

6. HELIOTROPIUM Linnaeus, Sp. Pl. 1: 130. 1753.

天芥菜属 tian jie cai shu

Herbs annual or perennial, rarely subshrubs, pubescent or strigose, rarely scabrous. Leaves alternate, less often opposite, sessile or petiolate. Cymes terminal, rarely axillary, unilateral, scorpioid, bracteate or not. Calyx 5-parted. Corolla white or light bluish purple, less often yellow, cylindric or funnelform, strigose outside, glabrous and rarely appressed pubescent inside; throat frequently pubescent; limb 5-parted; lobes orbicular, sometimes linear, margin with folds or undulate. Filaments extremely short; anthers included. Ovary completely or incompletely divided into 4 lobes; ovules 4. Style terminal; stigma conical or ringlike. Fruit nutletlike dry drupes, without evident mesocarp at maturity, endocarp bony, dividing into 4 1-seeded or 2 2-seeded mericarps. Seeds straight or curved, usually with a thin endosperm.

About 250 species: tropical and temperate regions; ten species in China.

Heliotropium ovalifolium Forsskål var. *depressum* (Chamisso) Merrill is not included here because no material was available for study.

- 1a. Corolla blue, violet, or purple.
 - 2a. Leaf blade decurrent to petiole, lateral veins 5–7 pairs; cymes solitary; mericarps with longitudinal ribs 10. *H. indicum*
 - 2b. Leaf blade not decurrent to petiole, lateral veins 7–9 pairs; cymes paniculate or corymbose; mericarps without longitudinal ribs 9. *H. pseudoindicum*
- 1b. Corolla white.
 - 3a. Stigma short conical, not longer than style.
 - 4a. Shrubby perennials; flowers sessile; stigma ca. 1/2 as long as style 2. *H. arguzioides*
 - 4b. Annuals; flowers pedicellate; stigma ca. as long as style.
 - 5a. Style glabrous; mericarps narrowly ovate, 3–3.5 mm 8. *H. acutiflorum*
 - 5b. Style densely white pubescent; mericarps linear-oblong, complanate, ca. 5 mm 7. *H. micranthum*
 - 3b. Stigma long conical, longer than style.
 - 6a. Leaf blade elliptic to elliptic-ovate or obovate, 3–6 cm, sparsely strigose; mericarps glabrous or strigose.
 - 7a. Mericarps glabrous, ± distinctly tuberculate; stigma elongated, deeply 2-cleft at apex 5. *H. europaeum*
 - 7b. Mericarps retrorsely strigose, indistinctly rugose and warty; stigma not 2-cleft at apex 6. *H. lasiocarpum*
 - 6b. Leaf blade narrowly oblong to ovate or linear-lanceolate, 0.3–2 cm, densely strigose; mericarps hairy.
 - 8a. Cymes slender, 2–6 cm; flowers sparse, in 1 row 3. *H. strigosum*
 - 8b. Cymes stout, 0.8–2.5 cm; flowers crowded, in 2 rows.
 - 9a. Bracts lanceolate; fruit densely antrorse hirtellous at apex 1. *H. marifolium*
 - 9b. Bracts elliptic to ovate; fruit appressed pubescent above middle 4. *H. formosanum*

1. *Heliotropium marifolium* Retzius, Observ. Bot. 2: 8. 1781.

Arid, sandy beaches. Hainan [Cambodia, India, Indonesia, Malaysia, Pakistan, Sri Lanka, Thailand, Vietnam].

大苞天芥菜 da bao tian jie cai

2. *Heliotropium arguzioides* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 406. 1842.

Subshrubs 10–15 cm tall, much branched; branches spreading or prostrate, sparsely hirtellous. Leaves crowded, ± opposite when young, alternate in age, ± sessile, narrowly oblong to lanceolate, 0.8–1.5 cm × 2–3 mm, densely antrorse appressed hirtellous, base cuneate, apex acute. Cymes terminal, scorpioid, 1–2.5 cm; bracts spreading, lanceolate, 3–4 mm. Flowers sessile, crowded. Calyx 2.5–4 mm, densely hispid outside, glabrous below middle inside; lobes lanceolate to ovate-lanceolate, slightly enlarged in fruit. Corolla white, tubular, 2–3 mm, base ca. 1 mm wide; throat constricted to 0.5 mm; limb ca. 1 mm wide, densely hispid outside, slightly exceeding calyx or not; lobes ovate, ca. 0.5 mm. Filaments extremely short, inserted near base of corolla tube; anthers ovate-lanceolate, ca. 0.5 mm, apices thickened, coherent. Ovary globose. Style less than 0.5 mm; stigma ringlike at base, conical at apex. Fruit globose, ca. 2 mm in diam., densely pale yellow hirtellous, divided at maturity into 4 1-seeded mericarps; mericarps ca. 1.5 mm, white spotted adaxially near middle. Fl. Jun.

新疆天芥菜 xin jiang tian jie cai

Heliotropium radula Fischer & C. A. Meyer; *H. xinjiangense* Y. L. Liu.

Herbs perennial, shrubby, 25–30 cm tall. Stems erect or ascending, branched from base, densely pubescent, with ribs and flaking white bark; branches crowded. Petiole short, 3–5 mm, or subsessile, white pubescent; leaf blade gray-green, oblong-elliptic to oblong or ovate, 1–2 × 0.5–1 mm, abaxially soft pubescent, adaxially scabrous, densely appressed hirsute and hirtellous, base rounded to broadly cuneate, margin subrevolute, apex obtuse to acute; lateral veins 2 or 3 pairs. Cymes terminal and axillary, scorpioid, 1–2.5 cm wide, pubescent, ebracteate. Flowers sessile. Calyx 1.5–2 mm, parted nearly to base, densely gray pubescent outside, glabrous inside; lobes narrowly ovate or oblong.

Corolla white, tubular, 2–3.5 mm, base ca. 1 mm wide; limb ca. 1 mm wide, densely antrorse pubescent outside, glabrous inside; lobes orbicular, margin crispate. Filaments extremely short, inserted above middle of corolla tube; anthers ovate, ca. 0.5 mm. Ovary ellipsoid, glabrous. Style ca. 1 mm, glabrous; stigma short conical, 0.5–2 mm, glabrous, base ringlike. Fruit ellipsoid, divided at maturity into 4 1-seeded mericarps; mericarps ovate, 2–3 mm, densely villous. Fl. and fr. Aug.

Dunes. N Xinjiang (Huocheng Xian) [Kazakhstan, Russia, Uzbekistan].

Heliotropium xinjiangense differs from *H. arguzioides* only by having a longer conical stigma 1–2 mm (instead of ca. 0.5 mm). However, since stigma length is variable and unreliable, the two are considered conspecific.

3. *Heliotropium strigosum* Willdenow, Sp. Pl. 1(2): 743. 1798.

细叶天芥菜 xi ye tian jie cai

Lithospermum chinense Hooker & Arnott.

Herbs perennial, rarely annual, 15–30 cm tall. Stems numerous, slender, prostrate or ascending, base woody, densely appressed strigose. Leaves crowded; petiole 0.5–1 mm, or \pm sessile; leaf blade linear-lanceolate, 3–10 \times 1–1.5 mm, appressed strigose, margin usually revolute; midvein prominent abaxially, concave adaxially, without evident lateral veins. Cymes scorpioid, slender, 2–6 cm; bracts 1–3 mm. Flowers sparse, unilateral. Calyx 2–3 mm; lobes lanceolate, sparsely strigose. Corolla white, tubular or funnelform, 3–4 mm, widest at middle, ca. 1 mm wide; throat constricted, glandular, sparsely pubescent; limb 3.5–4 mm wide; lobes suborbicular, with folds above middle, densely hispid outside. Anthers ovate-lanceolate, 0.5–0.7 mm, apices thickened, coherent. Ovary globose, glabrous. Style short, evident; stigma conical, base ringlike, ca. 3 mm wide, apex short pubescent. Fruit compressed globose, ca. 2 mm in diam., densely strigose-hirtellous, divided at maturity into 4 1-seeded mericarps; mericarps trigonous-ovate, ca. 1 mm. Fl. and fr. Jul-Sep. $2n = 22, 26, 32, 64$.

Sandy places, woods on coastal slopes. Fujian, Guangdong [Afghanistan, Bhutan, Cambodia, India, Kashmir, Laos, Myanmar, Nepal, Pakistan, Thailand, Vietnam; Africa, Australia].

4. *Heliotropium formosanum* I. M. Johnston, J. Arnold Arbor. 32: 114. 1951.

台湾天芥菜 tai wan tian jie cai

Herbs perennial, ascending or prostrate, short gray strigose. Stems 10–25 cm tall, base usually woody; branches sparse, slender. Leaves crowded; petiole of basal leaves ca. 1 mm, other leaves \pm sessile; leaf blade elliptic to ovate, 3–4 \times 1–2 mm, base obtuse to rounded, apex acute; midvein prominent adaxially. Inflorescences terminal, obscurely scorpioid, 0.8–1.5 cm, 4–8-flowered; bracts ovate to elliptic, 2–3 mm. Flowers crowded. Calyx 2–3 mm, strigose outside, subglabrous inside; lobes unequal, 0.5–1.2 mm wide, slightly surpassing corolla tube. Corolla white, 3.5–4 mm; tube ca. 1.5 mm, middle 0.8–1 mm wide; throat slightly contracted, densely tomentose; limb to 4 mm wide; lobes ovate-

triangular, ca. 1 mm wide, with a wide obtuse fold between lobes. Filaments extremely short, inserted 0.4–0.6 mm above base of corolla tube; anthers ovate-lanceolate, 0.6–0.7 mm, apex coherent. Ovary smooth. Style ca. 0.5 mm; stigma long conical, 0.7–0.8 mm. Fruit convex, 1–1.2 mm, appressed pubescent above middle; mericarps with an aperture adaxially at middle, ribs with a scar at middle.

• Taiwan.

5. *Heliotropium europaeum* Linnaeus, Sp. Pl. 1: 130. 1753.

天芥菜 tian jie cai

Herbs annual, 20–50 cm tall. Stems erect or ascending, branched from base, strigose or hirtellous. Petiole 1–4 cm; leaf blade elliptic to elliptic-ovate, 1.5–4 \times 1–2.5 cm, abaxially gray-green and densely hirtellous, adaxially green and sparsely hirtellous, base widely cuneate to rounded, apex obtuse to acute. Cymes terminal and axillary, scorpioid, simple or dichotomously branched, 2–4 cm. Flowers sessile. Calyx lobes ovate to ovate-lanceolate, 2–3 \times 1–1.5 mm, not enlarged in fruit, strigose. Corolla white, 4–5 mm, base 1.5–2 mm wide; throat slightly contracted; limb (2–)3–4 mm wide; lobes rounded, ca. 1.5 mm wide, short strigose outside, glabrous inside. Anthers ovate-oblong, ca. 1 mm, without filaments, attached ca. 1 mm above base of corolla tube. Ovary globose, 0.5–0.7 mm in diam. Style short; stigma long conical, deeply 2-cleft, 1.2–1.5 mm, ringlike portion glabrous, apex short strigose. Fruit 2.5–3 mm in diam.; mericarps ovate, ca. 2 mm, \pm distinctly tuberculate, glabrous. Fl. and fr. Jul-Sep. $2n = 24, 32, 48$.

Gravelly deserts, river banks, valleys; 100–800 m. Naturalized in W Gansu, Xinjiang [Afghanistan, India, Pakistan, Russia; N Africa, SW Asia, S Europe].

6. *Heliotropium lasiocarpum* Fischer & C. A. Meyer, Index Sem. Hort. Pétrap. 4: 38. 1837.

毛果天芥菜 mao guo tian jie cai

Heliotropium eichwaldii Steudel var. *lasiocarpum* (Fischer & C. A. Meyer) C. B. Clarke; *H. ellipticum* Ledebour var. *lasiocarpum* (Fischer & C. A. Meyer) Popov; *H. europaeum* var. *lasiocarpum* (Fischer & C. A. Meyer) Kazmi.

Herbs annual, ca. 40 cm tall. Stems erect, sometimes woody at base, low branched, densely spreading or curved, white pubescent or sometimes hirtellous. Petiole 1–3 cm, densely pubescent or hirtellous; leaf blade obovate to elliptic-ovate, 2–6 \times 1.5–3.5 cm, white pubescent or hirtellous, base widely cuneate to rounded, margin entire, apex obtuse; lateral veins 3 or 4 pairs, usually densely pubescent. Cymes terminal and axillary, scorpioid, 8–15 cm; branches usually paired, rarely ternate, ebracteate. Flowers sessile. Calyx parted nearly to base; lobes lanceolate, 3–3.5 \times 0.5–1 mm, densely pubescent. Corolla white, tubular-campanulate, 4–4.5 mm, pubescent outside, glabrous inside; lobes rounded, 1–1.5 mm wide, with an erect or spreading fold between lobes. Anthers sessile, 1–1.2 mm, inserted ca. 1 mm above base, apex abruptly attenuate. Ovary globose, ca. 1 mm in diam., glabrous. Style extremely short or obscure; stigma ringlike, ca. 5 mm wide, sterile upper portion ca. 1 mm, 2-cleft. Fruit

2–2.5 mm in diam., dividing into 4 1-seeded mericarps; mericarps ovate, densely short strigose, sparsely tuberculate. Fl. and fr. Jun.

Deserts at low elevations, gravelly river marshes, meadows. N Henan, SW Shanxi, N Xinjiang [India, Kashmir, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

7. *Heliotropium micranthum* (Pallas) Bunge, Mém. Acad. Imp. Sci. Saint Pétersbourg Divers Savans 7: 399. 1851.

小花天芥菜 xiao hua tian jie cai

Onosma micranthos Pallas, Reise Russ. Reich. 2: 734. 1776; *Beruniella micrantha* (Pallas) K. Z. Zakirov & M. M. Nabiev.

Herbs perennial, 10–15 cm tall. Stems erect, base much branched, glabrous or sparsely hirtellous. Petiole 0.5–2 cm, sparsely hirtellous; leaf blade ovate-oblong to oblong-elliptic, 1.5–4.5 × 0.5–1.5 cm, abaxially gray-green, densely hirtellous, hairs discoid at base, adaxially green and subglabrous or sparsely hirtellous, base widely cuneate to rounded, apex obtuse. Cymes scorpioid, terminal and axillary, in large panicles. Pedicel slender, 2–4 mm, to 1 cm after anthesis. Calyx parted nearly to base, 2.5–3 mm, to 5 mm in fruit, sparsely hirtellous; lobes linear to oblong, apex acute. Corolla white, 2.5–3.5 mm, ca. as long as or slightly longer than calyx, base retrorse pubescent outside, glabrous inside; lobes lanceolate, ca. 0.5 mm, included, with a mucro between lobes. Filaments obscure, inserted at middle of corolla tube; anthers ovate-oblong, ca. 1 mm. Ovary ellipsoid, glabrous. Style ca. as long as stigma, ca. 0.7 mm, with many retrorse white hairs; stigma conical, densely white pubescent. Fruit oblong, divided at maturity into 4 1-seeded mericarps; mericarps complanate, linear-oblong, ca. 5 mm, sericeous-cottony. Fl. and fr. Jun.

Dunes and slopes in desert regions. N Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan; Europe].

8. *Heliotropium acutiflorum* Karelín & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 406. 1842.

尖花天芥菜 jian hua tian jie cai

Herbs perennial, 5–15 cm tall. Stems branched from base, spreading strigose; branches usually erect. Petiole 1–2 cm, densely strigose; leaf blade narrowly ovate to ovate, 1–2.5 × 1–1.5 cm, strigose or hirtellous, base broadly cuneate to rounded, margin entire, apex obtuse. Cymes scorpioid, 1–3 cm, usually 3–7-flowered. Pedicel slender. Calyx lobes oblong-ovate, 2–2.5 mm, slightly enlarged in fruit, strigose outside, glabrous inside. Corolla tubular, ca. 3 mm, short strigose outside, glabrous inside; throat with 5 terete appendages; lobes erect to spreading, linear, ca. 0.5 mm. Filaments inserted ca. 1 mm above base of corolla tube; anthers oblong, ca. 1 mm. Ovary subglobose ca. 0.8 mm in diam., glabrous. Style 0.6–0.8 mm, ca. as long as stigma, glabrous; stigma short conical to subellipsoid, short pubescent. Mericarps narrowly ovate, 3–3.5 mm, densely white villous. Fl. and fr. May–Jun.

Dunes, sandy ground. N Xinjiang [Kazakhstan, Kyrgyzstan,

Russia, Tajikistan, Turkmenistan, Uzbekistan].

9. *Heliotropium pseudoindicum* H. Chuang, Acta Bot. Yunnan 5(1): 59. 1983.

拟大尾摇 ni da wei yao

Herbs erect, 20–50 cm tall. Stems stout, much branched, hirtellous, woody at base. Petiole 5–10 mm, hirtellous; leaf blade elliptic, 4–8 × 1–2.4 cm, usually hirtellous, base cuneate, margin entire, apex acute to acuminate; lateral veins 7–9 pairs, inconspicuous. Cymes terminal, paniculate or corymbose, scorpioid, 5–9 × 6–9 cm. Flowers in 2 ranks along 1 side of rachis. Calyx green; lobes lanceolate to narrowly lanceolate, 2.5–3 mm, densely hirtellous outside. Corolla purple, 6–7 mm, sparsely pubescent outside; tube cylindrical, 4–5 mm, elongated at anthesis; lobes of limb rounded. Filaments short, slender, inserted above base. Style terete, slightly longer than ovary; stigma conical, ca. 1 mm. Mericarps pale gray-green, subreniform, ca. 1 mm, glabrous, with obscure dots, without ribs.

• Cultivated ground; ca. 600 m. Yunnan (Mengla Xian).

10. *Heliotropium indicum* Linnaeus, Sp. Pl. 1: 130. 1753.

大尾摇 da wei yao

Herbs annual, 20–50 cm tall. Stems erect, stout, much branched, strigose. Leaves alternate or subopposite; petiole 2–5 cm; leaf blade 3–9 × 2–4 cm, pubescent or strigose, base rounded or truncate, decurrent to petiole, margin undulate, apex acute; lateral veins 5–7 pairs. Cymes solitary, scorpioid, 5–15 cm, ebracteate. Flowers sessile, crowded. Calyx lobes lanceolate, 1.5–2 mm, strigose. Corolla light blue or blue-purple, salverform, 3–4 mm, base ca. 1 mm wide; throat contracted to ca. 0.5 mm; limb 2–2.5 mm wide; lobes rotund, ca. 1 mm wide, margin crispate. Anthers narrowly ovate, ca. 0.5 mm, inserted ca. 1 mm above base. Ovary glabrous. Style ca. 0.5 mm; stigma conical, pubescent. Fruit ribbed, 3–3.5 mm, glabrous or nearly so, deeply 2-cleft into mericarps each divided into 2 1-seeded pyrenes; mericarps longitudinally ribbed. Fl. and fr. Apr–Oct. $2n = 22, 24, 44, 64$.

Hills, river banks, open waste places; 0–700 m. Widely scattered. Fujian, Hainan, Nanhai Zhudao, Taiwan, SW Yunnan [Cambodia, India, Indonesia, Japan (Ryukyu Islands), Laos, Malaysia, Myanmar, Thailand, Vietnam; Africa, North America, Pacific Islands, South America].

Entire plant is used in herbal medicine.

Flora of China 16: 338–341. 1995.