

**26. YINSHANIA** Ma & Y. Z. Zhao, *Acta Phytotax. Sin.* 17(3): 113. 1979.

阴山芥属 yin shan qi shu

*Cochleariella* Y. H. Zhang & R. Vogt; *Cochleariopsis* Y. H. Zhang (1985), not Á. Löve & D. Löve (1976); *Hilliella* (O. E. Schulz) Y. H. Zhang & H. W. Li.

Herbs annual or perennial with tubers or rhizomes. Trichomes absent or simple or 1- or 2-forked. Stems erect, ascending, or decumbent. Basal leaves not rosulate, simple, undivided or pinnately or palmately lobed, trifoliolate, or pinnately compound. Cauline leaves petiolate, not auriculate, similar to basal leaves or simple upward. Racemes few to many flowered, ebracteate or rarely bracteate throughout. Fruiting pedicels erect, ascending, divaricate, or reflexed. Sepals oblong or ovate, spreading, not saccate. Petals white or rarely pinkish, spreading, longer than sepals; blade obovate, oblong, or ovate, apex rounded; claw absent or short. Stamens 6, spreading, subequal; filaments not dilated at base; anthers ovate or oblong, apex obtuse. Median nectaries absent; lateral glands 1 on each side of lateral stamen. Ovules 1–24 per ovary. Fruit dehiscent silicles, oblong, ovoid, ellipsoid, or globose, terete, rarely slightly latiseptate or angustiseptate, sessile; valves veinless or obscurely veined, glabrous, papillate, or with simple trichomes, smooth; replum rounded; septum complete, perforated, or absent; style obsolete or to 3 mm; stigma discoid, entire. Seeds uniseriate or biseriate, wingless, oblong, ovate, reniform, orbicular, ovoid, lenticular, elliptic, ellipsoid, or globose, slightly flattened; seed coat minutely reticulate or papillate, not mucilaginous when wetted; cotyledons incumbent or rarely accumbent.

Thirteen species: China, N Vietnam; 13 species (12 endemic) in China.

All species of *Yinshania* were treated in FRPS as members of *Cochlearia*, a genus that does not occur in China, the Himalaya, or SW Asia. A few species of *Cochlearia* grow in N Russia, with the range of one extending into Japan. The record of *C. officinalis* Linnaeus in FRPS (p. 98) is likely an error. For a detailed account of *Yinshania* and its segregates see Al-Shehbaz et al. (*Harvard Pap. Bot.* 3(1): 79–94. 1998).

1a. Most or all leaves simple, entire, repand, or sinuate, rarely lowermost few trifoliolate ..... 8. *Y. sinuata*

1b. Leaves compound or pinnately lobed.

2a. Flowers bracteate along entire length or only on lower half of inflorescence.

3a. Plants annual; ovary ca. 8-ovuled, cylindric, papillate ..... 13. *Y. hui*

3b. Plants perennial; ovary ca. 4-ovuled, obovate-ellipsoid, glabrous ..... 12. *Y. hunanensis*

2b. Flowers ebracteate.

4a. Trichomes forked.

5a. Leaves and stems canescent, densely villous with trichomes 0.3–0.5(–0.6) mm ..... 6. *Y. furcatopilosa*

5b. Leaves and stems not canescent, puberulent with trichomes 0.05–0.08(–0.1) mm ..... 3. *Y. zayuensis*

4b. Trichomes simple or absent.

6a. Inflorescence rachis conspicuously flexuous.

7a. Leaves canescent, densely villous, margin of lower leaves deeply crenate; seeds 0.7–0.9 mm,

(4–)10–20 per fruit ..... 5. *Y. henryi*

7b. Leaves not canescent, glabrous or sparsely pubescent, margin of lower leaves not deeply crenate; seeds 1.5–2 mm, 2(–4) per fruit ..... 2. *Y. yixianensis*

6b. Inflorescence rachis straight.

8a. Leaflets of middle and lower leaves less than 1 cm wide.

9a. Leaves glabrous, lower ones trifoliolate; fruit papillate ..... 4. *Y. fumarioides*

9b. Leaves usually pilose, rarely glabrous, lower ones pinnate, with 2–5 pairs of lateral leaflets;

fruit glabrous or rarely pilose ..... 1. *Y. acutangula*

8b. Leaflets of middle and lower leaves more than 1 cm wide.

10a. Lower leaves with 5–9 leaflets; fruit conspicuously compressed; plants tuberous perennials ..... 11. *Y. rupicola*

10b. Lower leaves with 3(or 5) leaflets; fruit plump, not compressed; plants annuals with slender roots.

11a. Leaflet apex acuminate-caudate; fruit appressed to rachis; plants puberulent with

trichomes to 0.1 mm ..... 10. *Y. lichuanensis*

11b. Leaflet apex obtuse or acute, rarely subacuminate; fruit widely spreading or reflexed; plants glabrous throughout or rarely glabrescent.

12a. Fruit ovate or obovate, 2- or 3-seeded; style 0.5–0.8 mm; pedicel (1.5–)2.5–4

mm ..... 9. *Y. paradoxa*

12b. Fruit narrowly oblong, 7–10-seeded; style (1–)1.5–2 mm; pedicel 6–10 mm ..... 7. *Y. rivulorum*

**1. *Yinshania acutangula*** (O. E. Schulz) Y. H. Zhang, Acta Phytotax. Sin. 25: 217. 1987.

锐棱阴山芥 rui leng yin shan qi

Annuals, (8–)30–60(–100) cm tall. Stems slender, distinctly angled or subterete, branched, sparsely to densely covered with simple trichomes (0.1–)0.3–0.4(–0.5) mm, rarely glabrescent or glabrous. Basal leaves and lowermost cauline leaves pinnate, with 2–5 pairs of lateral leaflets, often withered at fruiting, pilose with subappressed, simple, straight trichomes; petiole 0.5–2 cm; leaflets membranous, oblong or ovate-lanceolate, 5–20 × 2–9 mm, sparsely pubescent or rarely glabrous, base cuneate, margin deeply serrate or entire, apex obtuse, with a minute callose mucro; upper cauline leaves similar to lower ones but progressively shorter upward. Racemes terminal and lateral, many flowered, elongated in fruit. Fruiting pedicels 4–7 mm, slender, straight, divaricate or slightly recurved, glabrous or pilose. Sepals ovate, 1–1.5 mm. Petals white, obovate, 2–2.5 × ca. 0.7 mm. Filaments ca. 1 mm. Ovules (2–)4–20(–24) per ovary. Fruit oblong-linear, oblong, narrowly ovoid, or globose, 1.5–4 × 1–1.5 mm, not compressed, sessile; valves membranous, papillate or pilose; style 0.5–0.8 mm. Seeds brown, oblong-ovate, 0.6–1(–1.1) × 0.4–0.5(–0.6) mm, reticulate. Fl. Jul–Aug, fr. Aug–Oct.

• Mountain slopes, meadows, rock crevices, valleys, fields, among bushes, roadsides, dry areas; 900–3000 m. Gansu, Hebei, Nei Mongol, Qinghai, Shaanxi, Sichuan.

1a. Fruit oblong to oblong-linear, rarely narrowly ovoid; seeds (10–)14–20(–24) per fruit, 0.6–0.8 mm ..... 1a. subsp. *acutangula*

1b. Fruit globose, rarely globose-ovoid; seeds 2–4(–6) per fruit, 0.8–1(–1.1) mm.

2a. Fruit pilose; stems obscurely angled to subterete ..... 1b. subsp. *microcarpa*

2b. Fruit minutely papillate or glabrous; stems distinctly angled ..... 1c. subsp. *wilsonii*

**1a. *Yinshania acutangula*** subsp. *acutangula*

锐棱阴山芥(原亚种) rui leng yin shan qi (yuan ya zhong)

*Cochlearia acutangula* O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 10: 554. 1929; *Rorippa villosa* R. F. Huang; *Yinshania acutangula* var. *albiflora* (Ma & Y. Z. Zhao) Y. H. Zhang; *Y. albiflora* Ma & Y. Z. Zhao; *Y. albiflora* var. *gobica* Z. X. An; *Y. wenxianensis* Y. H. Zhang; *Y. wenxianensis* var. *songpanensis* Y. H. Zhang.

Stems distinctly angled. Fruit oblong to oblong-linear, rarely narrowly ovoid, glabrous or minutely papillate.

Seeds (10–)14–20(–24) per fruit, 0.6–0.8 mm. Fl. Jul–Aug, fr. Aug–Oct.  $2n = 14^*$ .

• Mountain slopes, meadows, rock crevices, valleys, fields, among bushes, roadsides, dry areas; 900–3000 m. Gansu, Hebei, Nei Mongol, Qinghai, Shaanxi, Sichuan.

**1b. *Yinshania acutangula*** subsp. *microcarpa* (K. C. Kuan) Al-Shehbaz et al., Harvard Pap. Bot. 3(1): 83. 1998.

小果阴山芥 xiao guo yin shan qi

*Cochlearia microcarpa* K. C. Kuan, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 1980(8): 40. 1980; *Yinshania microcarpa* (K. C. Kuan) Y. H. Zhang.

Stems obscurely angled to subterete. Fruit globose, pilose. Seeds 2–4(–6) per fruit, 0.8–1(–1.1) mm. Fr. Aug.

• Dry areas by rocks; ca. 1100 m. Gansu, Sichuan.

**1c. *Yinshania acutangula*** subsp. *wilsonii* (O. E. Schulz) Al-Shehbaz et al., Harvard Pap. Bot. 3(1): 83. 1998.

威氏阴山芥 wei shi yin shan qi

*Cochlearia henryi* (Oliver) O. E. Schulz var. *wilsonii* O. E. Schulz, Repert. Spec. Nov. Regni Veg. 38: 108. 1935; *Yinshania qianningensis* Y. H. Zhang; *Y. qianningensis* var. *brachybotrys* Y. H. Zhang.

Stems distinctly angled. Fruit globose, rarely globose-ovoid, minutely papillate or glabrous. Seeds 2–4(–6) per fruit, 0.8–1(–1.1) mm. Fl. Jul–Aug, fr. Aug–Oct.  $2n = 12^*$ .

• Valleys, roadsides; 1400–3000 m. Gansu, Sichuan.

**2. *Yinshania yixianensis*** (Y. H. Zhang) Al-Shehbaz et al., Harvard Pap. Bot. 3(1): 84. 1998.

黟县阴山芥 yi xian yin shan qi

*Hilliella yixianensis* Y. H. Zhang, Acta Phytotax. Sin. 33: 94. 1995.

Annuals or biennials. Stems erect, 40–90 cm tall, striate, glabrous or rarely pilose with simple trichomes. Basal and median cauline leaves compound, with 2 or 3 pairs of lateral leaflets; petiole 0.5–1.5 cm; leaflets thin papery, ovate or elliptic, 1–4 × 0.8–1.7 cm, hispidulous, base obtuse or cuneate, margin obtusely dentate with the teeth mucronate, apex acute; petiolule to 5 mm; uppermost cauline leaves smaller, with fewer teeth and lateral leaflets. Racemes terminal and lateral, elongated considerably in fruit; rachis conspicuously flexuous, slender. Fruiting pedicels slender, 5–6 mm. Sepals elliptic, ca. 1.5 × 0.5 mm, spreading. Petals white, spreading, ovate, ca. 2.5 × 1.5 mm. Fruit subglobose-obovoid, ca. 3.5 × 2.5 mm; valves papillate. Seeds 2(–4) per fruit, ovoid, 1.5–2 mm. Fr. Jul.  $2n = 42^*$ .

• Roadsides; ca. 200 m. Anhui.

**3. *Yinshania zayuensis*** Y. H. Zhang, Acta Phytotax. Sin. 25: 214. 1987.

察隅阴山芥 cha yu yin shan qi

*Yinshania exiensis* Y. H. Zhang; *Y. ganluoensis* Y. H. Zhang.

Annuals, (14–)30–60 cm tall. Stems erect, simple or branched, puberulent with forked and bifurcate trichomes 0.05–0.08(–0.1) mm, rarely glabrous above. Leaves pinnatisect; petiole 2–7 mm; leaf blade oblong, 0.6–3 × 0.4–1.5(–2.3) cm, puberulent with minute, simple and forked trichomes, rarely glabrescent; terminal lobe oblong, 3–15 × 1–5 mm, base cuneate, margin serrate or subentire, apex acute; lateral lobes 1–3 pairs, 1.5–13 × 0.5–3 mm. Racemes paniculate; rachis straight or rarely flexuous. Fruiting pedicels divaricate or ascending, slender, straight, 5–10 mm, pubescent or glabrous. Sepals oblong, 1–1.6 × 0.5–0.7 mm, white at margin and apex. Petals white or rarely pinkish, 1.5–2 × 0.7–1 mm. Filaments 1.1–1.2 mm; anthers oblong, ca. 0.2 mm. Ovules 16–20 per ovary. Fruit oblong, ellipsoid, or ovoid, plump, (2–)2.5–4 × 0.9–1.6 mm; valves with distinct midvein and reticulate veins, glabrous; style 0.1–0.5 mm. Seeds dark brown, ovate, 0.6–0.9 × 0.4–0.6 mm, reticulate. Fl. and fr. Jul–Aug.

• Woods; 2600–3000 m. Hubei, Sichuan, Xizang, Yunnan.

**4. *Yinshania fumarioides*** (Dunn) Y. Z. Zhao, Acta Sci. Nat. Univ. Intramongol. 23: 568. 1992.

紫堇叶阴山芥 zi jing ye yin shan qi

*Cochlearia fumarioides* Dunn, J. Linn. Soc., Bot. 38: 355. 1908; *Cochlearia warburgii* O. E. Schulz; *Cochleariella zhejiangensis* (Y. H. Zhang) Y. H. Zhang & R. Vogt; *Cochleariopsis warburgii* (O. E. Schulz) L. L. Lou; *Cochleariopsis zhejiangensis* Y. H. Zhang; *Hilliella fumarioides* (Dunn) Y. H. Zhang & H. W. Li; *H. warburgii* (O. E. Schulz) Y. H. Zhang & H. W. Li; *H. warburgii* var. *albiflora* S. X. Qian; *Yinshania warburgii* (O. E. Schulz) Y. Z. Zhao; *Y. zhejiangensis* (Y. H. Zhang) Y. Z. Zhao.

Annuals, (5–)10–20(–35) cm tall, glabrous throughout except for papillate fruit valves. Stems slender, branched below or above. Basal and lowermost cauline leaves 3-foliolate; petiole 0.2–3 cm, not winged; terminal leaflet ovate or suborbicular, 0.7–1.5(–2) cm × 4–10 mm, base cuneate or subcordate, margin lobed, without apiculate callosities, apex truncate or emarginate; lateral leaflets obliquely ovate, 2.3–11 × 1.2–8 mm, margin lobed or crenate; uppermost leaves simple, gradually smaller upward. Racemes several to many flowered, ebracteate; rachis slender, only somewhat flexuous. Fruiting pedicels slender, horizontal or slightly reflexed, (3–)6–10 mm, straight or slightly recurved, glabrous. Sepals oblong, 0.9–1.2 × 0.5–0.6 mm, glabrous. Petals white, obovate, 1.8–2.1 × 0.9–1.3 mm, base shortly clawed, apex rounded. Filaments 0.7–

0.9(–1.3) mm; anthers oblong-ovate, 0.2–0.4 mm. Fruit suborbicular, 1.5–2.5 mm in diam., plump; valves densely papillate, appearing minutely papillate or subglabrous when young; style 0.2–0.5 mm. Seeds 2 per fruit, brown, broadly ovate to ovate-oblong, 1.2–1.5 × 0.8–1.1 mm, minutely papillate. Fl. and fr. May–Aug.

• Wet slopes, rocky cliffs, forests, along streams; 400–1000 m. Anhui, Fujian, Zhejiang.

**5. *Yinshania henryi*** (Oliver) Y. H. Zhang, Acta Phytotax. Sin. 25: 213. 1987.

柔毛阴山芥 rou mao yin shan qi

*Nasturtium henryi* Oliver, Hooker's Icon. Pl. 18: t. 1719. 1887; *Cochlearia henryi* (Oliver) O. E. Schulz; *N. kouytchense* H. Léveillé.

Annuals, 15–35(–50) cm tall. Stems branched, terete. Leaves 3–5(–9)-foliolate, canescent, usually densely pubescent with straight simple trichomes (0.5–)0.6–1 mm; petiole 1.5–6 cm; terminal leaflet broadly ovate or suborbicular, rarely narrowly ovate, 1.5–2.5 × 0.8–2.8 cm, base slightly cordate or subtruncate, margin 3-lobed, lobes deeply crenate, ending in a small callose mucro, apex rounded; lateral leaflets petiolate or sessile, blade 6–10 mm, base attenuate. Racemes ebracteate, elongated in fruit; rachis slender, slightly to strongly flexuous, at least apically. Fruiting pedicels slender, straight, spreading, 5–10(–15) mm, pubescent or rarely glabrous. Sepals oblong, 1.5–2 × 0.7–1.2 mm, pubescent outside. Petals white, obovate, 2–3.5 × 1–1.5 mm, base shortly clawed, apex rounded. Filaments 1.3–2 mm; anthers ovate, ca. 0.3 mm. Fruit narrowly oblong, oblong-lanceolate, or sublinear, (2.5–)3–5 × 1–1.2 mm, plump; valves navicular, pubescent or sometimes glabrous, thickened at margin; septum complete or perforate; style 0.3–0.7(–1.2) mm. Seeds (2–)5–10 in each locule, brown, reticulate, ovate, 0.7–0.9 × 0.5–0.7 mm. Fl. and fr. Jun–Sep.  $2n = 12^*$ .

• Mountain slopes, rocky areas, valleys; 800–1200 m. Guizhou, Hubei, Sichuan, Yunnan.

**6. *Yinshania furcatopilosa*** (K. C. Kuan) Y. H. Zhang, Acta Phytotax. Sin. 25: 214. 1987.

叉毛阴山芥 cha mao yin shan qi

*Cochlearia furcatopilosa* K. C. Kuan, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 1980(8): 41. 1980.

Annuals, 10–20(–30) cm tall, canescent, densely covered with forked trichomes. Stems erect, branched, terete. Basal and lower cauline leaves 3–5-foliolate, canescent, densely pubescent with bifurcate trichomes 0.25–0.5(–0.6) mm; petiole 1–3(–4.5) cm; terminal leaflet ovate, rarely oblong or subreniform, 0.6–1.2 × 0.4–1.5 cm, base subtruncate or rounded, margin lobed or crenate, not ending in callose apiculae, apex rounded; lateral leaflets suborbicular or ovate, 3–6 × 2–7 mm,

margin crenate or entire. Uppermost leaves simple, pubescent; petiole 1–6 mm; leaf blade oblong, 3–10 × 1.5–4.5 mm, base rounded, margin entire, apex obtuse. Racemes paniculate, ebracteate; rachis distinctly flexuous. Fruiting pedicels divaricate, straight, slender, (3–)5–9(–12) mm, glabrous or pubescent at base. Sepals oblong, 1.2–1.6 × 0.8–0.9 mm, glabrous, white at margin and apex. Petals white, obovate, 3–3.3 × 1.6–2 mm, base shortly clawed, apex rounded. Filaments 1–1.6 mm; anthers oblong-ovate, ca. 0.3 mm. Ovules 8–12 per ovary. Fruit ovate or obovate, rarely oblong, 1.7–2.5(–3) × 0.8–1.1 mm; valves not veined, glabrous; septum perforate; style 0.4–0.5 mm. Seeds brown, oblong, 0.7–0.8 × 0.3–0.4 mm, finely papillate, narrowly margined. Fl. and fr. Jun–Jul.  $2n = 12^*$ .

• Mountain slopes, rocky areas, roadsides; 800–1600 m. Hubei.

**7. *Yinshania rivulorum*** (Dunn) Al-Shehbaz et al., Harvard Pap. Bot. 3(1): 87. 1998.

河岸阴山芥 he an yin shan qi

*Nasturtium rivulorum* Dunn, J. Linn. Soc., Bot. 38: 354. 1908; *Cochlearia formosana* Hayata; *C. rivulorum* (Dunn) O. E. Schulz; *Hilliella alatipes* (Handel-Mazzetti) Y. H. Zhang & H. W. Li var. *micrantha* Y. H. Zhang; *H. formosana* (Hayata) Y. H. Zhang & H. W. Li; *H. rivulorum* (Dunn) Y. H. Zhang & H. W. Li; *Yinshania formosana* (Hayata) Y. Z. Zhao.

Annuals, 8–50 cm tall, glabrous throughout. Basal and lowermost cauline leaves trifoliolate, rarely 1 simple; petiole 4–10 cm, gradually shorter upward, not winged; leaflet blade ovate, oblong, or rarely lanceolate, 1–5 × 0.8–3 cm, papery, base cordate, rounded, or cuneate, margin repand or rarely sinuate-toothed, with conspicuous callose mucros terminating veins, apex obtuse or acute; petiolule 2–12 mm, longer on terminal leaflet. Upper leaves similar to lower ones, becoming simple at the inflorescence. Racemes lax, ebracteate; rachis straight. Fruiting pedicels 6–10 mm, slender, straight, reflexed. Sepals 1–2 mm. Petals white, obovate, 1.5–2.5 mm, minutely clawed. Filaments white, 1–2 mm; anthers ca. 0.2 mm. Fruit oblong, 3–6 × ca. 1.5 mm, papillate when immature; septum absent; style 0.5–0.8 mm. Seeds 7–10, oblong, 0.8–1 × ca. 0.5 mm. Fl. and fr. Apr–Dec.

• Shady river banks, mountain slopes; 300–800 m. Fujian, Hunan, Taiwan.

**8. *Yinshania sinuata*** (K. C. Kuan) Al-Shehbaz et al., Harvard Pap. Bot. 3(1): 88. 1998.

弯缺阴山芥 wan que yin shan qi

Annuals, (8–)15–30 cm tall, glabrous throughout. Stems erect or subdecumbent, branched. Petiole 0.5–5 cm; leaf blade simple or rarely lowermost trifoliolate, ovate, 1.5–6 × 1–4 cm, base cordate or subtruncate, margin sinuate or repand, with apiculate callosities at vein tips, apex obtuse. Racemes ebracteate; rachis straight. Fruiting pedicels slender, reflexed, (5–)8–12 mm, straight, glabrous. Sepals oblong-ovate, 1.7–2.5 ×

0.8–1.1 mm, glabrous, narrowly membranous at margin and apex. Petals white, obovate, 2.5–3 × 1.2–1.7 mm, base shortly clawed, apex rounded. Filaments 1.5–2 mm; anthers 0.4–0.6 mm. Fruit oblong, 6–12 × 1.7–2.3 mm, glabrous; style 0.8–1.5 mm. Seeds (5–)7–14(–21), brown, ovate, 0.8–1.3 mm.

• Forests, mountain slopes, rock crevices, shady moist sand; near sea level to 700 m. Anhui, Guangdong, Hunan, Jiangxi.

- 1a. Lowermost leaves simple; seeds 0.8–0.9 mm ..... 8a. subsp. *sinuata*
- 1b. At least some lowermost leaves trifoliolate; seeds 1.2–1.3 mm ..... 8b. subsp. *qianwuensis*

**8a. *Yinshania sinuata* subsp. *sinuata***

弯缺阴山芥(原亚种) wan que yin shan qi (yuan ya zhong)

*Cochlearia sinuata* K. C. Kuan, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 1980(8): 39. 1980; *Hilliella sinuata* (K. C. Kuan) Y. H. Zhang & H. W. Li.

Lowermost leaves always simple. Fruit 5–10 mm. Seeds 0.8–0.9 mm. Fl. Mar, fr. May.  $2n = 42^*$ .

• Dense forests, mountain slopes, rock crevices, shady moist sand; near sea level to 200 m. Anhui, Guangdong, Hunan, Jiangxi.

**8b. *Yinshania sinuata* subsp. *qianwuensis*** (Y. H. Zhang) Al-Shehbaz et al., Harvard Pap. Bot. 3(1): 89. 1998.

寻乌阴山芥 xun wu yin shan qi

*Hilliella sinuata* (K. C. Kuan) Y. H. Zhang & H. W. Li var. *qianwuensis* Y. H. Zhang, Acta Bot. Yunnan. 8: 405. 1986.

At least some of the lowermost leaves trifoliolate. Fruit 6–13 mm. Seeds 1.2–1.3 mm. Fr. May.

• Forests; 200–700 m. Jiangxi.

**9. *Yinshania paradoxa*** (Hance) Y. Z. Zhao, Acta Sci. Nat. Univ. Intramongol. 23: 567. 1992.

卵叶阴山芥 luan ye yin shan qi

*Cardamine paradoxa* Hance, J. Bot. 6: 111. 1868; *Cochlearia paradoxa* (Hance) O. E. Schulz; *Hilliella paradoxa* (Hance) Y. H. Zhang & H. W. Li.

Annuals, 30–70 cm tall, glabrous throughout or rarely puberulent with minute simple trichomes to 0.06 mm. Stems erect, angled, simple or branched above. Basal and lowermost cauline leaves 3(or 5)-foliolate; petiole 4–8 cm; leaflet blade ovate, oblong, or lanceolate, 1.5–5(–6) × 1–2(–3) cm, base subtruncate, cuneate, obtuse, or oblique, margin crenate or repand and with mucronate callosities terminating veins, apex obtuse or acute and mucronate; petiolule of terminal leaflets 0.2–2 cm. Racemes terminal and lateral, ebracteate; rachis slender, straight or subflexuous apically. Fruiting pedicels (1.5–)2.5–4 mm, straight, spreading or reflexed. Sepals oblong, 1.5–2 mm. Petals white, obovate, 2–2.5 mm, apex rounded; claw to 1 mm. Filaments white,

1.5–2 mm; anthers oblong, ca. 0.4 mm. Fruit ovoid or ellipsoid, 3–4 × 2–2.5 mm; valves glabrous; septum absent; style 1–2 mm. Seeds 2 or 3, oblong, 1.5–1.8 × ca. 1 mm. Fl. Apr–Nov, fr. May–Dec. *2n* = 42\*. Mountain slopes, valleys, roadsides; 300–1000 m. Guangdong, Guangxi, Hubei, Sichuan [N Vietnam].

The above first record from Vietnam is based on *Harder, Loc & Tai 4294* (IEBR, MO).

**10. *Yinshania lichuanensis*** (Y. H. Zhang) Al-Shehbaz et al., *Harvard Pap. Bot.* 3(1): 90. 1998.

利川阴山芥 *li chuan yin shan qi*

*Hilliella lichuanensis* Y. H. Zhang, *Acta Bot. Yunnan.* 9: 158. 1987; *Cochlearia changhuaensis* (Y. H. Zhang) L. L. Lou; *C. lichuanensis* (Y. H. Zhang) L. L. Lou; *C. longistyla* (Y. H. Zhang) L. L. Lou; *H. changhuaensis* Y. H. Zhang; *H. guangdongensis* Y. H. Zhang; *H. longistyla* Y. H. Zhang.

Annuals or perennials, (40–)60–110 cm tall, puberulent with simple trichomes 0.03–0.08(–0.1) mm. Stems erect, sulcate. Basal and lowermost cauline leaves 3–5-foliolate; petiole 2.5–7 cm, usually narrowly winged, grooved and sparsely to densely puberulent adaxially; leaflet blade lanceolate, (3–)6–14 × (0.8–)2–5 cm, terminal ones usually larger, base cuneate, rounded, or oblique, margin serrate or irregularly dentate, mucronate, apex acuminate-caudate, abaxially puberulent, adaxially sparsely puberulent at least on veins; petiolule of lateral leaflets obsolete to 5 mm. Uppermost leaves simple or rarely 3-foliolate, similar in morphology to leaflets of lower leaves. Racemes terminal and lateral, elongated considerably in fruit. Fruiting pedicels straight, slender, 2–5 mm, erect-ascending, subappressed to rachis. Sepals oblong, 2–2.5 mm. Petals white, spatulate, 2.5–3(–3.5) × ca. 1 mm, base clawed. Filaments white, 2–2.5 mm; anthers oblong, 0.5–0.7 mm. Fruit obovoid, oblong, or ellipsoid, 3–5 × 1.5–2 mm; valves thick; gynophore obsolete or to 0.5 mm; septum absent; style 0.5–1.5(–2) mm. Seeds 1–3, brown to blackish brown, oblong, 1.5–2.5 × 1–1.4 mm, reticulate. Fl. May–Jun, fr. Jun–Aug. *2n* = 42\*.

• Limestone areas, wet valleys, shady woods, mountain slopes, roadsides, along streams; 300–1200. Anhui, Fujian, Guangdong, Jiangxi, Zhejiang.

**11. *Yinshania rupicola*** (D. C. Zhang & J. Z. Shao) Al-Shehbaz et al., *Harvard Pap. Bot.* 3(1): 91. 1998.

石生阴山芥 *shi sheng yin shan qi*

Perennials, 30–100 cm tall, with a thick tuberous rhizome 2–4 cm wide, glabrous throughout. Stems 1 or few from rhizome, erect, sulcate, branched above. Basal and lowermost cauline leaves compound, 5–9-foliolate; petiole (3–)8–15(–20) cm; leaflets broadly oblong, ovate, or lanceolate, (2–)4–7(–10) × (1–)2–3(–4) cm, base oblique, cuneate, or subtruncate, margin coarsely

serrate with a distinct mucro at tooth apex, apex obtusely acuminate with a distinct mucro; petiolule 1–5(–20) mm. Upper cauline leaves 3- or 5-foliolate, becoming gradually smaller and narrower upward. Racemes terminal and lateral, many flowered; lowermost flowers sometimes bracteate. Fruiting pedicels filiform, recurved to reflexed, 4–10 mm. Sepals oblong, 1.5–2 mm, whitish at margin. Petals white, oblong or obovate, 2–4 × 1–2 mm, apex rounded; claw to 1 mm. Filaments white, 1–1.5 mm; anthers ovate, ca. 0.5 mm. Fruit suborbicular-obovate or narrowly elliptic, conspicuously flattened parallel to replum, 2.5–6 × 2–3(–4) mm; valves obscurely veined; septum sometimes absent; gynophore ca. 0.5 mm; style (0.5–)1–2 mm. Seeds 2 or 3, brown, ovate-oblong, flat, 1.2–1.8 × 0.6–1.5 mm. Fl. May–Sep, fr. Jun–Oct.

• Forests, wet places, valleys, along streams, rock crevices in wet shady places; 700–1200 m. Anhui, Fujian, Guangxi, Hunan, Jiangxi, Sichuan.

- 1a. Fruit narrowly elliptic, 5–6 × 2–2.5 mm ..... 11a. subsp. *rupicola*
- 1b. Fruit suborbicular-obovate, 2.5–4 × 2.5–4 mm ..... 11b. subsp. *shuangpaiensis*

**11a. *Yinshania rupicola*** subsp. ***rupicola***

石生阴山芥(原亚种) *shi sheng yin shan qi* (*yuan ya zhong*)

*Cochlearia rupicola* D. C. Zhang & J. Z. Shao, *Acta Phytotax. Sin.* 24: 404. 1986; *Hilliella rupicola* (D. C. Zhang & J. Z. Shao) Y. H. Zhang.

Petals white. Fruit narrowly elliptic, 5–6 × 2–2.5 mm. Fl. May, fr. Jun.

• Forests, rock crevices in wet shady places; 1000–1200 m. Anhui.

**11b. *Yinshania rupicola*** subsp. ***shuangpaiensis*** (Z. Y. Li) Al-Shehbaz et al., *Harvard Pap. Bot.* 3(1): 92. 1998.

双牌阴山芥 *shuang pai yin shan qi*

*Hilliella shuangpaiensis* Z. Y. Li, *Acta Bot. Yunnan.* 10: 117. 1988; *H. xiangguiensis* Y. H. Zhang.

Petals white or lilac. Fruit suborbicular-obovate, 2.5–3 × ca. 3 mm. Fl. May–Sep, fr. Jun–Oct. *2n* = 44\*.

• Forests, wet places, valleys, along streams; 700–1000 m. Fujian, Guangxi, Hunan, Jiangxi, Sichuan.

The above first record from Jiangxi is based on *Xiong Bing 1566* (MO).

**12. *Yinshania hunanensis*** (Y. H. Zhang) Al-Shehbaz et al., *Harvard Pap. Bot.* 3(1): 92. 1998.

湖南阴山芥 *hu nan yin shan qi*

*Hilliella hunanensis* Y. H. Zhang, *Acta Bot. Yunnan.* 9: 160. 1987.

Perennials, glabrous throughout. Rhizomes thick, to 5 mm in diam. Stems slender, branched from base, ascending. Basal and lowermost cauline leaves 5-

foliolate; petiole 5–8.5 cm; leaflets thin, broadly ovate or suborbicular, (0.5–)1–2.5(–3.5) × (5–)1–2(–2.5) cm, margin shallowly 5–7-lobed or repand, veins ending in a distinct mucro; terminal leaflet cuneate or subcordate at base, lateral leaflets oblique at base; petiolule (2–)5–10(–30) mm. Middle and upper cauline leaves gradually reduced in size, 3-foliolate. Racemes bracteate along lower half; bracts simple or lowermost 3-foliolate, considerably reduced in size upward. Fruiting pedicels slender, often recurved, 0.8–1.5 cm. Sepals 1.5–1.7 mm. Petals white, 2–2.5 × ca. 1.5 mm. Filaments ca. 1 mm; anthers ca. 0.3 mm. Fruit broadly elliptic or suborbicular, (3–)4–6 × 3–4(–5) mm, flattened; valves glabrous, inconspicuously veined; gynophore ca. 0.5 mm; style (0.5–)1–2(–3) mm. Seeds 2 or 3, oblong, 1.5–2 × 0.7–1.2 mm, minutely papillate. Fl. May–Jun, fr. Jun–Aug.

• Rocky areas, valleys, streamsides, dense forests; 500–1600 m. Guangxi, Hunan, Jiangxi.

**13. *Yinshania hui*** (O. E. Schulz) Y. Z. Zhao, Acta Sci. Nat. Univ. Intramongol. 23: 567. 1992.

武功山阴山荠 wu gong shan yin shan qi

*Cochlearia hui* O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 8: 546. 1923; *Hilliella hui* (O. E. Schulz) Y. H. Zhang & H. W. Li.

Annuals, glabrous throughout, 15–20 cm tall. Stems branched, flexuous. Basal leaves trifoliolate; petiole ca. 3 cm; terminal leaflet ovate or subcordate, 1–2 cm, unequally coarsely crenate, apex emarginate and mucronulate; lateral leaflets smaller and with shorter petiolules, obliquely ovate; middle cauline leaves ca. 1 cm, trifoliolate, with ovate terminal leaflet and much smaller lateral leaflets; uppermost leaves simple. Racemes lax, 8–10-flowered, bracteate to apex. Lowermost pedicels to 1.5 cm. Sepals oblong-ovate, ca. 2 mm. Petals white or pink, ca. 3 mm, ovate, cuneate at base, rounded at apex. Stamens 2–2.5 cm; anthers oblong, ca. 0.5 mm. Pistil narrowly cylindrical; ovary 8-ovuled; style ca. 0.7 mm. Immature fruit ellipsoid, ca. 1.5 mm; valves minutely papillate. Fl. Apr.

• About 1500 m. Jiangxi.

