

51. CRUCIHIMALAYA Al-Shehbaz et al., Novon 9: 298. 1999.

须弥芥属 *xu mi jie shu*

Herbs annual or biennial, rarely perennial with a caudex. Trichomes simple and stalked, 1- or 2-forked, sometimes stellate. Stems erect or ascending. Basal leaves rosulate or not, entire or dentate, rarely pinnately lobed. Cauline leaves sessile or subsessile, usually auriculate or sagittate, entire, dentate, or rarely pinnately lobed, rarely absent. Racemes several to many flowered, ebracteate or bracteate. Fruiting pedicels erect, ascending, or divaricate. Sepals oblong, erect, pubescent, base of lateral pair not saccate. Petals white, pink, or purple, longer than sepals; blade spatulate, rounded; claw obscurely distinct from blade. Stamens 6, erect, slightly tetradynamous; filaments not dilated at base; anthers ovate or oblong, obtuse at apex. Nectar glands confluent and subtending bases of filament. Ovules (30–)40–120(–150) per ovary. Fruit dehiscent siliques, linear, terete or somewhat 4-angled, rarely latiseptate, sessile or subsessile; valves with a distinct midvein, glabrous or rarely pubescent, smooth or torulose; replum rounded; septum complete; style to 1 mm; stigma capitate, entire. Seeds uniseriate, wingless, oblong, plump; seed coat minutely reticulate, mucilaginous when wetted; cotyledons incumbent.

Nine species: C and SW Asia, Himalayas, Mongolia, Russia; six species in China.

- 1a. Fruit valves densely and coarsely stellate; pedicels pubescent all around; fruit often subappressed to rachis ..... 2. *C. lasiocarpa*
- 1b. Fruit valves glabrous or very rarely puberulent; pedicels glabrous adaxially, rarely (*C. wallichii*) pubescent all around; fruit not appressed to rachis.
  - 2a. Cauline leaves distinctly auriculate or amplexicaul at base.
    - 3a. Racemes bracteate at least along proximal portion; annuals or biennials; cauline leaves usually auriculate; upper leaves coarsely stellate ..... 4. *C. himalaica*
    - 3b. Racemes ebracteate; perennials; cauline leaves sagittate or amplexicaul; upper leaves softly stellate ..... 1. *C. mollissima*
  - 2b. Cauline leaves petiolate or sessile, neither auriculate nor amplexicaul, sometimes absent.
    - 4a. Lowermost flowers of main raceme ebracteate; basal leaves lyrate or pinnatifid, often canescent, persistent in flower and fruit ..... 6. *C. wallichii*
    - 4b. Lowermost flowers of main raceme bracteate; basal leaves entire or dentate, not canescent, withered by flowering or fruiting.
      - 5a. Cauline leaves adaxially with simple and forked trichomes, ovate, elliptic, or oblong, rarely oblanceolate; plants 4–15(–20) cm tall; main raceme bracteate nearly throughout ..... 5. *C. axillaris*
      - 5b. Cauline leaves adaxially with stellate stalked trichomes, linear-lanceolate; plants (18–)30–85(–120) cm tall; only lowermost flowers of main raceme bracteate ..... 3. *C. stricta*

1. *Crucihimalaya mollissima* (C. A. Meyer) Al-Shehbaz et al., Novon 9: 299. 1999.

柔毛须弥芥 *rou mao xu mi jie*

*Sisymbrium mollissimum* C. A. Meyer in Ledebour, Fl. Altaic. 3: 140. 1831; *Arabidopsis mollissima* (C. A. Meyer) N. Busch; *A. mollissima* var. *dentata* O. E. Schulz; *A. mollissima* var. *glaberrima* (J. D. Hooker & Thomson) O. E. Schulz; *A. mollissima* var. *pamirica* (Korshinsky) O. E. Schulz; *A. mollissima* var. *thomsonii* (J. D. Hooker) O. E. Schulz; *Hesperis mollissima* (C. A. Meyer) Kuntze; *Sisymbrium mollissimum* C. A. Meyer f. *pamiricum* Korshinsky; *S. thomsonii* J. D. Hooker; *Stenophragma mollissimum* (C. A. Meyer) B. Fedtschenko.

Herbs perennial, (5–)10–40(–60) cm tall. Stems erect, simple or few to many branched at base, densely pubescent, with short-stalked, stellate trichomes, often basally hirsute with horizontal simple or forked trichomes to 1.8 mm, rarely glabrous or glabrescent. Basal leaves rosulate, petiolate, often remaining

throughout growing season; petiole (0.2–)0.5–1.7(–3) cm, often ciliate, base persistent; leaf blade spatulate, oblanceolate, or oblong, (0.6–)1–2.5(–5) cm × 2–8(–15) mm, finely stellate pubescent, margin coarsely dentate or rarely subentire, apex obtuse. Middle cauline leaves ovate or narrowly oblong or lanceolate, sessile, 0.7–2.5(–4) cm × 2–7(–10) mm, finely stellate pubescent or rarely glabrescent, base sagittate or amplexicaul, margin entire or rarely repand or dentate, apex acute. Racemes ebracteate. Fruiting pedicels slender, stellate pubescent laterally and abaxially, glabrous adaxially, divaricate, (3–)4–10(–16) mm. Sepals often pink, oblong, 2–2.5 × 0.8–1 mm, densely pubescent, sometimes narrowly membranous. Petals white or pink, spatulate, 3–4.5 × 0.9–1.1(–1.5) mm, attenuate to base; claw to 1 mm. Filaments 2.5–3 mm; anthers oblong, 0.4–0.6 mm. Ovules 70–120 per ovary. Fruit linear, terete, straight or often slightly curved, erect or ascending or rarely divaricate, (1.2–)2.5–3.5(–5) cm × 1–1.5 mm; valves glabrous, with a prominent midvein;

style (0.1–)0.4–0.7(–1) mm. Seeds brown, oblong, 0.8–1.1 × 0.3–0.5 mm. Fl. Jun–Aug, fr. Jul–Aug.  $2n = 16$ .

Open slopes, grassy meadows; 2600–4400 m. Gansu, Sichuan, Xinjiang, Xizang [Afghanistan, India, Kashmir, Kazakstan, Kyrgyzstan, Mongolia, Pakistan, Russia (Siberia), Tajikistan].

The records of *Crucihimalaya mollissima* in FRPS (as *Arabidopsis mollissima*) from Sichuan and Yunnan are based on misidentified plants of *C. himalaica*.

**2. *Crucihimalaya lasiocarpa*** (J. D. Hooker & Thomson) Al-Shehbaz et al., *Novon* 9: 300. 1999.

毛果须弥芥 *mao guo xu mi jie*

*Sisymbrium lasiocarpum* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 5: 162. 1861, not (F. Mueller) F. Mueller (1869); *Arabidopsis lasiocarpa* (J. D. Hooker & Thomson) O. E. Schulz; *A. lasiocarpa* var. *micrantha* W. T. Wang; *A. monachorum* (W. W. Smith) O. E. Schulz; *Guillenia duthiei* (O. E. Schulz) Bennet; *Hesperis lasiocarpa* (J. D. Hooker & Thomson) Kuntze; *Microsymbrium duthiei* O. E. Schulz; *S. bhutanicum* N. P. Balakrishnan, nom. illeg. (included *S. lasiocarpum*); *S. monachorum* W. W. Smith.

Herbs annual or biennial, (10–)25–70(–120) cm tall. Stems erect, simple or branched at base, densely hirsute with horizontal simple trichomes to 1.3 mm, these mixed throughout with much smaller, short-stalked, stellate trichomes. Basal leaves not rosulate, petiolate, often caducous by fruiting; petiole (0.3–)1–3 cm; leaf blade spatulate, (0.3–)1–5(–7) cm × (2–)6–11(–20) mm, stellate pubescent and often mixed with simple or forked trichomes, margin dentate or rarely lyrate lobed, apex obtuse. Middle cauline leaves obovate, oblong, or elliptic, sessile and broad at base, (0.6–)1–2(–2.5) cm × (3–)6–11 mm, stellate pubescent, dentate, repand, or entire, reduced in size upward. Racemes bracteate throughout or only lower flowers bracteate; bracts similar to uppermost cauline leaves. Fruiting pedicels slender, stellate pubescent all around, suberect or rarely divaricate, (0.5–)1–4(–6) mm. Sepals oblong, 1.5–2(–2.5) × 0.8–1 mm, densely pubescent, sometimes narrowly membranous. Petals white or pink, spatulate or narrowly oblanceolate, 2–3(–4) × 0.6–0.9 mm, attenuate to base; claw to 1 mm. Filaments 1.5–2.5 mm; anthers oblong-ovate, 0.3–0.4 mm. Ovules 70–160 per ovary. Fruit linear, terete, straight, appressed to rachis or rarely divaricate, (0.6–)1.5–3(–4.2) cm × 0.7–1 (–1.3) mm; valves densely stellate pubescent, with an inconspicuous midvein; style 0.3–0.6(–1) mm. Seeds light brown, oblong or subovoid, 0.5–0.6 × 0.3–0.4 mm. Fl. Apr–Aug, fr. May–Sep.

Fields, forest margins, grassy slopes, river banks, limestone scree and slopes, roadsides; 2400–4500 m. Sichuan, Xizang, Yunnan [Bhutan, India (Uttar Pradesh), Nepal].

**3. *Crucihimalaya stricta*** (Cambessèdes) Al-Shehbaz et al., *Novon* 9: 300. 1999.

直须弥芥 *zhi xu mi jie*

*Malcolmia stricta* Cambessèdes in Jacquemont, Voy. Inde 4(Bot.): 16. 1844; *Arabidopsis himalaica* (Edgeworth) O. E. Schulz var. *kunawurensis* O. E. Schulz; *A. stricta* (Cambessèdes) N. Busch; *A. stricta* var. *bracteata* O. E. Schulz; *Hesperis stricta* (Cambessèdes) Kuntze; *Sisymbrium strictum* (Cambessèdes) J. D. Hooker & Thomson.

Herbs annual or biennial, (10–)22–85(–125) cm tall. Stems erect, simple or sometimes branched at base, densely pubescent with short-stalked, stellate trichomes, often basally hirsute with horizontal simple trichomes to 1.4 mm. Basal leaves not rosulate, petiolate, often caducous by fruiting; petiole to 3 cm; leaf blade spatulate, 4–9 × 1–2 cm, stellate pubescent and sometimes mixed with simple or forked trichomes, margin coarsely dentate or rarely lyrate lobed, apex obtuse. Middle cauline leaves narrowly oblong, lanceolate-linear, or narrowly oblanceolate, sessile, (1–)2–5(–8) cm × (2–)3.5–10(–17) mm, stellate pubescent, base attenuate, margin dentate, repand, or entire. Racemes basally or rarely lowermost 1 or 2 flowers bracteate; bracts similar to uppermost cauline leaves. Fruiting pedicels slender, stellate pubescent laterally and abaxially, glabrous adaxially, divaricate or rarely ascending, (0.5–)1–4(–6) mm. Sepals oblong, 1.7–2.5 × 0.6–0.8 mm, densely pubescent, sometimes narrowly membranous. Petals white, pink, or purple, spatulate, 2.5–3(–4) × 0.7–1 mm, attenuate to base; claw to 1 mm. Filaments 2–2.8 mm; anthers oblong, 0.4–0.6 mm. Ovules 60–120 per ovary. Fruit linear, terete, straight or curved, divaricate or rarely ascending, (1–)2–4(–5.5) cm × 0.6–1 mm; valves glabrous or very rarely puberulent, with a conspicuous midvein; style (0.2–)0.6–1.3(–1.8) mm. Seeds brown, oblong or subovoid, uniseriate, 0.6–0.9 × 0.3–0.4 mm. Fl. Apr–Aug, fr. May–Sep.

Forest margins, grassy areas; 1600–2400(–4200) m. Xizang [India, Kashmir, Nepal, Pakistan].

The record of *Crucihimalaya stricta* in FRPS (as *Arabidopsis stricta*) from Sichuan is based on misidentified plants of *C. himalaica*.

**4. *Crucihimalaya himalaica*** (Edgeworth) Al-Shehbaz et al., *Novon* 9: 301. 1999.

须弥芥 *xu mi jie*

*Arabis himalaica* Edgeworth, Trans. Linn. Soc. London 20: 31. 1846; *Arabidopsis brevicaulis* (Jafri) Jafri; *A. himalaica* (Edgeworth) O. E. Schulz; *A. himalaica* var. *harrissii* O. E. Schulz; *A. himalaica* var. *integrifolia* O. E. Schulz; *A. himalaica* var. *rupestris* (Edgeworth) O. E. Schulz; *Arabis brevicaulis* Jafri; *A. rupestris* Edgeworth; *Hesperis himalaica* (Edgeworth) Kuntze; *Sisymbrium himalaicum* (Edgeworth) J. D. Hooker & Thomson; *S. rupestre* (Edgeworth) J. D. Hooker & Thomson.

Herbs annual or biennial, very rarely perennial, (3–)10–50(–70) cm tall. Stems erect, simple or few to many branched at base, densely pubescent with coarse,

stalked, stellate and forked trichomes, often basally hirsute with horizontal, simple or forked trichomes to 1.8 mm, rarely glabrescent distally. Basal leaves rosulate, petiolate, often withered by fruiting; petiole (0.3–)0.7–1.5(–2) cm, often ciliate; leaf blade spatulate, oblanceolate, ovate, or oblong, (0.4–)1–3(–4) cm × 2–10(–14) mm, densely pubescent with coarse, stalked, stellate and forked trichomes, margin coarsely dentate or rarely subentire, apex obtuse. Middle cauline leaves oblong, rarely ovate or lanceolate, sessile, 0.5–2.5(–3.2) cm × 2–7(–11) mm, pubescent as basal leaves, rarely glabrescent, base auriculate or rarely sagittate, margin coarsely dentate or rarely entire, apex acute. Racemes bracteate along entire length or only lowermost few flowers bracteate. Fruiting pedicels slender, stellate pubescent laterally and abaxially, glabrous adaxially, divaricate, (1–)2–7(–11) mm. Sepals often pink, oblong, 1.5–2.5(–3) × 0.7–1 mm, densely pubescent, sometimes narrowly membranous. Petals purple, pink, or rarely white, spatulate, 2–3.5(–5) × (0.6–)1–1.5(–2) mm, attenuate to base; claw to 1 mm. Filaments 1.5–3 mm; anthers oblong, 0.3–0.5 mm. Ovules 50–110 per ovary. Fruit linear, terete, straight or rarely slightly curved, erect or divaricate-ascending, (0.8–)1.5–3.5(–4.5) cm × (0.4–)0.5–0.8(–1) mm; valves glabrous or rarely puberulent, with an obscure or rarely prominent midvein; style (0.1–)0.4–0.6 mm. Seeds brown, oblong, 0.5–0.8 × 0.2–0.4 mm. Fl. (Mar)Apr–Sep, fr. Jun–Oct.  $2n = 16$ .

Rocky hillsides, grassy meadows, sandy slopes, flood plains, scree, pastures; (1500–)2600–4400(–5000) m. Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Kashmir, Nepal, Pakistan, Sikkim].

**5. *Crucihimalaya axillaris*** (J. D. Hooker & Thomson) Al-Shehbaz et al., *Novon* 9: 301. 1999.

腋花须弥芥 *ye hua xu mi jie*

*Sisymbrium axillare* J. D. Hooker & Thomson, *J. Proc. Linn. Soc., Bot.* 5: 162. 1861; *Guillenia axillaris* (J. D. Hooker & Thomson) Bennet; *G. bracteosa* (Jafri) H. B. Naithani & S. N. Biswas; *Microsisymbrium axillare* (J. D. Hooker & Thomson) O. E. Schulz; *M. axillare* var. *brevipedicellatum* Jafri; *M. axillare* var. *dasy carpum* O. E. Schulz; *M. bracteosum* Jafri.

Herbs annual or perennial, (3–)10–20 cm tall. Stems decumbent or ascending, few to many branched at base, densely hispid with coarse, horizontal, simple trichomes to 2 mm, these often mixed with coarse, forked, much smaller, stalked stellate ones, rarely glabrescent distally. Basal leaves rosulate, petiolate, often withered by fruiting; petiole (0.2–)1–2 cm, often ciliate; leaf blade spatulate, (0.6–)1–3.5(–5) × (0.2–)0.5–1.5 cm, pubescent with stalked, forked trichomes mixed with larger, forked or simple ones, margin coarsely dentate, sinuate, or lyrate-pinnatifid, apex obtuse. Middle cauline leaves broadly oblong, elliptic, or obovate, sessile, 1–2.5 × (0.2–)0.7–1.3 cm, pubescent as basal leaves, rarely glabrescent, base cuneate, not auriculate, margin

dentate, apex acute. Racemes bracteate along entire length. Fruiting pedicels slender, stellate pubescent laterally and abaxially, glabrous adaxially or rarely all around, divaricate or ascending, (2.5–)4–10(–12) mm. Sepals narrowly oblong, 2–3 × 0.6–1 mm, coarsely pubescent. Petals white or pink, spatulate, 3–4.5 × (0.8–)1–1.2 mm, attenuate to base; claw to 1 mm. Filaments 2–3 mm; anthers oblong, 0.4–0.6 mm. Ovules 60–90 per ovary. Fruit linear, terete, curved upward or sometimes straight, divaricate, (1.4–)2.5–4(–5) cm × 0.6–0.8 mm; valves glabrous or rarely puberulent, with an obscure midvein; style (0.1–)0.4–1 mm. Seeds brown, oblong, 0.8–1 × 0.3–0.4 mm. Fl. Mar–Jun, fr. May–Jul.

Rocky hillsides, shady banks, open woodlands, roadsides, rock crevices, terraces, forests; 2200–3000 m. Xizang [Bhutan, India, Kashmir, Nepal, Sikkim].

**6. *Crucihimalaya wallichii*** (J. D. Hooker & Thomson) Al-Shehbaz et al., *Novon* 9: 301. 1999.

卵叶须弥芥 *luan ye xu mi jie*

*Sisymbrium wallichii* J. D. Hooker & Thomson, *J. Proc. Linn. Soc., Bot.* 5: 158. 1861; *Arabidopsis campestris* O. E. Schulz; *A. mollissima* (C. A. Meyer) N. Busch var. *afghanica* O. E. Schulz; *A. russelliana* Jafri; *A. taraxacifolia* (T. Anderson) Jafri; *A. wallichii* (J. D. Hooker & Thomson) N. Busch; *A. wallichii* var. *viridis* O. E. Schulz; *Arabis bucharica* (Lipsky) Nevski; *A. tibetica* J. D. Hooker & Thomson var. *bucharica* Lipsky; *A. taraxacifolia* T. Anderson; *Hesperis wallichii* (J. D. Hooker & Thomson) Kuntze; *Microsisymbrium angustifolium* Jafri.

Herbs annual or biennial, (5–)12–50(–80) cm tall. Stems erect, simple or few to many branched at base, densely to sparsely tomentose with finely branched stellate trichomes, often basally hirsute with horizontal, simple or forked trichomes (0.5–)0.8–1.5(–2) mm, rarely glabrescent distally. Basal leaves rosulate, petiolate, often lyrate or pinnatifid persistent or withered by fruiting; petiole 0.5–1.5(–2.5) cm, often ciliate; leaf blade spatulate, oblanceolate, or obovate in outline, 1–6(–12) × 3–1.7(–3) cm, densely tomentose with finely branched stellate trichomes, margin coarsely dentate or rarely entire, with up to 8 lobes on each side of midvein; lateral lobes oblong or ovate, increasing in size distally, much smaller than obovate or suborbicular terminal lobe, to 1.5 × 0.8 cm, entire or dentate. Middle cauline leaves oblong, oblanceolate, or linear, sessile, 0.7–4(–7) cm × 1–10(–20) mm, pubescent as basal leaves, rarely glabrescent, base usually minutely auriculate, margin entire, coarsely dentate, or lyrate, apex acute. Racemes ebracteate, lax. Fruiting pedicels slender, straight, stellate pubescent all around or glabrous adaxially, divaricate or rarely ascending, (0.2–)0.5–1.6(–2.5) cm. Sepals green or pink, oblong, 1.5–2.5(–3) × 0.7–1 mm, densely pubescent or glabrescent, sometimes narrowly membranous. Petals purple, pink,

or white, spatulate, (2–)2.5–3.5(–4.5) × 0.4–0.6 mm, attenuate to base. Filaments 2.5–3(–3.5) mm; anthers oblong, 0.3–0.6 mm. Ovules 70–150 per ovary. Fruit linear, terete or subcompressed, arcuate or straight, divaricate- to recurved or rarely ascending, (2.5–)3.5–7.5(–9.5) cm × 0.6–1 mm; valves glabrous, with an obscure or prominent midvein; style (0.2–)0.5–1(–1.5) mm. Seeds brown, oblong, 0.6–1 × 0.3–0.5 mm. Fl. Apr–Aug, fr. May–Sep.  $2n = 14, 16, 18$ .

Rocky slopes, hillsides, limestone crevices and ledges; (700–) 1200–4400. Xizang [Afghanistan, Bhutan, India, Kashmir, Kazakstan, Kyrgyzstan, Nepal, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

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