

18. **THLASPI** Linnaeus, Sp. Pl. 2: 645. 1753.

菥蓂属 xi ming shu

Herbs annual, biennial, or perennial, often glabrous and glaucous. Trichomes absent or simple. Stems prostrate or erect, simple or branched. Basal leaves petiolate or subsessile, rosulate or not, simple, entire or dentate. Cauline leaves sessile, often auriculate, sagittate, or amplexicaul at base, entire or rarely dentate. Racemes ebracteate, elongated or not in fruit. Fruiting pedicels slender, divaricate or ascending, rarely reflexed. Sepals ovate or oblong, erect or ascending, base of lateral pair not saccate, margin membranous. Petals white, rarely purple or yellow; blade obovate, oblong, or spatulate, apex obtuse or emarginate; claw differentiated or not from blade. Stamens 6, tetradynamous; filaments dilated or not at base; anthers ovate or oblong, obtuse at apex. Nectar glands 2 or 4, lateral, often 1 on each side of lateral stamen; median glands absent. Ovules 4–24 per ovary. Fruit dehiscent siliques or silicles, linear, oblong, obovate, obcordate, elliptic, lanceolate, or suborbicular, often apically notched, strongly angustiseptate, sessile; valves keeled, winged or wingless; replum rounded; septum complete, membranous, translucent, veinless; style obsolete or prominent, exerted or included in apical notch of fruit; stigma capitate, entire or slightly 2-lobed. Seeds uniseriate, wingless, oblong, ovoid, or ellipsoid, plump; seed coat smooth, reticulate, rugose, or striate, mucilaginous or not when wetted; cotyledons accumbent or rarely incumbent.

About 75 species: temperate Eurasia, especially SW Asia and C and S Europe; six species (two endemic) in China.

*Thlaspi* was divided by Meyer (Feddes Repert. 84: 449–470. 1970) into 12 genera largely based on seed anatomy. Molecular data provide some support for the recognition of some of Meyer's segregates (e.g., *Microthlaspi* F. K. Meyer and *Noccaea* Moench), but such studies are not comprehensive and therefore the traditional broader concept of the genus is tentatively retained in this treatment.

The majority of Chinese and Himalayan material is often difficult to determine to species because of the lack of mature fruit and their remarkable variability in habit, foliage, and flower size.

1a. Annuals; fruit obovate or suborbicular.

2a. Middle and upper cauline leaves auriculate or sagittate at base; fruit 9–20 × 7–20 mm, broadly winged all around; seeds blackish brown, concentrically striate, 1.6–2 mm ..... 1. *T. arvense*

2b. Middle and upper cauline leaves cordate-amplexicaul; fruit 3–7 × 3–5 mm, broadly winged only apically; seeds yellowish brown, smooth, 1–1.3 mm ..... 2. *T. perfoliatum*

1b. Perennials with slender, branched caudices; fruit oblong or elliptic.

3a. Fruit elliptic, apex neither winged nor emarginate or retuse; ovules or seeds 4–8(–10) ..... 5. *T. andersonii*

3b. Fruit narrowly oblong or oblong-obovate, apex winged and/or emarginate or retuse; ovules or seeds more than 12, if less then fruit valves prominently veined.

4a. Fruit narrowly oblong, 1.5–2.3(–3) mm wide; petals lavender, purplish, or rarely white; cauline leaves dentate or denticulate, rarely repand or entire ..... 3. *T. yunnanense*

4b. Fruit oblong-obovate, (3.5–)4–5(–6) mm wide; petals white; cauline leaves entire or repand, rarely denticulate.

5a. Ovules or seeds 14–24; fruit wing not veined ..... 4. *T. flagelliferum*

5b. Ovules or seeds 4–8(–10); fruit wing distinctly veined ..... 6. *T. cochleariforme*

1. **Thlaspi arvense** Linnaeus, Sp. Pl. 2: 646. 1753.

菥蓂 xi ming

Herbs annual, (9–)15–55(–80) cm tall, glabrous throughout, often glaucous, fetid when crushed. Stems erect, simple or branched above. Petiole of basal leaves 0.5–3 cm; leaf blade oblanceolate, spatulate, or obovate, 1–5 × 0.4–2.3 cm, base attenuate or cuneate, margin entire, repand, or coarsely toothed, apex rounded.

Middle cauline leaves sessile, oblong, (0.5–)1.5–4(–8) × (0.2–)0.5–1.5(–2.5) cm, base sagittate or auriculate, margin dentate, repand, or entire, apex rounded, obtuse, or subacute. Fruiting pedicels (0.5–)0.9–1.3(–1.5) cm, slender, divaricate, straight or slightly curved upward. Sepals ovate or oblong, (1.5–)2–3(–3.3) × 1–1.5 mm, not saccate, margin white. Petals white, spatulate, (2.4–)3–4.5(–5) × (0.8–)1.1–1.6 mm, narrowed to a clawlike

base ca. 1 mm, apex obtuse or emarginate. Filaments (1–)1.5–2 mm; anthers ovate, 0.3–0.5 mm. Ovules 6–16 per ovary. Fruit obovate or suborbicular, (0.6–)0.9–2 × (0.5–)0.7–2 cm, base obtuse or rounded, apex deeply emarginate and apical notch ca. 5 mm deep; wings 1–1.5 mm wide at base, 3.5–5 mm wide apically; style absent or 0.1–0.3 mm. Seeds blackish brown, ovoid, (1.2–)1.6–2(–2.3) × 1.1–1.3 mm, concentrically striate. Fl. and fr. Mar–Oct.  $2n = 14^*$ .

Roadsides, grassy slopes, fields, waste places; 100–5000 m. Throughout China except Guangdong, Hainan, and Taiwan [Afghanistan, Bhutan, India, Japan, Kashmir, Kazakstan, Korea, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Sikkim, Tajikistan, Turkmenistan, Uzbekistan; Africa, SW Asia; introduced in Australia, North and South America].

This species is a cosmopolitan weed used as a medicinal plant and a source of oil. Cattle feeding on the plant develop tainted milk.

**2. *Thlaspi perfoliatum*** Linnaeus, Sp. Pl. 2: 646. 1753.

全叶蒜芥 *quan ye xi ming*

*Microthlaspi perfoliatum* (Linnaeus) F. K. Meyer.

Herbs annual, (3–)5–28(–40) cm tall, glabrous throughout, often glaucous. Stems erect, simple or branched basally or above. Petiole of basal leaves 0.5–1.3 cm; leaf blade ovate or broadly elliptic, 0.3–2(–2.7) cm × 2–10 mm, base cuneate or attenuate, margin entire or rarely obtusely few toothed, apex rounded. Middle cauline leaves sessile, ovate-cordate or suboblong, (1–)2–4(–5.5) × (0.2–)0.5–1.5(–2) cm, base cordate-amplexicaul, margin entire or repand, apex obtuse. Fruiting pedicels (2.5–)4–6(–8) cm, slender, divaricate, straight. Sepals ovate or oblong, (0.8–)1–1.5(–1.8) × 0.5–1 mm, not saccate, margin white. Petals white, spatulate or oblong, 1.5–2.5(–3) × 0.7–1.3 mm, apex rounded. Filaments 1–1.5 mm; anthers ovate, 0.1–0.2 mm. Ovules 4–10 per ovary. Fruit obovate or rarely suborbicular, 3–5.5(–7) × 3–4(–5.5) mm, base obtuse, apex deeply emarginate and apical notch 1–1.5 mm deep; wings 1–2 mm wide apically, much narrower at base; style absent or 0.1–0.3 mm. Seeds yellow-brown, ovoid, 0.9–1.3(–1.5) × 0.7–1 (–1.2) mm, smooth. Fl. and fr. Apr–Jul.  $2n = 14, 28, 42$ .

Slopes, roadsides, waste grounds, forest margins; 400–2400 m. Xinjiang [Afghanistan, Kazakstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; N Africa, SW Asia, Europe].

**3. *Thlaspi yunnanense*** Franchet, Bull. Soc. Bot. France 33: 407. 1886.

云南蒜芥 *yun nan xi ming*

*Thlaspi yunnanense* var. *dentatum* Diels.

Herbs perennial, (4–)8–25(–30) cm tall, glabrous throughout. Stems erect or ascending, simple. Basal leaves rosulate; petiole (0.1–)0.5–1.5(–2.5) cm; leaf blade oblong, spatulate, ovate, or suborbicular, 3–10(–15) × 2–5(–10) mm, base obtuse, margin entire, repand, or dentate, apex rounded. Middle cauline leaves sessile, oblong, ovate, or suborbicular, 0.5–1.8(–2.5) cm × (2–)4–7(–10) mm, base auriculate, margin dentate or denticulate, rarely repand or entire, apex rounded, obtuse, or subacute. Fruiting pedicels (2–)4–7(–10) mm, slender, divaricate, straight or slightly recurved. Sepals oblong, 1.5–2 × 0.8–1.2(–1.5) mm, not saccate, margin white. Petals lavender, purplish, or rarely white, spatulate, (3–)3.5–4.5(–5.5) × (1–)1.5–2.2(–3) mm, apex rounded. Filaments 1–2 mm; anthers ovate, 0.4–0.5 mm. Ovules 14–18 per ovary. Fruit oblong to oblong-linear, (0.8–)1–1.4(–1.6) cm × 1.5–2.3(–3) mm, base obtuse, apex retuse and apical notch 0.1–0.4 mm deep, or obtuse and apical notch obsolete; apical wings obsolete or rarely to 0.3 mm wide; style 0.5–1(–1.5) mm. Seeds dark brown, ovoid, 0.9–1.3 × 0.6–0.8 mm, obscurely reticulate. Fl. late May–Aug, fr. Jul–Sep.

• Grassy slopes, pastures, meadows, scree; 3200–5100 m. Sichuan, Xizang, Yunnan.

The type collections of *Thlaspi yunnanense* and *T. yunnanense* var. *dentatum* are indistinguishable in every aspect except for the size of leaf teeth, a feature that is highly variable within any given collection. The apical notch of the fruit can also be variable: in the type collection of *T. yunnanense* it ranges from obsolete to 0.4 mm deep. *Thlaspi yunnanense* is recorded here for the first time from Xizang, based on Ludlow, Sherriff & Taylor 4163 (BM).

**4. *Thlaspi flagelliferum*** O. E. Schulz, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 98. 1926.

四川蒜芥 *si chuan xi ming*

Herbs perennial, (3–)6–35(–60) cm tall, glabrous throughout. Stems erect or ascending, simple. Basal leaves rosulate; petiole 0.5–2.5(–6) cm; leaf blade oblong, ovate, or orbicular, (0.3–)0.6–2(–3) cm × 3–7(–15) mm, base rounded or truncate, margin entire or repand, apex rounded. Middle cauline leaves sessile, oblong, ovate, or suborbicular, 0.6–1.6(–2.5) cm × 2–8(–12) mm, base auriculate, margin entire or repand, rarely denticulate, apex rounded, obtuse, or subacute. Fruiting pedicels 4–6 mm, slender, divaricate, straight or slightly recurved. Sepals oblong, 2–3 × 1–1.5 mm, not saccate, margin white. Petals white, spatulate or obovate, (4.5–)5–6(–7) × (2–)2.5–3.5(–4) mm, apex rounded. Filaments 3.5–4.5 mm; anthers 0.5–0.7 mm. Ovules 14–24 per ovary. Fruit oblong-obovate, 0.8–1.3 cm × (3.5–)4–5(–5.5) mm, base acute, apex emarginate and apical notch 0.2–0.5 mm deep; apical wings 0.6–1 mm wide; style (0.6–)1–1.7 mm. Seeds brown, oblong-ovate, 1–1.3 × 0.5–0.6(–0.9) mm, obscurely reticulate. Fl. late Apr–Aug, fr. May–Sep.

• Alpine grassy slopes, alpine meadows, roadsides; 500–4200 m. Sichuan.

The immature fruit of *Thlaspi* cannot be used to determine the degree of development of the apical notch and/or wings. This misled Schulz to describe the fruit of *T. flagelliferum* as wingless and without an apical notch. However, the holotype, Weigold s.n. (W), and fragmentary isotype at B clearly show the early development of wings and notch.

**5. *Thlaspi andersonii*** (J. D. Hooker & Thomson) O. E. Schulz, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 98. 1926.

西藏蒜芥 *xi zang xi ming*

*Iberidella andersonii* J. D. Hooker & Thomson, J. Proc. Linn. Soc., Bot. 5: 177. 1861; *I. tibetica* C. Marquand & Airy Shaw.

Herbs perennial, (4–)6–15(–20) cm tall, glabrous throughout. Stems erect or decumbent, simple. Basal leaves rosulate; petiole (2–)5–10(–15) mm; leaf blade oblong, spatulate, or suborbicular, (0.3–)0.5–1.5(–1.8) cm × 2–6(–10) mm, base obtuse, margin entire, apex rounded. Middle cauline leaves sessile, oblong, ovate, or suborbicular, 5–10(–15) × 2–5(–7) mm, base auriculate, margin repand or entire, apex rounded, obtuse, or subacute. Fruiting pedicels (2–)4–7 mm, slender, divaricate, straight. Sepals oblong, 2–2.5 × 1.2–1.5 mm, not saccate, margin white. Petals white

with lavender tinge, spatulate, (5–)6–7 × 2.5–3.5 mm, apex rounded. Filaments 2.5–3.5 mm; anthers oblong, 0.6–0.8 mm. Ovules 4–8(–10) per ovary. Fruit elliptic, 5–8 × 3–4 mm, base obtuse, apex obtuse to subacute, without apical notch; apical wings absent; style 0.7–1.5 mm. Seeds dark brown, oblong, 1.6–1.9 × 1–1.2 mm, obscurely reticulate. Fl. (Mar–)May–Jul, fr. Jun–Aug.

Rocky crevices, scree, moist grounds, steep hillsides, grassy river banks; 3200–5200 m. Xizang [Bhutan, Kashmir, Nepal, Pakistan, Sikkim].

The record and illustration in FRPS and Fl. Yunnan. (6: 32. 1995) of *Thlaspi andersonii* from Yunnan are most likely based on young plants of *T. yunnanense* with an obsolete apical notch, a feature not uncommon in the species.

**6. *Thlaspi cochleariforme*** de Candolle, Syst. Nat. 2: 381. 1821.

山蒜沸 shan xi ming

*Noccaea cochleariformis* (de Candolle) Á.. Löve & D. Löve; *N. exauriculata* (Komarov) Czerepanov; *Thlaspi exauriculatum* Komarov.

Herbs perennial, (5–)8–25(–45) cm tall, glabrous throughout, glaucous. Stems erect or ascending, simple. Basal leaves rosulate; petiole 0.5–1.5(–2.5) cm; leaf blade spatulate, oblong, or ovate, 0.6–2.8(–3.5) cm × 3–11(–15) mm, base obtuse, margin entire, apex rounded. Middle cauline leaves sessile, oblong or ovate, 0.6–2.8(–3.5) cm × 4–12(–16) mm, base auriculate or amplexicaul, margin repand or entire, rarely denticulate, apex obtuse or acute. Fruiting pedicels (2–)4–8 mm, slender, divaricate, straight. Sepals oblong, 2–3 × 1–1.5 mm, not saccate, margin white. Petals white, spatulate, 5–7 × 2–3 mm, apex rounded. Filaments 2.5–3.5 mm; anthers oblong, 0.6–0.8 mm. Ovules 4–8(–10) per ovary. Fruit narrowly obovate or obovate-obcordate, rarely oblong-obovate, (5–)6–10(–13) × 4–6 mm, base subacute, apex emarginate and apical notch 1–2 mm deep; apical wings 1–2.5 mm wide; style (0.2–)0.7–1.5(–2) mm. Seeds brown, ovate-oblong, 1.2–1.8 × 0.9–1.1 mm, obscurely reticulate. Fl. May–Jun, fr. Jun–Aug.  $2n = 56, 84$ .

Grassy slopes, roadsides, meadows; 600–3700 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Xinjiang, Xizang [Kashmir, Kazakstan, Mongolia, Pakistan, Russia, Tajikistan].

*Thlaspi cochleariforme* was reduced in FRPS to the synonymy of *T. thlaspioides* (Pallas) Kitagawa, but the latter is a synonym of *T. alpestre* Linnaeus, a species restricted to Europe. The records in FRPS and Fl. Xinjiang. (2(2): 83. 1995) of *Thlaspi ferganense* N. Busch from Xinjiang are based on misidentified plants of *T. cochleariforme*.

