal value. It is common in the E Himalayas, where the plants differ slightly in that simple basal leaves are more prevalent, the petals are sometimes dark purple, and it is recorded up to 4100 m in altitude. See also the taxonomic note under *Pimpinella candolleana*.

**13. *Pimpinella bisinuata*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 332. 1930.

重波茵芹 chong bo hui qin

Plants perennial, 30–70 cm, sparsely hirsute. Root fusiform, 3–5 × ca. 0.3 cm. Stem solitary, slender, 3–4-branched. Basal petioles 3–5 cm; blade ternate, rarely simple; leaflets 1–3 × 1–1.5 cm; lateral leaflets cordate-ovate, base subtruncate or bisinuate; terminal leaflets ovate-lanceolate. Cauline leaves simple, cordate-ovate, 2.5–4 × 1.5–2 cm, sessile, 3–4-lobed, lobes lanceolate. Umbels 2.5–6 cm across; bracts usually absent, or 1–3, linear, 2–6 mm; rays 8–15, 1.2–5 cm, unequal, densely hirsute; bracteoles 3–5, linear, 1.5–2.5 mm, ca. equal to or shorter than pedicels; umbellules ca. 8 mm across, 10–20-flowered; pedicels 1–3 mm, unequal. Calyx teeth obsolete. Petals white, obovate, apex notched with incurved lobule. Stylopodium conic; styles 1–1.5 × stylopodium, reflexed. Fruit ovoid, ca. 2 × 1.8 mm, base cordate, surface pubescent with short papillae; vittae 1–4 in each furrow, 2–4 on commissure. Seed face plane. Fl. Jul–Aug, fr. Sep–Oct.

• Forests, grassy slopes, streamsides; 1000–3500 m. W Sichuan, Yunnan.

See the taxonomic note under *Pimpinella candolleana*.

**14. *Pimpinella smithii*** H. Wolff, Acta Horti Gothob. 2: 307. 1926.

直立茵芹 zhi li hui qin

*Pimpinella stricta* H. Wolff.

Plants perennial, 30–50 cm, generally pubescent throughout. Root cylindrical, 10–20 × ca. 1 cm. Stem much-branched. Basal and lower petioles 5–20 cm; blade ternate-2-pinnate; ultimate segments ovate or ovate-lanceolate, setulose on the veins. Upper leaves 1-pinnate or 2–3-lobed; lobes lanceolate. Umbels 3–11 cm across; bracts 0, occasionally 1, linear, like uppermost leaf; rays 5–25, 0.2–7 cm, stout, extremely unequal; bracteoles 2–8, linear, 1.2–2.3 mm, unequal; umbellules 7–12 mm across, 10–25-flowered; pedicels 1–10 mm, very unequal. Calyx teeth obsolete. Petals white, ovate or broad-ovate, base cuneate, apex notched with incurved lobule. Stylopodium conic; styles ca.

equal to stylopodium. Fruit ovoid-globose, 1.8–2 × 1.5–2 mm, sparsely pubescent or glabrescent; vittae 2–4 in each furrow, 4–6 on commissure. Seed face plane. Fl. Jul–Aug, fr. Aug–Oct.

• Forest margins, alpine low scrub, grasslands, streamsides; 1400–3600 m. Gansu, Guangxi, Henan, Hubei, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Yunnan.

**15. *Pimpinella fargesii*** H. de Boissieu, Bull. Herb. Boissier, sér. 2, 2: 808. 1902.

城口茵芹 cheng kou hui qin

*Pimpinella fargesii* var. *alba* H. de Boissieu.

Plants perennial, 40–100 cm, generally glabrous. Rootstock short, thick, ca. 3 × 1.5 cm; roots fusiform. Stem solitary, stout, 3–4-branched. Basal petioles 10–15 cm; blade 1–2-pinnate; pinnae 2–3 pairs; ultimate segments ovate or ovate-lanceolate, 3–4 × 1.5–3 cm, margins serrate. Cauline leaves similar to the basal, smaller, sessile, 3-lobed, lobes lanceolate. Terminal umbels 3–8 cm across, lateral umbels smaller; bracts 0, occasionally 1, linear, like uppermost leaf; rays (7–)15–25, (1–)2–3.5 cm, ca. equal; bracteoles 1–5, linear, 2.5–4 mm, reflexed, nearly as long as pedicels; umbellules ca. 13 mm across, 10–20-flowered; pedicels 3–9 mm. Calyx teeth obsolete. Petals white, obovate or ovate, apex notched with incurved lobule. Stylopodium conic; styles ca. 2–4 × stylopodium, reflexed or spreading. Fruit ovoid, ca. 3 × 1.8 mm, base cordate, surface sparsely pubescent or glabrous; vittae 2–3 in each furrow, 4 on commissure. Seed face plane. Fl. Jul–Aug, fr. Aug–Oct.

• Forest margins, grasslands, streamsides; 500–3400 m. W Hubei, Jiangxi, Sichuan.

**16. *Pimpinella chungdienensis*** C. Y. Wu ex R. H. Shan et al., Acta Phytotax. Sin. 18: 375. 1980.

中甸茵芹 zhong dian hui qin

Plants perennial, 30–70 cm, sparsely pubescent. Taproot cylindrical, ca. 5 × 0.8 cm. Stems 1(–2), slender, 2–3-branched or unbranched. Basal petioles 4–6 cm; blade ternate or 1-pinnate; pinnae 2–3 pairs, cordate-ovate, 1–3 × 1–2.5 cm, pubescent, margins coarsely serrate. Cauline leaves similar to the basal, smaller, 1-pinnate or 3-lobed, lobes lanceolate. Umbels 2.5–3 cm across; bracts absent, occasionally 1, linear, like uppermost leaf; rays 4–10, 5–25 mm, slightly unequal, pubescent; bracteoles 1–3, linear, ca. 3 mm, shorter than pedicels; umbellules ca. 7 mm across, 6–10-flowered; pedicels 2–4 mm. Calyx teeth obsolete. Petals white, obovate, base cuneate, apex with incurved lobule. Stylopodium low-conic; styles 1–1.5 × stylopodium, spreading. Fruit ovoid-globose, ca. 1 × 1 mm, densely pubescent; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. Jul–Sep, fr. Aug–Sep.

• Coniferous forests, among shrubs along streamsides, grasslands, rock crevices; 2400–3500 m. W Sichuan, E Xizang, NW Yunnan.

**17. *Pimpinella tonkinensis*** Chermeson, Bull. Soc. Bot. France 68: 511. 1921.

瘤果茵芹 liu guo hui qin

Plants perennial, 50–100 cm, puberulent. Root fusiform. Stem solitary. Basal and lower petioles 5–8 cm; blade ternate or

ternate-1-2-pinnate; ultimate segments broad-ovate, 4–6 × 1–2 cm, base cuneate or truncate, margins irregular serrate. Upper leaves smaller, 3-lobed, lobes lanceolate. Umbels 2–4.5 cm across; bracts 0 or 1–2, linear, ca. 7 mm; rays 8–16, 2–2.5 cm, subequal, pubescent; bracteoles 2–5, linear, shorter than pedicels; umbellules 5–9 mm across, 15–20-flowered; pedicels 1–4 mm. Calyx teeth obsolete. Petals white, obovate, apex with incurved lobule. Stylopodium low-conic; styles 1–1.5 × stylopodium, spreading or reflexed. Fruit ovoid-globose, ca. 1.5 × 2 mm, sparsely pubescent; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. Jul–Aug, fr. Sep–Oct.

Montane forests; 1500–2200 m. Hong Kong (Lo Fall Shan), SE Yunnan (Wenshan) [Vietnam].

**18. *Pimpinella rubescens*** (Franchet) H. Wolff in Handel-Mazetti, *Symb. Sin.* 7: 715. 1933.

少花茴芹 shao hua hui qin

*Hydrocotyle rubescens* Franchet, *Bull. Soc. Philom. Pairs* 8(6): 108. 1894.

Plants annual, 10–40 cm, slender, pubescent. Root fusiform, 5–10 × ca. 2 mm, slender. Stem flexuose, little-branched, ascending (or creeping), densely pubescent along one side, 3–5-branched from the base. Basal and lower petioles 2–5 cm; blade simple or ternate, cordate-rounded; ultimate segments broad-ovate or ovate, 5–20 × 5–20 mm, both surfaces densely pubescent, margins crenate. Upper leaves smaller, sessile, 3-lobed, lobes ovate or lanceolate. Umbels 0.5–1 cm across, usually lateral on short peduncles; peduncles 0.2–1.5 mm; bracts and bracteoles absent; rays 2–3, 0.5–8 mm, very unequal, umbellules 2–3.5 mm across, 2(–4)-flowered; pedicels 0.2–1.5 mm, extremely unequal. Calyx teeth obsolete. Petals pale pink or purple, obovate or broad-ovate, apex with incurved lobule. Stylopodium low-conic or flat; styles ca. 1 × stylopodium. Fruit ovoid, ca. 1.8 × 1.3 mm, base cordate, surface glabrous; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. May–Jul, fr. Aug.

• Shaded damp areas, among rocks along streams; 3000–3600 m. SW Sichuan, NW Yunnan.

**19. *Pimpinella serra*** Franchet & Savatier, *Enum. Pl. Jap.* 2: 372. 1879.

锯边茴芹 ju bian hui qin

*Sium serrum* (Franchet et Savatier) Kitagawa.

Plants annual, 40–70 cm, slender, glabrous. Roots fusiform, sometimes clustered. Stem erect, much branched above, rooting at the basal nodes. Basal and lower petioles 4–9 cm; blade ternate or 1-pinnate, pinnae 2 pairs; leaflets oblong-ovate or ovate, 5–7 × 2–4 cm, margins serrate, teeth cartilaginous, lateral leaflets sessile, terminal leaflets petiolate. Upper leaves usually reduced, 3-lobed, lobes oblong-ovate or lanceolate, 5–20 × 3–8 mm. Inflorescence much-branched, umbels 2.5–4 cm across; bracts absent, occasionally 1, lanceolate, 2–5 mm; rays 3–4, 1–3 cm, subequal; bracteoles 2–3, lanceolate, 0.5–2 mm, spreading; umbellules ca. 10 mm across, 3–5-flowered; pedicels 2–6 mm, elongating to 15 mm in fruit. Calyx teeth obsolete.

Petals white, ovate, apex with an incurved lobule. Stylopodium low-conic; styles 0.75–1 × stylopodium, spreading. Fruit ovoid, ca. 3 × 1.8 mm, base cordate, surface glabrous; vittae 3 in each furrow, 4–6 on commissure. Seed face plane. Fl. and fr. Jul–Sep.

Streamsides; 800–900 m. Anhui [Japan].

Recent molecular studies uphold Kitagawa's placement of this species in *Sium*.

**20. *Pimpinella refracta*** H. Wolff, *Repert. Spec. Nov. Regni Veg.* 27: 190. 1929.

下曲茴芹 xia qu hui qin

Plants annual, 30–45 cm, glabrous. Taproot slender. Stem solitary, much-branched, slender. Lower petioles 1–2 cm; blade 1–2-pinnate, pinnae 3–4 pairs; ultimate segments ovate-lanceolate, 10–35 × 5–20 mm. Upper leaves 3-lobed, lobes lanceolate. Umbels numerous, 3–5 cm across, very lax; bracts 1 or absent, linear, ca. 3 mm; rays 2–3, 0.4–1.8 cm, unequal, slender, divergent; bracteoles absent; umbellules ca. 5 mm across, 3–4-flowered; pedicels 1–3 mm, to 8 mm in fruit. Calyx teeth obsolete. Petals white, obcordate, apex with small incurved lobule. Stylopodium low-conic; styles ca. equal to stylopodium, spreading. Fruit ovoid, ca. 2 × 1.5 mm, base cordate, surface glabrous, usually only one mericarp matures; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. and fr. Jun–Aug.

• Shaded areas among shrubs; ca. 2000 m. SW Guizhou (Xingyi), NW Yunnan (Dêqên, Weixi).

This poorly known taxon is recorded only from a few collections. The illustration in *FRPS* (55(2): 87. 1985) does not agree with the type of this species (*Forrest 14885*) and is something different.

**21. *Pimpinella flaccida*** C. B. Clarke, *J. Linn. Soc., Bot.* 25: 28. 1889.

细软茴芹 xi ruan hui qin

*Carum flaccidum* (C. B. Clarke) Franchet; *Pimpinella duclouxii* H. de Boissieu.

Plants annual, 30–60 cm, slender, sparsely puberulent. Taproot, 4–8 × ca. 0.3 cm. Stem branched from base. Basal petioles 0.5–3 mm; blade 1–2-ternate or 1-pinnate, pinnae 2 pairs; ultimate segments oblong-ovate or broad-ovate, 4–5 × 3–5 cm, margins crenate or coarsely serrate. Cauline leaves similar to basal, smaller, 3-lobed, lobes lanceolate. Umbels 2–3.5 cm across, spreading; bracts and bracteoles absent; rays 2–6, 0.5–2 cm, glabrous; umbellules 4–7 mm across, 2–8-flowered; pedicels 0.5–2, elongating to 10 mm in fruit. Calyx teeth obsolete. Petals white, obovate or ovate, apex with incurved lobule. Stylopodium low-conic; styles ca. 1 × stylopodium. Fruit ovoid, ca. 1 × 1 mm, base cordate, surface glabrous (occasionally papillose); vittae 3 in each furrow, 4–6 on commissure. Seed face plane. Fl. Apr–Jun, fr. Jul–Sep.  $2n = 20^*$ .

Forests, among shrubs, grassy slopes, alpine meadows; 2200–3800 m. W Sichuan, NW Yunnan [NE India].

Specimens attributed to this taxon have been confused with *Trachyspermum scaberulum*. Further work is needed to clarify the status of this Indian species in China.

**22. *Pimpinella grisea*** H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 184. 1929.

灰叶茴芹 hui ye hui qin

Plants biennial, 60–80 cm, slender, pubescent throughout. Taproot slender, short, ca. 5 cm. Stems several, much-branched. Lower petioles 3–7 cm; blade ternate; leaflets ovate, 10–30 × 3–5 mm, margins serrate. Upper leaves smaller, 1-pinnate, pinnae 2–3 pairs, or 3-lobed; lobes lanceolate or linear. Umbels numerous, 1–2 cm across; bracts and bracteoles absent; rays 4–5, 5–10 mm, unequal; umbellules ca. 5 mm across, 5–10-flowered; pedicels 1–2.5 mm. Calyx teeth obsolete. Petals white, cordate-ovate, base cuneate, apex with incurved lobule. Stylopodium low-conic; styles ca. 2 × stylopodium, reflexed. Young fruit ovoid, base cordate, surface pubescent (mature fruit not known). Fl. and fr. Jun–Sep.

• Grassy slopes in valleys; 1200–4000 m. SE Xizang, NW Yunnan (Dèqên).

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

**23. *Pimpinella niitakayamensis*** Hayata, Icon. Pl. Formos. 10: 20. 1921.

台湾茴芹 tai wan hui qin

*Pimpinella astilbifolia* Hayata.

Plants perennial, 10–40 cm, pubescent to nearly glabrous. Root cylindrical, ca. 10 × 0.3 cm. Stems little-branched or unbranched. Basal petioles 5–10 cm; blade oblong-ovate in outline, 4–8(–20) × 1.5–3 cm, 1-pinnate; pinnae 2–4 pairs, remote, sessile, broad-ovate or suborbicular, rarely 2–3-lobed, 10–20 × 5–15 mm, base truncate, margins dentate, apex obtuse or rounded. Cauline leaves few, 1–2-pinnate, pinnae lanceolate, deeply lacerate. Umbels terminal, (2–)5–7 cm across, occasionally lateral; bracts 1–3, linear-lanceolate, 5–8 mm; rays 6–8(–12), 2–3(–4) cm, hirsute; bracteoles 1–5, linear, 2–4 mm; umbellules 5–11 mm across, 6–8-flowered; pedicels 0.5–4 mm, very unequal. Calyx teeth obsolete. Petals white or cream, apex with small incurved lobule. Stylopodium short conic; styles ca. equal to stylopodium. Fruit ovoid, 2–3 × 1.5–2 mm, base cordate, surface glabrous; vittae 2–3 in each furrow, 4–6 on commissure. Seed face plane. Fl. May–Sep, fr. Aug–Oct.  $2n = 18^*, 20^*$ .

• Mossy places in forests, grassy slopes; 2000–3500 m. Taiwan.

**24. *Pimpinella thellungiana*** H. Wolff in Engler, Pflanzenr. 90(IV. 228): 304. 1927.

羊红膻 yang hong shan

Plants perennial, 30–80(–110) cm, shortly pubescent. Root cylindrical, 50–150 × 5–10 mm. Stem little-branched. Basal and lower petioles 5–20 cm; blade oblong-ovate in outline, 4–17 × 2–6 cm, 1-pinnate; pinnae 3–5 pairs, ovate or ovate-lanceolate, 10–40(–70) × 5–20(–40) mm, margins lacerate-incised or pinatifid, adaxially sparsely pubescent, abaxially densely pubescent. Upper leaves smaller, 1-pinnate, pinnae 2–3 pairs, or reduced to bladeless sheaths. Umbels (2.5–)4–6 cm across; bracts and bracteoles absent; rays 8–20(–25), 2–3(–4) cm, subequal, filiform, glabrous; umbellules 7–12 mm across, 10–25-flower-

ed; pedicels 1.5–5 mm, unequal, glabrous. Calyx teeth obsolete. Petals white, ovate or obovate, apex with incurved lobule. Stylopodium conic; styles ca. 2–3 × stylopodium, spreading. Fruit oblong-ovoid, ca. 3 × 2 mm, glabrous; vittae 3 in each furrow, 4–6 on commissure. Seed face plane. Fl. Jun–Aug, fr. Aug–Oct.

Forests, among shrubs, grassy slopes; 600–2300 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [SE Russia].

This species has reputed medicinal value (in Shaanxi).

**25. *Pimpinella cnidioides*** H. Pearson ex H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 183. 1929.

蛇床茴芹 she chuang hui qin

*Pimpinella thellungiana* H. Wolff var. *tenuisecta* Y. C. Chu.

Plants perennial, 20–40 cm, sparsely pubescent. Root cylindrical, 7–10 × ca. 1 cm. Stem little-branched. Basal and lower petioles 5–20 cm; blade 2-pinnate; primary pinnae 5–6 pairs; secondary pinnae broad linear, 5–15 × 1–2 mm, sparsely pubescent. Upper leaves reduced, 1-pinnate or 3-lobed, lobes linear. Umbels 3–5 cm across; bracts and bracteoles absent; rays 15–25, 2–4 cm; umbellules 5–10 mm across, 15–20-flowered; pedicels 2–4 mm. Calyx teeth obsolete. Petals white, obovate, base shortly clawed, apex with small incurved lobule. Stylopodium conic; styles ca. 3 × stylopodium. Fruit oblong-ovoid, ca. 3 × 2.5 mm, base cordate, glabrous; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. Jun–Jul, fr. Aug–Sep.

• Grassy slopes. Hebei, Heilongjiang, Jilin.

**26. *Pimpinella filipedicellata*** S. L. Liou, Acta Phytotax. Sin. 28: 145. 1990.

细柄茴芹 xi bing hui qin

Plants perennial, ca. 40 cm, glabrous throughout. Roots unknown. Stem little-branched. Lower petioles 9–11 cm; blade broad-ovate or triangular-ovate in outline, 7.5–10 × 3.5–5 cm, 2–3-pinnate; primary pinnae 4–5 pairs; ultimate segments lanceolate. Upper leaves reduced, smaller. Umbels 10–14 cm across; bracts and bracteoles absent; rays 6–8, 3.5–5 cm; umbellules 15–20 mm across, 9–14-flowered; pedicels 5–10 mm, filiform. Calyx teeth obsolete. Petals white, broad obovate, base narrow, apex with small incurved lobule. Stylopodium domed; styles ca. 1 × stylopodium, spreading. Fruit oblong-ovoid, 5–7 × 2.5–3 mm, glabrous; vittae 3 in each furrow, 4 on commissure. Seed face slightly concave. Fl. and fr. Aug–Sep.

• Montane rock crevices. E Xizang (Lhorong).

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

**27. *Pimpinella helosciadoidea*** H. de Boissieu, Bull. Herb. Boissier, sér. 2, 2: 809. 1902.

沼泽茴芹 zhao sheng hui qin

Plants perennial, 50–70 cm, glabrous. Root fibrous. Stem branched. Lower petioles 7–10 cm; blade ternate-2–3-pinnate; ultimate segments ovate-lanceolate or lanceolate, 10–20 × 5–10



mm, pubescent on the veins. Upper leaves smaller. Umbels 3–4.5 cm across; bracts absent; rays 20–30, 5–30 mm, extremely unequal; bracteoles 3–5, linear, 1.5–3 mm, ca. equal to or shorter than pedicels; umbellules 4–6 mm across, 10–20-flowered; pedicels 2–3 mm. Calyx teeth obsolete. Petals white, obovate, base cuneate, apex with incurved lobule. Stylopodium conic; styles ca. 2 × stylopodium, reflexed. Fruit ovoid, 2.5–3 × ca. 2 mm, base cordate, surface glabrous; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. Jun–Jul, fr. Aug–Sep.

• Montane forests, grassy slopes; 1300–1600 m. W Hubei, NE Sichuan.

**28. *Pimpinella brachystyla*** Handel-Mazzetti, Oesterr. Bot. Z. 82: 251. 1933.

短柱茴芹 *duan zhu hui qin*

*Pimpinella nakaiana* Kitagawa; *Spuriopimpinella brachystyla* (Handel-Mazzetti) Kitagawa.

Plants perennial, 30–80 cm, puberulent. Root fusiform, 4–8 × 0.3–0.6 cm. Stem 2–4-branched. Basal and lower petioles 4–15 cm; blade 2-ternate or ternate-2-pinnate; ultimate segments ovate or broad-ovate, 2–5 × 1.5–3 cm, abaxially glaucous, pubescent, margins serrate. Upper leaves 2-ternate or pinnate; ultimate segments oblong-ovate or lanceolate. Umbels 3–4 cm across; bracts absent, occasionally 1, linear-lanceolate, 3–5 mm; rays 4–6(–8), 1.5–2.5 cm, extremely unequal; bracteoles 2–4, linear, 0.5–3 mm, ca. equal to or shorter than pedicels; umbellules 5–7 mm across, 5–10-flowered; pedicels 1–3 mm. Calyx teeth obsolete. Petals white, broad-ovate, apex with incurved lobule. Stylopodium conic; styles ca. equal to stylopodium. Fruit ovoid, ca. 2 × 1.5 mm, base cordate, surface glabrous; vittae 3–4 in each furrow, 4–6 on commissure. Seed face plane. Fl. Jun–Jul, fr. Aug–Sep.

• Moist valley sides, grassy slopes, streamsides; 500–2000 m. Gansu, Hebei, Nei Mongol, Shanxi.

**29. *Pimpinella acuminata*** (Edgeworth) C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 686. 1879.

尖叶茴芹 *jian ye hui qin*

*Reutera acuminata* Edgeworth, Trans. Linn. Soc. London 20: 52. 1846; *Pimpinella hazariensis* H. Wolff.

Plants perennial, 60–100 cm, glabrous. Root cylindrical, 3–8 × ca. 0.8 cm. Stem little-branched, often tinged purple at base. Lower petioles 6–14 cm; blade ternate-2-pinnate; primary pinnae 4–5 pairs; ultimate segments ovate or lanceolate, 10–20 × 5–10 mm, abaxially pubescent along veins, margins irregularly incised. Upper leaves smaller, 1–2-pinnate or 3-lobed, lobes lanceolate. Umbels 4–10(–14) cm across; bracts 5–6, linear, 3–20 mm; rays 4–10(–13), 2–3 cm in flower, subequal, lengthening to 5–6 cm and spreading in fruit; bracteoles 2–6, linear-filiform, 2–13 mm; umbellules 9–15 mm across, 5–12-flowered; pedicels 0.5–6 mm, very unequal, lengthening to 10–20 mm in fruit. Calyx teeth obsolete. Petals white, broad-ovate, abaxially pilose, apex notched with incurved lobule. Stylopodium conic; styles ca. equal to stylopodium. Fruit ovoid, 2–3 × ca. 2 mm, base cordate, surface glabrous; vittae 2–3 in each furrow, 2 on commissure. Seed face slightly concave. Fl. Jun–Jul, fr. Aug–Sep.

Forests, forest margins, grassy slopes; 2000–2300 m. Qinghai, W Sichuan, Xizang, NW Yunnan [NW India, Kashmir, Pakistan].

**30. *Pimpinella nyingchiensis*** Z. H. Pan & K. Yao, Acta Phytotax. Sin. 30: 263. 1992.

林芝茴芹 *lin zhi hui qin*

Plants perennial, 40–50 cm, glabrous. Rootstock slender, swollen at nodes. Stem 2–3-branched. Basal petioles ca. 7 cm, purplish at base; blade broad-ovate in outline, 8–10 × 12–14 cm, ternate-2–3-pinnate; ultimate segments ovate or broad-ovate, 1.2–1.5 × 1–1.2 cm, abaxially papillose-scaly along the main veins and rachis. Cauline leaves similar to basal, smaller, sessile, 1–2-pinnate or 3-lobed. Umbels 2.5–4 cm across; bracts 1, reduced to sheath with aristate tip, ca. 5 mm; rays 5–8, 1.5–2.5 cm, subequal, scabrid; bracteoles 3–6, linear, ca. 2 mm, umbellules ca. 15 mm across, 12–14-flowered; pedicels 1–4 mm, unequal. Calyx teeth obsolete. Petals white, obovate, unequal, base shortly clawed, apex with incurved lobule. Stylopodium flattened; styles 2–3 × stylopodium. Fruit ovoid, ca. 2 × 1.8 mm, base cordate, surface glabrous; vittae 2–3 in each furrow, 4 on commissure. Seed face plane. Fl. and fr. Jul–Sep.

• Forests; ca. 3100 m. SE Xizang (Nyingchi).

This poorly known taxon is recorded only from the type gathering.

**31. *Pimpinella caudata*** (Franchet) H. Wolff in Engler, Pflanzenz. 90(IV. 228): 279. 1927.

尾尖茴芹 *wei jian hui qin*

*Carum caudatum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 126. 1894.

Plants perennial, 30–45 cm, glabrous throughout. Root cylindrical, 10–15 × ca. 0.4 cm. Stem 2–3-branched. Basal and lower petioles 3–8 cm; blade 2-ternate; ultimate segments oblong-ovate or ovate, 1.5–2.5 × 1–1.5 cm, margins coarsely serrate, apex acuminate caudate. Upper leaves 1-pinnate, pinnae lanceolate. Umbels 4–6 cm across; bracts 2(–4), linear, 5–8 mm; rays 10–15, 2–3(–8) cm; bracteoles 1–6, linear, 1.5–3 mm, ca. equal to or shorter than pedicels; umbellules 4–6 mm across, 8–15-flowered; pedicels 2–3 mm. Calyx teeth obsolete. Petals white, obcordate, apex with incurved lobule. Stylopodium short conic; styles 2–3 × stylopodium. Fruit ovoid, ca. 2.5 × 2 mm, base cordate, surface glabrous; vittae 3 in each furrow, 6 on commissure. Seed face plane. Fl. and fr. Jul–Sep.

• Mossy forests, open forests, among shrubs, alpine meadows; 3000–3600 m. W Sichuan, E Xizang, NW Yunnan.

**32. *Pimpinella triternata*** Diels, Bot. Jahrb. Syst. 29: 496. 1900.

三出叶茴芹 *san chu ye hui qin*

Plants perennial, 30–150 cm, glabrous. Root fusiform. Basal petioles 3–7 cm; blade triangular-ovate in outline, 10–20 × 10–25 cm, 3-ternate; leaflets oblong-lanceolate or oblong-rhombic, 1–3 × 1–2 cm, margins serrate or pinnatifid. Cauline leaves similar to basal, 3-lobed, lobes linear-lanceolate, or reduced to bladeless sheaths. Umbels 3–7 cm across, terminal umbels with hermaphrodite and sterile flowers, flowers in lateral umbels all sterile; bracts absent; rays 5–7, 4–5 cm, shortly pubescent; brac-

teoles few, linear, 2–14 mm; umbellules ca. 6 mm across in flower, to 16 mm across in fruit, many-flowered; pedicels 2.5–3 mm, about equal, those of the fertile flowers elongating to 7 mm in fruit. Calyx teeth obsolete. Petals white, ovate or oblong-ovate, apex mucronate, without incurved lobule. Stylopodium conic; styles 2–4 × stylopodium. Fruit ovoid, 1.5–2.8 × 0.5–1.8 mm, base cordate, surface glabrous; vittae 3–4 in each furrow, 2–4 on commissure. Seed face slightly concave. Fl. and fr. Jul–Sep.

• Forest margins, grasslands; 800–1700 m. Chongqing (Chengkou, Nanchuan).

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

**33. *Pimpinella henryi*** Diels, Bot. Jahrb. Syst. 29: 495. 1900.

川鄂茴芹 chuan e hui qin

*Pimpinella sutchuensis* H. de Boissieu.

Plants perennial, 50–100 cm, stout, essentially glabrous. Root cylindrical, ca. 8 × 0.7 cm. Stem 3–5-branched. Basal petioles 18–25 cm; blade 2-ternate; leaflets oblong-ovate or oblong-rhombic, 4–12 × 2–10 cm, margins coarsely serrate or irregularly incised. Cauline leaves similar to basal, 1-pinnate or 3-lobed. Umbels 5–10 cm across; bracts absent, occasionally 1, ca. 2 mm; rays 15–25, 2–4 cm, unequal, scabrid; bracteoles 1–2, linear, ca. 1.5 mm, or absent; umbellules 5–8 mm across, 15–30-flowered, polygamous; pedicels 2–3 mm, subequal, filiform, those of fertile flowers elongating to 6 mm in fruit. Calyx teeth obsolete. Petals white, oblong-ovate, apex mucronate, not inflexed. Stylopodium conic; styles 2–4 × stylopodium, reflexed. Fruit cordate-ovoid, ca. 1.5 × 1.5 mm, glabrous; vittae 3 in each furrow, 4–6 on commissure. Seed face slightly concave. Fl. May–Jul, fr. Aug–Sep.

• Forests, forest margins, grasslands, streamsides; 1500–3100 m. Gansu, W Hubei, Shaanxi, Sichuan.

**34. *Pimpinella rhomboidea*** Diels, Bot. Jahrb. Syst. 29: 496. 1900.

菱叶茴芹 ling ye hui qin

Plants perennial, 50–100 cm, stout, mostly glabrous (except leaves). Root cylindrical, 10–20 × ca. 1 cm. Stem 2–4-branched. Basal leaves few, petioles 10–20 cm; blade 2-ternate; leaflets pubescent on the veins, margins coarsely serrate or irregularly incised, apex caudate; lateral leaflets oblong-ovate, 5–8 × 2–5 cm; terminal leaflets broad-ovate or rhombic, 7–9 × 3–9 cm. Cauline leaves similar to basal, smaller, sessile, 3-lobed. Umbels 3–10 cm across; bracts 1–5, linear, ca. 5 mm, or absent; rays 10–25, 0.5–4(–6.5) cm, unequal, slender; bracteoles 2–5, linear, 0.5–3 mm, ca. equal to or shorter than pedicels; umbellules 4–8 mm across, 15–30-flowered, polygamous; pedicels 0.5–3 mm in flower, in fertile flowers elongating to 8 mm in fruit. Calyx teeth obsolete. Petals white, oblong-ovate, apex mucronate or faintly incurved. Stylopodium conic; styles 2–4 × stylopodium, reflexed. Fruit ovoid, ca. 1.5 × 1.4 mm, base cordate, surface glabrous; vittae 3 in each furrow, 6 on commissure. Seed face slightly concave. Fl. May–Jul, fr. Aug–Sep.

• Forests, among shrubs, alpine meadows, moist grassland along streams; 900–3700 m. Gansu, Guizhou, Hebei, Henan, Shaanxi, Sichuan.

- 1a. Basal leaves 2-ternate, ultimate segments 5–8 × 2–5 cm ..... 34a. var. *rhomboidea*
- 1b. Basal leaves ternate-2-pinnate, ultimate segments 1–1.5 × 0.5–1 cm ..... 34b. var. *tenuiloba*

**34a. *Pimpinella rhomboidea* var. *rhomboidea***

菱叶茴芹(原变种) ling ye hui qin (yuan bian zhong)

Basal leaves 2-ternate; ultimate segments 5–8 × 2–5 cm.

• Forests, among shrubs, moist grassland along streams; 900–3700 m. Gansu, Guizhou, Hebei, Henan, Shaanxi, Sichuan.

**34b. *Pimpinella rhomboidea* var. *tenuiloba*** R. H. Shan & F. T. Pu, Acta Phytotax. Sin. 27: 63. 1989.

小菱叶茴芹 xiao ling ye hui qin

Basal leaves ternate-2-pinnate, ultimate segments 1–1.5 × 0.5–1 cm.

• Alpine meadows; 2600–3400 m. W Sichuan.

**35. *Pimpinella purpurea*** (Franchet) H. de Boissieu, Bull. Soc. Bot. France 53: 428. 1906.

紫瓣茴芹 zi ban hui qin

*Carum purpureum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 27. 1894; *Pimpinella markgrafiana* Fedde ex H. Wolff.

Plants perennial, 30–80 cm, glabrous (pubescent only along abaxial leaf veins and at base of umbels and umbellules). Root cylindrical, 5–20 × 0.5–1 cm. Stem 1–2-branched. Basal petioles 3–25 cm; blade triangular-ovate in outline, 2-ternate, or 1–2-pinnate; pinnae 2–3 pairs; ultimate segments ovate or oblong-ovate, 1–5 × 0.5–3.5 cm, margins serrate or incised. Cauline leaves similar to basal, 1-pinnate or 3-lobed, lobes lanceolate. Umbels 3–6 cm across; bracts 1–2, linear or like uppermost leaf, 8–15 mm, or absent; rays 10–17, 2–6.5 cm, unequal, pubescent; bracteoles 2–3, linear, 3–6 mm, ca. equal to pedicels; umbellules 9–11 mm across, 10–20-flowered; pedicels 1.5–3.5 mm, unequal. Calyx teeth conspicuous, linear-lanceolate, 0.3–0.8 mm, unequal. Petals purple, oblong-ovate or broad-ovate, base shortly clawed, apex mucronate, without incurved lobule. Stylopodium short conic, or flat; styles 0.5–1.5 × stylopodium, spreading. Fruit ovoid, ca. 1.7 × 1.1 mm, base cordate, surface glabrous; vittae 3 in each furrow, 4 on commissure. Seed face slightly concave. Fl. Jul–Aug, fr. Sep–Oct.

Forests, among shrubs, grasslands, alpine meadows; 3000–3800 m. NW Yunnan [N Myanmar].

**36. *Pimpinella pimpinellisimulacrum*** (Farille & S. B. Malla) Farille, Candollea 40: 554. 1985.

喜马拉雅茴芹 xi ma la ya hui qin

*Similisinocarum pimpinellisimulacrum* Farille & S. B. Malla, Bull. Soc. Bot. France, Lett. Bot. 131: 70. 1984.

Plants perennial, 10–30 cm, slender, glabrous. Taproot slen-

der. Stem erect, simple. Leaves mostly basal, petioles 2–3 cm; blade ternate, orbicular to oval in outline, 2–3 × 3–4 cm; leaflets 3(–5)-lobed. Upper leaves 1–2, similar to basal or absent. Umbels 3–5 cm across; bracts (0–)1–2, linear, apex entire, rarely 2–3-fid; rays 4–6(–10), 2–3 cm, subequal, slender, scaberulous at apex; bracteoles 3–6, linear, 4–6 mm, entire, spreading to reflexed; umbellules 6–8-flowered; pedicels 3–5 mm. Calyx teeth minute, triangular, ca. 0.2 mm. Petals purple, base shortly clawed, apex short, narrow. Stylopodium domed; styles 1–1.5 × stylopodium, spreading or reflexed. Young fruit narrowly ovoid-ellipsoid, ca. 2 × 1 mm, glabrous; vittae 3 in each furrow, 4–6 on commissure (mature fruit not known). Seed face plane. Fl. & fr. Sep–Oct.

Among dwarf shrubs, alpine valleys, grassland along streams; 4100–4500 m. S Xizang (near Nyalam) [Nepal].

This incompletely known taxon is recorded only from a few collections. The slender, glabrous stem, inconspicuous calyx teeth, clawed petals, and ellipsoid fruit resemble *Simocarum*, and further work is needed.

**37. *Pimpinella liana*** M. Hiroe, *Umbell. Asia* 1: 60. 1958 [“*liana*”].

景东茴芹 jing dong hui qin

Plants perennial, 30–60 cm, mostly glabrous. Root fusiform. Basal petioles 8–15 cm; blade 2-ternate; ultimate segments ovate, rhombic, 2.5–7 × 1.5–5 cm, abaxially glaucous, sparsely pubescent, margins serrate, or incised. Cauline leaves similar to basal, 1-pinnate or 3-lobed; lobes ovate or lanceolate, 20–30 × 5–10 mm. Umbels 6–8 cm across; bracts absent; rays 6–15, 3–5 cm, unequal; bracteoles 1–7, linear, 3–4 mm, ca. equal to or shorter than pedicels; umbellules ca. 12 mm across, 10–20-flowered; pedicels 1.5–6 mm. Calyx teeth conspicuous, lanceolate, ca. 0.3 mm. Petals white, ovate or broad-ovate, apex mucronate, without incurved lobule. Stylopodium conic; styles 2–3 × stylopodium. Fruit oblong-ovoid, ca. 2.5 × 1.5 mm, base cordate, glabrous; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. Jul–Aug, fr. Sep–Oct.

- Forests, grassy slopes; 1200–2400 m. W Yunnan (Jingdong).

This incompletely known taxon is recorded only from a few collections.

**38. *Pimpinella brachycarpa*** (Komarov) Nakai, *J. Coll. Sci. Imp. Univ. Tokyo* 26(1): 261. 1909.

短果茴芹 duan guo hui qin

*Pimpinella calycina* Maximowicz var. *brachycarpa* Komarov, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 25: 145. 1905; *Aegopodium brachycarpum* (Komarov) Schischkin; *Spuriopimpinella brachycarpa* (Komarov) Kitagawa.

Plants perennial, 70–85 cm, essentially glabrous. Root fibrous. Stem 2–3-branched. Basal petioles 6–10 cm; blade ternate, rarely 2-ternate; leaflets pubescent on veins, margins coarsely serrate; lateral leaflets ovate, 3–8 × 4–6.5 cm; terminal leaflets broad-ovate, 5–8 × 4–6 cm. Cauline leaves similar to basal, sessile, 3-lobed, lobes lanceolate. Umbels 3–6 cm across; bracts absent, rarely 1–3, linear, 5–12 mm; rays 7–15, 2–4 cm; bracteoles 2–5, linear, 2–5 mm, shorter than pedicels; umbellules

ca. 10 mm across, 15–20-flowered, polygamous; pedicels 2–4 mm. Calyx teeth conspicuous, lanceolate, ca. 0.3 mm. Petals white, obcordate, apex with small incurved lobule. Stylopodium conic; styles 2–3 × stylopodium. Fruit ovoid, ca. 2 × 1.8 mm, base cordate, surface glabrous; vittae 2–3 in each furrow, 6 on commissure. Seed face plane. Fl. Jun–Jul, fr. Aug–Sep.

Forest margins, river banks; 500–900 m. Guizhou, Hebei, Jilin, Liaoning, Shanxi [N Korea, SE Russia].

**39. *Pimpinella koreana*** (Y. Yabe) Nakai, *J. Coll. Sci. Imp. Univ. Tokyo* 26(1): 261. 1909.

朝鲜茴芹 chao xian hui qin

*Pimpinella nikoensis* Y. Yabe var. *koreana* Y. Yabe, *Bot. Mag. (Tokyo)* 17: 106. 1958; *Spuriopimpinella koreana* (Y. Yabe) Kitagawa.

Plants perennial, 40–60 cm, essentially glabrous. Root fibrous. Stem 2–3-branched. Basal and lower petioles 5–12 cm; blade 1–2-ternate; lateral leaflets ovate or oblong-ovate, terminal leaflets rhombic, 3–10 × 1–5 cm, pubescent on veins, margins coarsely serrate or incised. Upper leaves smaller, sessile, 3-lobed, lobes ovate or lanceolate. Umbels 4–6 cm across; bracts absent, occasionally 2–3, linear, ca. 5 mm; rays 5–15, 3–4 cm; bracteoles 2–6, linear-lanceolate, 1.5–2.5 mm, ca. equal to or shorter than pedicels; umbellules 6–12 mm across, 10–20-flowered, polygamous; pedicels 1.5–5 mm, very unequal. Calyx teeth conspicuous, lanceolate, 0.4–0.6 mm, unequal. Petals white, apex with incurved lobule. Stylopodium conic; styles ca. 2 × stylopodium, reflexed. Fruit ovoid, ca. 1 × 0.8 mm, base cordate, glabrous; vittae 2–3 in each furrow, 4 on commissure. Seed face plane. Fl. and fr. Jul–Oct.

Forests, moist grassland along streams; 500–1500 m. Zhejiang [Japan, Korea].

**40. *Pimpinella calycina*** Maximowicz, *Bull. Acad. Imp. Sci. Saint-Petersbourg* 19: 182. 1873.

具萼茴芹 ju e hui qin

*Spuriopimpinella calycina* (Maximowicz) Kitagawa.

Plants perennial, ca. 40 cm, essentially glabrous. Root fusiform, sometimes clustered. Stem branched. Basal petioles 4–6 cm; blade 2-ternate; leaflets ovate or oblong-ovate, 1–2 × 1–1.5 cm. Cauline leaves similar to basal, petiole up to 15 cm; blade 1–2-ternate; lateral leaflets oblong-ovate or ovate, usually 2-lobed, terminal leaflets oblong-rhombic, 4–10 × 2–4 cm, pubescent on veins, 3-lobed, lobes lanceolate. Umbels (3–)6–10 cm across; bracts 3–5, linear-lanceolate, 3–8 mm, sometimes like uppermost leaf; rays 6–12(–15), 2–4(–8) cm, subequal; bracteoles 5(–8), linear-lanceolate or subulate, 1–2 mm, shorter than pedicels; umbellules 4–10 mm across, 10–15-flowered; pedicels 3–6 mm, very unequal. Calyx teeth conspicuous, lanceolate or narrowly triangular, 0.5–0.8 mm. Petals white, obovate or obcordate, apex with incurved lobule. Stylopodium conic; styles 2–3 × stylopodium. Fruit oblong-ovoid, ca. 5 × 2 mm, glabrous; vittae 2–3(–4) in each furrow, 4 on commissure. Seed face plane. Fl. Jun–Aug, fr. Sep–Oct.

Thickets, grassy slopes. NE China (unlocalized specimen) [Japan, Korea].

**41. *Pimpinella valleculosa*** K. T. Fu, Fl. Tsinling. 1(3): 457. 1981.

谷生茴芹 gu sheng hui qin

Plants perennial, 50–100 cm, glabrous. Root cylindrical, 10–15 × ca. 0.5 cm. Stem purplish. Basal petioles 3–12 cm; blade 3–4-pinnate; ultimate segments linear, 5–25 × 1–2 mm. Cauline leaves similar to basal, 1-pinnate or 3-lobed. Umbels 5–10 cm across; bracts absent; rays 6–10, 1–2.5 cm, unequal; bracteoles 3–7, linear, 3–4 mm, ca. equal to or shorter than pedicels; umbellules 5–15 mm across, 6–13-flowered; pedicels 4–6 mm. Calyx teeth conspicuous, acute or subulate, ca. 0.3 mm. Petals white, apex with incurved lobule. Stylopodium short conic; styles 2–3 × stylopodium, recurved. Fruit oblong-ovoid, 2.5–3 × 1.5–2 mm, glabrous; vittae 3 in each furrow, 6 on commissure. Seed face plane. Fl. Jul–Aug, fr. Sep–Nov.

• Shaded valleys, grassy slopes; 400–1200 m. SE Gansu, E Hubei, S Shaanxi, NE Sichuan.

**42. *Pimpinella xizangensis*** R. H. Shan & F. T. Pu, Acta Phytotax. Sin. 24: 311. 1986.

多花茴芹 duo hua hui qin

Plants perennial, 80–100 cm, glabrous. Root cylindrical, ca. 10 × ca. 0.4 mm. Stem 2–3-branched, base clothed with fibrous remnant sheaths. Basal petioles 5–10 cm; blade triangular in outline, 10–15 × 5–10 cm, ternate-2-pinnate, primary pinnae 4–5 pairs; ultimate segments broad-ovate or suborbicular, 1–2 × 1–1.5 cm, margins coarsely serrate. Cauline leaves similar to basal, smaller, ternate-1-pinnate or 3-lobed. Umbels 6–8 cm across, mainly terminal, lateral umbels 2–3; bracts 1–3, lanceolate, 16–20 × 1–2 mm; rays 6–8, 4–6 cm, subequal; bracteoles 4–6, linear, 3–4 mm; umbellules 5–8 mm across; many-flowered; pedicels 4–6 mm. Calyx teeth conspicuous, triangular, ca. 0.3 mm. Petals white, broad-ovate, apex slightly incurved. Stylopodium domed; styles ca. 1 × stylopodium. Fruit ovoid, ca. 4 × 2.5 mm, base cordate; vittae 1 in each furrow, 2 on commissure. Seed face plane. Fl. Jun–Jul, fr. Jul–Sep.

• Valley forests; ca. 2700 m. S Xizang (Lhünzê).

This species is recorded only from a few collections.

**43. *Pimpinella arguta*** Diels, Bot. Jahrb. Syst. 29: 496. 1900.

锐叶茴芹 rui ye hui qin

Plants perennial, 40–100 cm, glabrous. Root fusiform or napiform, 3–6 × ca. 0.7 cm. Stem 2–3-branched. Basal petioles 6–10 cm; blade 2–3-ternate; ultimate segments ovate-lanceolate or rhombic, 2–6 × 1–2 cm, abaxially pubescent on veins, margins sharply serrate, apex acuminate or caudate. Cauline leaves similar to basal, 2-ternate or 3-lobed. Umbels 1.5–4 cm across; bracts (0–)2–6, linear, ca. 2 mm; rays 9–20, 2–7 cm, very unequal; bracteoles 3–8, linear-filiform, ca. 1 mm, shorter than pedicels; umbellules 5–8 mm across, 10–25-flowered, polygamous; pedicels 2–3 mm, elongating to 7 mm in fruit. Calyx teeth conspicuous, lanceolate, ca. 0.5 mm. Petals white, obovate, apex with incurved lobule. Stylopodium conic; styles 2–3 × stylopodium, reflexed. Fruit ovoid, ca. 4 × 3 mm, base cordate, surface glabrous; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. Jun–Aug, fr. Aug–Oct.

• Coniferous forests, grassland and scrub at forest margins; 1300–3400 m. Gansu, Guizhou, Hebei, Henan, Hubei, Shaanxi, Sichuan.

**44. *Pimpinella komarovii*** (Kitagawa) R. H. Shan & F. T. Pu in R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(2): 111. 1985.

辽冀茴芹 liao ji hui qin

*Spuriopimpinella komarovii* Kitagawa, J. Jap. Bot. 17: 560. 1941.

Plants perennial, ca. 1 m, pubescent. Root fusiform. Stem 3–4-branched. Basal petioles 7–20 cm; blade 1–3-ternate; ultimate segments ovate or ovate-lanceolate, 2–8 × 1–4 cm, abaxially glaucous, pubescent on veins. margins crenate or serrate, apex acuminate. Cauline leaves similar to basal, 2–3-ternate. Uppermost leaves 3-lobed, lobes lanceolate. Umbels 4–6 cm across; bracts absent; rays 9–15, 2–3.5 cm, unequal; bracteoles 1–3, linear, 5–10 cm, ca. equal to or shorter than pedicels; umbellules 8–12 mm across, 10–15-flowered; pedicels 5–15 mm. Calyx teeth conspicuous, lanceolate, 0.3–0.5 mm. Petals white, ovate or obovate, apex with incurved lobule. Stylopodium conic; styles 2–3 × stylopodium. Fruit cordate-ovoid, ca. 2 × 1.5–2 mm, glabrous; vittae 3 in each furrow, 4 on commissure. Seed face plane. Fl. and fr. Jun–Sep.

Grassy slopes, grassland along streams. Hebei, Heilongjiang, Liaoning [N Korea].

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

*Pimpinella bialata* H. Wolff (Repert. Spec. Nov. Regni Veg. 27: 188. 1929), described from Hubei (A. Henry 2649, holotype, ?K).

*Pimpinella crispulifolia* H. de Boissieu (Bull. Soc. Bot. France 56: 354. 1909), described from Yunnan (“Laokouychan,” F. Ducloux 4083, holotype, P).

*Pimpinella decursiva* H. Wolff (Repert. Spec. Nov. Regni Veg. 16: 237. 1920), described from Shandong (“Clarabucht, Tsingya,” Krug 232 & 463, syntypes, ?B).

*Pimpinella limprichtii* H. Wolff (Repert. Spec. Nov. Regni Veg. Beih.

12: 450. 1922), described from Hebei (Wuling Shan, 2000 m, W. Limpricht 2930, holotype, unlocalized).

*Pimpinella tagawae* M. Hiroe (Umbell. Asia 1: 61. 1958 [“tagawai”]), described from Taiwan (“Taipei” [Taipei], 1000–2000 m, M. Tagawa 105, holotype, KYO).

*Pimpinella urbaniana* Fedde ex H. Wolff (Repert. Spec. Nov. Regni Veg. 27: 330. 1930), described from Yunnan (“Tong-tsichouan” [Dongchuan], F. Ducloux 6492, holotype, P).

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