

10. LEPIDIUM Linnaeus, Sp. Pl. 2: 643. 1753.

独行菜属 du xing cai shu

Herbs annual, biennial, or perennial, sometimes subshrubs, rarely shrubs or climbers. Trichomes absent or simple. Stems erect or ascending, sometimes creeping, simple or branched basally and/or apically. Basal leaves rosulate or not, simple, entire or pinnately dissected. Cauline leaves petiolate or sessile, base cuneate, attenuate, auriculate, sagittate, or amplexicaul, margin entire, dentate, or dissected. Racemes ebracteate, corymbose, elongated or not in fruit. Fruiting pedicels terete, flattened, or winged, erect or divaricate. Sepals ovate or oblong, rarely orbicular, base of lateral pair not saccate. Petals white, yellow, or pink, erect or spreading, sometimes rudimentary or absent; blade obovate, spatulate, oblong, oblanceolate, orbicular, linear, or filiform, apex obtuse, rounded, or emarginate; claw absent or distinct. Stamens 2 and median, sometimes 6 and tetradynamous or subequal in length, rarely 4 and all median or 2 median and 2 lateral; anthers ovate or oblong. Nectar glands 4 or 6, distinct; median glands always present. Ovules 2 per ovary; placentation apical. Fruit dehiscent silicles, oblong, ovate, obovate, cordate, obcordate, elliptic, or orbicular, strongly angustiseptate; valves veinless or prominently veined, keeled or not, apically winged or wingless; replum rounded; septum complete or perforated, membranous; style absent, obsolete, or distinct, included or exerted from apical notch of fruit; stigma capitate, entire or rarely 2-lobed. Seeds 1 per locule, winged, margined, or wingless, oblong or ovate, plump or flattened; seed coat smooth, minutely reticulate, or papillate, usually copiously mucilaginous when wetted; cotyledons incumbent, rarely accumbent or diplecobal.

About 180 species: all continents except Antarctica; 16 species (two endemic, two introduced) in China.

1a. Cauline leaves sessile, amplexicaul, sagittate, or auriculate at base.

2a. Flowers yellow; upper leaves amplexicaul-perfoliate, basal leaves 2- or 3-pinnatisect; seeds winged all around 10. *L. perfoliatum*

2b. Flowers white; upper leaves auriculate or sagittate, basal leaves entire, dentate, or pinnatifid; seeds wingless.

3a. Annuals or biennials, usually densely long pubescent; fruit wings united with lower part of style; leaves herbaceous 1. *L. campestre*

3b. Perennials, glabrous, papillate, or crisped hairy; fruit wings free from style; leaves leathery.

4a. Basal and lowermost cauline leaves pinnatifid, upper ones subentire; plants glabrous .. 3. *L. cordatum*

4b. All leaves entire; plants with curved papillate trichomes 4. *L. cartilagineum*

1b. Cauline leaves petiolate or subsessile, cuneate or obtuse at base, if subauriculate then plants with capitate or clavate papillae.

5a. Stamens 6; stems glabrous or pubescent with long trichomes (puberulent in *L. alashanicum*).

6a. Petals absent; plants puberulent with subclavate papillate trichomes; all leaves linear, entire, margin involute 9. *L. alashanicum*

6b. Petals well developed; plants glabrous or pilose with slender trichomes; leaves variously-shaped, at least some pinnatifid, pinnatisect, dentate, or serrate, margin flat.

7a. Annuals; fruit (4–)5–6 mm, winged all around, broadly so apically; all or at least lower leaves 1- or 2-pinnatisect or -pinnatifid; cotyledons 3-lobed 2. *L. sativum*

7b. Perennials; fruit 1.5–3 mm, wingless or only apically winged; leaves entire, serrate, or dentate; cotyledons entire.

8a. Sepals persistent in fruit; fruit cordate at base 7. *L. obtusum*

8b. Sepals deciduous shortly after anthesis; fruit cuneate, obtuse, or rounded at base.

9a. Basal and lowermost cauline leaves pinnatifid or lyrate, with oblong or linear lateral lobes much smaller than terminal one; style (0.2–)0.3–0.4(–0.5) mm, distinctly exerted from apical notch 8. *L. lacerum*

9b. Basal and lowermost leaves dentate, serrate, or subentire; style absent, obsolete, or rarely to 0.1 mm.

10a. Uppermost cauline leaves sessile or subsessile, leathery; fruit not carinate; seeds (0.8–)1–1.3 mm 6. *L. latifolium*

10b. Uppermost cauline leaves shortly petiolate, papery; fruit carinate; seeds 1.5–2.2 mm 5. *L. ferganense*

5b. Stamens 4 or 2; stems puberulent with clavate or capitate papillae, sometimes with minute trichomes.

11a. Stamens 4; style longer than and exerted from apical notch of fruit 11. *L. cuneiforme*

- 11b. Stamens 2; style shorter than and included within apical notch of fruit.
 12a. Fruit orbicular; upper stems and rachis puberulent with curved minute trichomes; cotyledons accumbent 13. *L. virginicum*
 12b. Fruit elliptic, ovate, or obovate; upper stems and rachis puberulent with straight or clavate papillae; cotyledon incumbent.
 13a. Middle and upper cauline leaves usually pinnatifid; infructescences capitate; petals 0.5–1 mm 12. *L. capitatum*
 13b. Middle and upper cauline leaves dentate, serrate, or entire; infructescences elongated racemes; petals absent or rudimentary.
 14a. Basal leaves 2- or 3-pinnatisect; pedicels puberulent all around with slender trichomes; herbs fetid 14. *L. ruderales*
 14b. Basal leaves 1-pinnatifid or serrate; pedicel papillate only adaxially; herbs not fetid.
 15a. Fruit broadly obovate, widest above middle; raceme papillae terete or subclavate 15. *L. densiflorum*
 15b. Fruit elliptic, widest at middle; raceme papillae clavate or capitate .. 16. *L. apetalum*

1. *Lepidium campestre* (Linnaeus) R. Brown in W. T. Aiton, Hortus Kew. 4: 88. 1812.

绿独行菜 *lu du xing cai*

Thlaspi campestre Linnaeus, Sp. Pl. 2: 646. 1753.

Herbs annual or biennial, (8–)12–50(–60) cm tall, densely hirsute with spreading trichomes. Stems erect, simple or branched above. Basal leaves rosulate; petiole (0.5–)1.5–6 cm; leaf blade oblanceolate or oblong, (1–)2–6(–8) × 0.5–1.5 cm, base attenuate, margin entire, pinnatifid, or lyrate, apex obtuse or subacute. Cauline leaves sessile; leaf blade oblong, lanceolate, or narrowly deltoid-lanceolate, (0.7–)1–4(–6.5) cm × (2–)5–10(–15) mm, base sagittate or auriculate, margin dentate or subentire, apex acute to subobtusate. Fruiting pedicels slender, horizontal, (3–)4–8(–10) mm, pubescent. Sepals oblong, (1–)1.3–1.8 mm, erect to ascending, pubescent or glabrous. Petals white, spatulate, (1.5–)1.8–2.5(–3) × (0.2–)0.5–0.7 mm, base clawed, apex rounded. Stamens 6; filaments (1.2–)1.5–1.8(–2) mm; anthers oblong, 0.3–0.5 mm. Fruit ovate or broadly oblong, curved adaxially above middle, (4–)5–6(–6.5) × (3–)4–5 mm, winged distally, apex emarginate; valves vesicled; wings 1–2 mm; style united basally with wings, free portion 0.2–0.5 (–0.7) mm, included in apical notch. Seeds dark brown, oblong, 2–2.3(–2.8) × 1–1.3 mm, papillate, wingless; cotyledons incumbent. Fl. May–Jun, fr. Jun–Aug. $2n = 16$.

Fields, roadsides, pastures, waste grounds, disturbed sites, mountain slopes. Heilongjiang, Liaoning, Shandong [Russia; SW Asia, Europe; introduced elsewhere].

2. *Lepidium sativum* Linnaeus, Sp. Pl. 2: 644. 1753.

家独行菜 *jia du xing cai*

Herbs annual, (10–)20–80(–100) cm tall. Stems erect, simple or branched, sparsely crisped pilose above. Basal leaves not rosulate; petiole 1–4 cm; leaf blade variable in shape, 1- or 2-pinnatifid or -pinnatisect, 2–8(–10) × 1–3(–5) cm; ultimate lobes ovate or oblong,

margin dentate, apex acute. Cauline leaves petiolate; leaf blade similar to basal ones but less divided, with 1–4 lateral lobes on each side of midvein; uppermost leaves subsessile, linear, margin entire. Fruiting pedicels suberect, appressed to rachis, or ascending, straight, 1.5–4(–6) mm, terete or slightly flattened, glabrous. Sepals oblong, 1–1.8 × 0.5–0.8 mm, glabrous or pubescent abaxially. Petals white or lavender, spatulate or obovate, 2.5–3.5(–4) × 0.7–1.4 mm, base attenuate. Stamens 6; filaments 1.5–2 mm; anthers oblong, 0.4–0.5 mm. Fruit oblong-ovate or elliptic, (4–)5–6(–7) × 3–4.5 (–5.5) mm, base rounded, margin and apex broadly winged, apex emarginate; wings 1–1.5 mm at apex; apical notch 0.2–0.5 mm; style 0.2–0.5(–0.8) mm, free from wings, included in or rarely exerted from apical notch. Seeds reddish brown, oblong, 2–2.6 × 1–1.3 mm, wingless; cotyledons incumbent, 3-lobed. Fl. Jun–Jul, fr. Aug–Sep. $2n = 24, 32^*$.

Cultivated or naturalized; near sea level to 1700 m. Heilongjiang, Jiangsu, Jilin, Shandong, Xinjiang, Xizang [Afghanistan, India, Japan, Kashmir, Kazakhstan, Kyrgyzstan, Nepal, Pakistan, Russia, Sikkim, Tajikistan, Turkmenistan, Uzbekistan, Vietnam; N Africa, SW Asia, Europe; naturalized in North and South America].

3. *Lepidium cordatum* Willdenow ex Steven in de Candolle, Syst. Nat. 2: 554. 1821.

心叶独行菜 *xin ye du xing cai*

Herbs perennial, 15–40 cm tall, glabrous except for pilose sepals and pedicels, glaucous. Stems erect, branched basally and above. Basal leaf blade obovate, pinnatifid, withered by fruiting. Cauline leaves sessile; leaf blade oblong or lanceolate, 0.3–1.8(–3) cm × 2–7(–13) mm, subleathery, base sagittate or auriculate, margin serrulate or entire, apex acute or obtuse. Fruiting pedicels slender, straight, 2–4 mm, pilose in flower, glabrous in fruit. Sepals caducous, broadly ovate or suborbicular, 0.8–1.2 × 0.8–1 mm, sparsely pilose with crisped trichomes, broadly white at margin and apex. Petals white, obovate, 1.5–1.8 × 0.8–1 mm, base clawed, apex rounded. Stamens 6; filaments 0.7–

1.5 mm, often conspicuously dilated at base; anthers oblong, 0.2–0.4 mm. Fruit suborbicular or broadly ovate-cordate, 2–2.5(–2.8) × 1.8–2.3 mm, wingless, base sometimes subcordate; apical notch absent or rarely ca. 0.05 mm; style 0.1–0.3 mm; stigma discoid, distinctly broader than style. Seeds reddish brown, oblong, 0.9–1.1 × 0.5–0.6 mm, papillate; cotyledons incumbent. Fl. May–Jun, fr. Jun–Jul.

Saline meadows or lowlands; 1000–3900 m. Gansu, Nei Mongol, Ningxia, Qinghai, Xinjiang, Xizang [Kazakstan, Mongolia, Russia, Tajikistan].

The above first record from Xizang is based on *Ladygin 312* (LE).

4. *Lepidium cartilagineum* (J. Mayer) Thellung, Vierteljahrsschr. Naturf. Ges. Zürich 51: 173. 1906.

碱独行菜 jian du xing cai

Thlaspi cartilagineum J. Mayer, Abh. Böhm. Ges. Wiss. 235. 1786; *Lepidium cartilagineum* subsp. *crassifolium* (Waldstein & Kitaibel) Thellung; *L. crassifolium* Waldstein & Kitaibel; *L. kabulicum* K. H. Rechinger.

Herbs perennial, (10–)15–35(–40) cm tall, puberulent with papillate or curved trichomes; caudex with fibrous petiolar remains of previous years. Stems erect, branched. Basal leaves rosulate, fleshy, persistent; petiole 1.5–5(–7) cm; leaf blade ovate, oblong, or elliptic, (0.7–)1.7–4(–5) × (0.5–)0.8–1.5(–2.2) cm, usually glabrous, base cuneate or attenuate, margin entire, apex acute or obtuse. Cauline leaves sessile; leaf blade elliptic, oblong, or lanceolate, 0.2–4.7 cm × 1–9 mm, glabrous or with subappressed trichomes, base usually amplexicaul, margin entire, apex acute. Fruiting pedicels divaricate, straight or slightly curved, 3–6 mm, puberulent adaxially. Sepals oblong, 1–1.2 × ca. 0.5 mm, pilose with crisped trichomes, white at margin and apex, apex acute. Petals white, obovate or oblanceolate, 1–1.6 × 0.3–0.8 mm, apex rounded; claw obscurely differentiated. Stamens 6; filaments 0.8–1.1 mm; anthers oblong, 0.2–0.3 mm. Fruit ovate, 2.3–3.3 × 2.1–2.7 mm; valves glabrous, prominently reticulate veined; wing 0.1–0.2 mm; apical notch 0.05–0.2 mm; style 0.2–0.4 mm, exerted from apical notch. Seeds brown to reddish brown, ovate, 1.3–1.7 × 0.7–1 mm, papillate; cotyledons incumbent. Fl. Aug. $2n = 16$.

Saline lowlands or steppe; 400–1000 m. Nei Mongol, Xinjiang [Afghanistan, Kazakstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, C and S Europe].

5. *Lepidium ferganense* Korshinsky, Izv. Imp. Akad. Nauk, ser. 5, 9: 417. 1898.

全缘独行菜 quan yuan du xing cai

Herbs perennial, (25–)35–100(–110) cm tall. Stems simple few from base, many branched above, glabrous. Basal and lower cauline leaves long petiolate, papery; leaf blade linear-lanceolate or linear-oblong, (2–)3–12(–14) × (0.3–)1–2.5(–4) cm, base cuneate or attenuate, margin serrate, apex often acute. Upper cauline leaves shortly petiolate; leaf blade linear, (1–)2–8(–10) cm × (1–)2–7(–10) mm, base attenuate or

cuneate, margin entire, apex acute. Fruiting pedicels (3–)4–5(–6) mm, slender, divaricate. Sepals deciduous, ovate, 1–1.5 × 0.8–0.9 mm, glabrous, white at margin and apex. Petals white, broadly obovate, (2–)2.5–3 × 1–1.4 mm, apex rounded; claw 0.7–1 mm. Stamens 6; filaments 0.9–1.3 mm; anthers ovate, 0.2–0.3 mm. Fruit ovate-oblong or suborbicular, 2.5–3.5 × 2–2.5 mm, glabrous, wingless, carinate at replum, base rounded; apical notch absent or obsolete; style obsolete or rarely to 0.1 mm; stigma wider than style. Seeds reddish brown, oblong, 1.5–2.2 × 0.7–1.2 mm, often 3-angled, wingless, finely papillate; cotyledons incumbent. Fl. and fr. May–Jul.

Dry mountain slopes; 600–2100 m. Xinjiang [Afghanistan, Kazakstan, Kyrgyzstan, Tajikistan, Uzbekistan].

6. *Lepidium latifolium* Linnaeus, Sp. Pl. 2: 644. 1753.

宽叶独行菜 kuan ye du xing cai

Lepidium affine Ledebour; *L. latifolium* subsp. *affine* (Ledebour) Kitagawa; *L. latifolium* var. *affine* (Ledebour) C. A. Meyer; *L. latifolium* subsp. *sibiricum* Thellung; *L. sibiricum* Schweigger (1812), not Pallas (1776).

Herbs perennial, (20–)35–120(–150) cm tall. Stems erect, many branched above, slightly woody at base, glabrous or pubescent, often glaucous. Leaves leathery; petiole of basal and lower cauline leaves 1–7(–11) cm; leaf blade elliptic-ovate or oblong, (2–)3.5–15(–25) × (0.5–)1.5–5(–8) cm, glabrous or pubescent with usually curved trichomes, base attenuate, margin usually serrate, apex obtuse to subacute. Upper cauline leaves subsessile or sessile; leaf blade elliptic-ovate, oblong, or lanceolate, 1–9 × 0.3–4.5 cm, base cuneate, not auriculate, margin serrate or entire, apex acute. Inflorescence paniculate, ultimate branches subcapitate. Fruiting pedicels slender, 2–5(–6) mm, glabrous or rarely pubescent. Sepals deciduous, oblong or suborbicular, 1–1.4 × 0.8–0.9 mm, glabrous or pubescent, white at margin and apex. Petals white, obovate, 1.8–2.5 × (0.8–)1–1.3 mm, apex rounded; claw 0.7–1 mm. Stamens 6; filaments 0.9–1.4 mm; anthers ovate, 0.4–0.5 mm. Fruit oblong-elliptic, ovate-elliptic, or suborbicular, (1.6–)1.8–2.4(–2.7) × 1.3–1.8 mm, pubescent or glabrous, not carinate, wingless, base rounded; apical notch absent or obsolete; style obsolete. Seeds light brown, oblong-ovate, (0.8–)1–1.3 × 0.7–0.9 mm, compressed, wingless, finely papillate; cotyledons incumbent. Fl. May–Sep, fr. Jun–Oct. $2n = 24$.

Fields, roadsides, slopes, saline meadows; 100–4300 m. Gansu, Hebei, Heilongjiang, Henan, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang [Afghanistan, India, Kashmir, Kazakstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, S Europe].

The above first record from Sichuan is based on *Martin s.n.*, 30 May 1890 (LE). Forms with subsessile leaves and pubescent fruit are recognized as *Lepidium latifolium* subsp. or var. *latifolium*, whereas

those with sessile leaves and glabrous fruit have variously been recognized as *L. affine*, *L. latifolium* var. *affine*, and *L. latifolium* subsp. *sibiricum*. However, such distinction is artificial, as plants with glabrous and pubescent fruit are often found in the same population.

The seeds are used in Gansu and N Shaanxi for medicine.

7. *Lepidium obtusum* Basiner, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 2: 203. 1844.

钝叶独行菜 *dun ye du xing cai*

Lepidium latifolium Linnaeus subsp. *obtusum* (Basiner) Thellung; *L. loulanicum* Z. X. An & G. L. Zhou.

Herbs perennial, (30–)45–85(–110) cm tall. Stems erect, branched, glabrous. Basal and lowermost cauline leaves petiolate, withered early. Upper cauline leaves sessile or subsessile; leaf blade oblong-ovate, oblong, or lanceolate, 0.3–9(–15) × 0.1–2.5(–4) cm, leathery, glabrous or rarely sparsely pubescent, base cuneate or obtuse, margin entire or rarely serrulate, apex obtuse or acute. Inflorescence paniculate, ultimate branches capitate. Fruiting pedicels 1–3(–4) mm, slender, pubescent. Sepals persistent, ovate or suborbicular, 0.9–1.5 × 0.8–1.5 mm, sparsely crisped pilose abaxially, broadly white at margin and apex. Petals white, obovate, 1.3–1.8(–2.2) × 0.8–0.9(–1) mm, base shortly clawed, apex rounded. Stamens 6; filaments 1–1.4 mm, slightly dilated or not dilated at base; anthers oblong, 0.3–0.4 mm. Fruit broadly ovate, 1.6–2.3 × 1.8–2.2 mm, glabrous or rarely sparsely puberulent, wingless, carinate at replum, base cordate; apical notch absent or obsolete; style obsolete or rarely to 0.1 mm; stigma discoid, much broader than style. Seeds brown, oblong, 0.8–1.1 × 0.5–0.6 mm, wingless; cotyledons incumbent. Fl. and fr. Jul–Aug. $2n = 16$.

Pastures, field margins, waste places, deserts; 400–2800 m. Gansu, Nei Mongol, Ningxia, Qinghai, Xinjiang, Xizang [India, Kazakhstan, Mongolia, Russia, Tajikistan, Uzbekistan].

The above first records from Nei Mongol and Ningxia are based on *Petrov s.n.*, 6 Jul 1958 (LE), and *Yu Zhaoying 1039* (MO), respectively.

8. *Lepidium lacerum* C. A. Meyer in Ledebour, Fl. Altaic. 3: 191. 1831.

裂叶独行菜 *lie ye du xing cai*

Herbs perennial, (15–)20–50(–60) cm tall, glabrous or sparsely pilose with short trichomes. Stems usually few from base, branched above. Basal and lowermost cauline leaves with petioles 0.5–4(–6) cm, flattened at base, often ciliate; leaf blade oblong or oblanceolate in outline, pinnatifid, lyrate, or incised, (0.5–)1.5–6(–9) × (0.2–)0.7–2(–3) cm, base attenuate; lateral lobes 1–4 on each side of midvein, oblong, linear, or lanceolate, much smaller than terminal lobe, entire. Upper cauline leaves subsessile or shortly petiolate, linear to linear-lanceolate, 0.5–2 cm × 0.5–2 mm, entire or sparsely serrate. Fruiting pedicels divaricate-ascending, 3–6 mm,

slender, straight, sparsely crisped pilose adaxially. Sepals broadly obovate or suborbicular, 1–1.5 × 0.8–1.2 mm, abaxially sparsely crisped pilose or glabrous, with a broad white margin and apex. Petals white, obovate, 2–2.7(–3) × (1–)1.2–1.7 mm. Stamens 6; filaments 1–1.8 mm; anthers ovate, 0.2–0.3 mm. Fruit ovate, 2.5–3 × 1.8–2.2 mm, glabrous, wingless; apical notch obsolete or to 0.1 mm; style 0.2–0.5 mm, exerted from apical notch. Seeds brown, oblong, 1.2–1.5 × 0.7–0.9 mm; cotyledons incumbent. Fl. and fr. May–Jul.

Slopes, semideserts. Xinjiang [Kazakhstan, Mongolia].

This above first record of *Lepidium lacerum* from China is based on *Yunatov & Yuan 42a* (LE), collected 10–12 km N of Urumqi, as well as on *Xinjiang Team 268* (PE), collected near Urumqi.

9. *Lepidium alashanicum* H. L. Yang, Acta Phytotax. Sin. 19: 241. 1981.

阿拉善独行菜 *a la shan du xing cai*

Herbs perennial, sometimes flowering in first year, 4–15 cm tall, puberulent with subclavate papillate trichomes. Stems erect, branched at base and above. Basal leaves subsulate; petiole 0.5–2 cm, strongly flattened at base, persistent; leaf blade linear or oblanceolate-linear, 1–3.5 cm × 0.5–1.5 mm, puberulent, margin entire, involute, apex acute to subobtuse. Upper cauline leaves sessile; leaf blade linear, 0.5–2 cm × 0.5–1.5 mm, margin entire, involute. Fruiting pedicels 1.5–4 mm, divaricate, slender, straight or slightly recurved, puberulent adaxially with clavate trichomes. Sepals oblong-ovate, 0.5–0.7 × 0.3–0.4 mm, crisped pilose adaxially, purplish near apex. Petals absent. Stamens 6; filaments 0.5–0.7 mm; anthers broadly ovate, ca. 0.1 mm. Fruit broadly ovate to elliptic-ovate, 2.5–3 × 2–2.5 mm, glabrous; wing apical, 0.2–0.4 mm; apical notch 0.1–0.2 mm; style obsolete or to 0.1 mm, included in apical notch. Seeds yellowish brown, oblong, 1.2–1.5 × 0.6–0.8 mm; cotyledons incumbent. Fl. and fr. Jun–Aug.

• Dry slopes. Gansu, Nei Mongol.

10. *Lepidium perfoliatum* Linnaeus, Sp. Pl. 2: 643. 1753.

抱茎独行菜 *bao jing du xing cai*

Herbs annual or biennial, (7–)15–40(–65) cm tall, glabrous throughout or sparsely pubescent below, often slightly glaucous. Stems erect, simple at base, branched above. Leaves strongly dimorphic. Basal and lowermost cauline leaves with petioles (0.5–)1–2(–4) cm; leaf blade 2- or 3-pinnatifid or -pinnatisect, (1–)3–8(–15) cm; ultimate lobes linear or narrowly oblong. Upper cauline leaves sessile; leaf blade broadly ovate, cordate, or suborbicular, (0.5–)1–3(–4) × (0.5–)1–2.5(–3.5) cm, base deeply cordate-amplexicaul, margin entire, apex acute. Fruiting pedicels divaricate, 3–5(–7) mm, slender, straight, glabrous, terete. Sepals yellowish green, oblong, 0.8–1(–1.3) × 0.5–0.8 mm. Petals yellow, narrowly spatulate, 1–1.5(–1.9) × 0.2–0.5 mm, base

attenuate to a claw ca. 0.5 mm. Stamens 6; filaments 0.6–0.9 mm; anthers 0.1–0.2 mm. Fruit rhombic or orbicular, 3–4.5(–4.8) × 3–4 mm narrowly winged distally; wings apical, 0.2–0.4 mm; apical notch to ca. 0.3 mm; style 0.1–0.3 mm, as long as or shorter than apical notch. Seeds dark brown, ovate, 1.6–2(–2.3) × 1.2–1.4 mm, narrowly winged all around; cotyledons incumbent. Fl. Mar–Jun, fr. May–Jul. $2n = 16$.

Waste places, dry sandy slopes; near sea level to 1000 m. Gansu, Jiangsu, Liaoning, Shanxi, Xinjiang [Afghanistan, India, Japan, Kazakstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe; introduced elsewhere].

Sometimes eaten as a vegetable or used medicinally as an anti-scorbutic.

11. *Lepidium cuneiforme* C. Y. Wu, Icon. Cormophyt. Sin. 2: 36. 1972.

楔叶独行菜 xie ye du xing cai

Lepidium chinense Franchet, Pl. David. 1: 39. 1883, not Stokes (1812); *L. capitatum* J. D. Hooker var. *chinense* Thellung.

Herbs biennial, (8–)20–45(–60) cm tall, puberulent with clavate to subcapitate papillate trichomes. Stems erect, simple or branched. Basal and lowermost cauline leaves with petioles 5–10 mm; leaf blade spatulate or oblanceolate, 1–5 × 0.4–1.6 cm, base attenuate or cuneate, margin pinnatifid or irregularly crenulate, apex obtuse to subacute. Upper cauline leaves usually sessile; leaf blade obovate or oblanceolate, (0.6–)1–3(–3.8) cm × (2–)5–10(–12) mm, base subauriculate or cuneate, margin serrate along distal half, apex acute or obtuse. Fruiting pedicels slender, divaricate, recurved, 3–6 mm, puberulent adaxially with clavate trichomes. Sepals oblong, 0.7–1 × 0.4–0.6 mm, white at margin and apex, glabrous or with crisped trichomes. Petals white, obovate or suboblong, 0.5–0.7 × 0.2–0.3 mm, claw indistinct, apex rounded to obtuse. Stamens 4; filaments 0.9–1 mm; anthers ca. 0.1–0.3 mm. Fruit broadly elliptic, rarely ovate or suborbicular, 2.9–3.4 × 2.4–2.8 mm, glabrous; wing apical, 0.1–0.2 mm; apical notch 0.05–0.1 mm; style 0.1–0.3 mm, usually exerted from apical notch. Seeds brown, oblong-ovate, 1.4–1.5 × ca. 0.8 mm, pitted; cotyledons incumbent. Fl. and fr. Mar–Aug.

• Mountain slopes, roadsides, river beaches; 600–2700 m. Gansu, Guizhou, Jiangxi, Qinghai, Shaanxi, Sichuan, Yunnan.

12. *Lepidium capitatum* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 5: 175. 1861.

头花独行菜 tou hua du xing cai

Lepidium kunlunshanicum G. L. Zhou & Z. X. An. Herbs annual or biennial, (5–)10–35(–50) cm tall, densely covered with capitate or clavate papillate trichomes. Stems prostrate or rarely suberect, branched basally and above. Basal and lower cauline leaves with

petioles 0.5–4 cm; leaf blade oblong, spatulate, or lanceolate, (0.5–)1–4(–7) × 0.2–2 cm, usually glabrous, pinnatifid, base attenuate; lobes oblong, lanceolate, or linear, 2–8(–15) × 0.5–3(–5) mm, 1- or 2-pinnatifid or -partite, serrate, or entire. Upper cauline leaves shortly petiolate or sessile, similar to lowermost leaves, progressively smaller upward. Racemes capitate, elongated slightly or not elongated in fruit. Fruiting pedicels slender, divaricate, slightly recurved or straight, (1–)2–3(–4) mm, puberulent adaxially with clavate or capitate trichomes. Sepals oblong, 0.8–1 × 0.3–0.4(–0.5) mm, glabrous or with crisped trichomes. Petals white, narrowly obovate, (0.5–)0.6–0.9(–1) × 0.2–0.3 mm, base cuneate, apex subtruncate or emarginate. Stamens 4; filaments 0.8–1 mm; anthers ovate, 0.1–0.2 mm. Fruit broadly ovate, 1.8–2.5 × 1.7–1.8 mm, glabrous; wing apical, 0.1–0.3 mm; apical notch 0.05–0.3 mm; style obsolete, rarely to 0.15 mm, included in apical notch. Seeds brown, oblong-ovate, 1–1.1 × 0.6–0.7 mm; cotyledons incumbent. Fl. and fr. Jun–Sep.

Mountain slopes, disturbed areas, plains; 2700–5000 m. Gansu, Qinghai, Sichuan, Xinjiang, Xizang, Yunnan [Bhutan, India, Kashmir, Nepal, Sikkim].

13. *Lepidium virginicum* Linnaeus, Sp. Pl. 2: 645. 1753.

北美独行菜 bei mei du xing cai

Herbs annual or biennial, (6–)15–55(–70) cm tall, pubescent with curved, usually subappressed trichomes. Stems erect, branched above. Basal leaves with petioles 0.5–3.5 cm; leaf blade obovate, spatulate, or oblanceolate, (1–)2.5–10(–15) × 0.5–3(–5) cm, margin pinnatifid or lyrate; lobes oblong, serrate or dentate, apex acute. Cauline leaves shortly petiolate; leaf blade oblanceolate or linear, 1–6 cm × (2–)5–10 mm, base attenuate to subcuneate, margin serrate or entire, apex acute. Inflorescence lax or rarely dense; puberulent with curved, subappressed trichomes. Fruiting pedicels slender, straight, spreading, 2.5–4(–6) mm, usually glabrous abaxially. Sepals oblong, (0.5–)0.7–1(–1.1) × 0.5–0.7 mm, margin and apex white, pilose outside. Petals white, spatulate, 1–1.5(–2) × 0.2–0.6 mm, base attenuate, apex rounded, rarely rudimentary. Stamens 2; filaments 0.6–0.8 mm; anthers 0.1–0.2 mm. Fruit orbicular, 2.5–3.5(–4) mm in diam., narrowly winged apically, apex emarginate; apical notch 0.2–0.5 mm; style 0.1–0.2 mm, included in apical notch. Seeds reddish brown, ovate-oblong, usually narrowly winged at least distally, 1.3–1.7(–1.9) × 0.7–1 mm; cotyledons accumbent. Fl. Apr–Jun, fr. May–Sep. $2n = 32^*$.

Fields, roadsides, waste places, grassy areas; near sea level to 1000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Japan, Pakistan, Russia; native to North America; introduced elsewhere].

The seeds are used medicinally.

14. *Lepidium ruderae* Linnaeus, Sp. Pl. 2: 645. 1753.

柱毛独行菜 *zhu mao du xing cai*

Herbs annual or biennial, (5–)10–35(–55) cm tall, fetid, puberulent with terete papillate trichomes. Stems erect or ascending, branched above. Basal leaves with petioles 1–2(–3) cm; leaf blade (1 or)2- or 3-pinnatisect, (1.5–)3–5(–6) × (0.5–) 0.7–2(–2.5) cm, glabrous except for ciliate margin; ultimate lobes oblong, entire or rarely toothed, acute. Upper cauline leaves sessile; leaf blade linear, (0.4–)1–2(–3) cm × (0.3–)0.5–2.5(–3.5) mm, sparsely pubescent, base cuneate, not auriculate, margin usually entire, ciliate, apex obtuse to subacute. Fruiting pedicels slender, divaricate, straight or slightly curved, (1.5–)2–4(–5) mm, puberulent all around. Sepals oblong, 0.5–0.9(–1) × 0.2–0.4 mm, puberulent with papillate trichomes, margin and apex white. Petals absent, sometimes rudimentary and to 0.4 mm. Stamens 2; filaments 0.7–0.8 mm; anthers ovate, 0.1–0.2 mm. Fruit broadly elliptic, (1.5–)1.8–2.5(–3) × 1.5–2(–2.3) mm, narrowly winged apically; apical notch 0.1–0.2 mm; style to 0.1 mm, included in apical notch. Seeds brown, oblong or ovate-oblong, 1–1.5 × 0.6–0.7 mm, wingless, finely papillate; cotyledons incumbent. Fl. and fr. May–Jul. $2n = 16, 32^*$.

Sandy soil, pastures; 300–1100 m. Xinjiang [India, Kazakstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia, Europe; introduced in North America].

Lepidium ruderale was recorded in FRPS from Gansu, Henan, Hubei, Jilin, Liaoning, Ningxia, Qinghai, Shaanxi, and Shandong. The present authors have seen no material from these provinces, and it is likely that these records are based on misidentified plants of *L. apetalum*. The former is a fetid plant, puberulent with slender trichomes, with basal leaves (1 or)2- or 3-pinnatisect, cauline leaves nonauriculate, and fruiting pedicels terete, puberulent all around with slender trichomes. By contrast, *L. apetalum* is a nonfetid plant, puberulent with capitate or clavate trichomes, with basal leaves pinnatifid, cauline leaves often subauriculate, and fruiting pedicels slightly flattened or obscurely winged, puberulent almost always only adaxially.

15. *Lepidium densiflorum* Schrader, Index Sem. Hort. Gött. 4. 1832.

密花独行菜 *mi hua du xing cai*

Lepidium neglectum Thellung.

Herbs annual or biennial, (10–)25–50(–65) cm tall, puberulent with minute straight papillae, rarely glabrous. Stems erect, branched above. Basal leaves rosulate, withered early; petiole 0.5–1.5(–2) cm; leaf blade often oblanceolate, rarely spatulate or oblong, (1.5–)2.5–8(–11) cm × 5–10(–20) mm, base attenuate, margin coarsely serrate or pinnatifid, apex acute. Cauline leaves shortly petiolate; leaf blade narrowly oblanceolate or linear, irregularly serrulate or dentate, rarely subentire, reduced in size upward. Infructescences dense; rachis papillae straight, slender or subclavate. Fruiting pedicels slender, divaricate, slightly recurved, somewhat flattened, (1.5–)2–3.5(–4) mm, puberulent or papillate adaxially. Sepals oblong, 0.5–0.8(–1) × 0.3–0.5 mm, glabrous or sparsely pilose near apex, margin white. Petals usually absent, rarely

filiform and 0.3–0.9 mm. Stamens 2; filaments filiform, 0.6–1 mm; anthers ovate, 0.1–0.2 mm. Fruit obovate to obovate-suborbicular, (2–) 2.5–3(–3.5) × 1.5–2.5(–3) mm, widest above middle, apex obtuse or emarginate; apical wings ca. 0.5 mm; apical notch 0.2–0.4 mm; style 0.1–0.2 mm, included in apical notch. Seeds brown, ovate, wingless or obscurely winged, 1.1–1.3(–1.5) × 0.8–0.9 mm; cotyledons incumbent. Fl. May–Jun, fr. Jun–Jul. $2n = 32$.

Seashores, sandy places, roadsides; near sea level to 3800 m. Hebei, Heilongjiang, Jilin, Liaoning, Shandong, Yunnan [Korea, Mongolia, Russia, Tajikistan; native to North America; introduced elsewhere].

16. *Lepidium apetalum* Willdenow, Sp. Pl. 3: 439. 1800.

独行菜 *du xing cai*

Lepidium chitungense Jacot.

Herbs annual or biennial, (5–)10–25(–40) cm tall, puberulent with clavate or capitate trichomes. Stems erect, branched basally and above. Petiole of basal leaves (0.5–)1–3 cm; leaf blade oblong, lanceolate, or oblanceolate, 1.5–4(–5) × 0.7–1.2 (–1.5) cm, pinnatifid, sinuate, or dentate. Upper cauline leaves sessile; leaf blade narrowly lanceolate, linear-oblong, or linear, 0.6–3(–4) cm × 1–3(–5) mm, base subauriculate or sometimes cuneate, margin remotely serrate or entire, apex acute to subobtuse. Fruiting pedicels slender, often recurved, 2–4(–5) mm, puberulent only adaxially with clavate or capitate trichomes, slightly flattened or narrowly winged. Sepals caducous, oblong, 0.7–0.8 × 0.3–0.4 mm, glabrous or puberulent, white at margin and apex. Petals absent, or rudimentary, linear, ca. 0.3 mm. Stamens 2; filaments 0.7–0.8 mm; anthers broadly ovate, 0.1–0.2 mm. Fruit broadly elliptic, 2.2–3.1 × 1.7–2.3 mm, widest at middle, apex narrowly winged; apical notch 0.1–0.3 mm; style 0.05–0.15 mm, included in apical notch. Seeds reddish brown, ovate-oblong, 1.1–1.3 × 0.6–0.8 mm, wingless, finely papillate; cotyledons incumbent. Fl. Apr–Aug, fr. May–Sep.

Roadsides, slopes, waste places, ravines, plains, fields; 400–4800 m. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan, Zhejiang [India, Japan, Kazakstan, Korea, Mongolia, Nepal, Pakistan].

The above first record from Mongolia is based on *Chaney 498* (US).

