

27. LINARIA Miller, Gard. Dict. Abr. ed. 4, 2. 1754.

柳穿鱼属 liu chuan yu shu

Herbs, annual or perennial. Leaves alternate, opposite, or whorled, often sessile; veins 1 or several and campylodromous. Inflorescences spicate, racemose, or rarely capitate. Calyx 5-lobed almost to base. Corolla tube tubular, base spurred; limb 2-lipped; lower lip convex, dilated toward center of upper lip, almost closed at throat, and making corolla personate, 3-lobed, densely glandular hairy; upper lip erect, 2-lobed. Stamens 4, anterior 2 longer; anthers anterior and posterior connivent in 2 pairs, locules parallel, divergent after dehiscence. Stigma apex often emarginate. Capsule ovoid or globose, apically dehiscent by irregular pores, valves irregular. Seeds numerous, flattened, often disclike with a broadly winged margin, rarely 3-angled and wingless or reniform and with a thickened margin.

About 100 species: northern temperate zones, mainly in Asia and Europe; ten species in China.

1a. Leaves opposite or whorled at least basally.

2a. Leaf blade linear; seeds disclike, broadly winged at margin; corolla spur 10–15 mm 7. *L. vulgaris*

2b. Leaf blade ovate to oblong; seeds reniform, thickened at margin; corolla spur 3–6 mm 9. *L. japonica*

1b. Leaves alternate.

3a. Corolla spur 2–6 mm; inflorescence axis and pedicels with long glandular hairs.

4a. Calyx lobes linear-lanceolate, less than 2 mm wide; corolla spur 5–6 mm 5. *L. tibetica*

4b. Calyx lobes lanceolate to narrowly ovate, 2–3 mm wide; corolla spur 2–4 mm 6. *L. yunnanensis*

3b. Corolla spur more than 7 mm; inflorescence axis and pedicels glabrous or sparsely with short glandular hairs (densely glandular villous in *L. buriatica*).

5a. Leaves ovate-lanceolate, distinctly 3-veined; seeds 3-angled 10. *L. genistifolia*

5b. Leaves lanceolate to linear, mostly 1-veined; seeds disclike.

6a. Flowers purple to purple-red.

7a. Plants 30–50 cm tall; corolla spurs 10–15 mm, straight 1. *L. bungei*

7b. Plants 15–20 cm tall; corolla spurs 7–8 mm, slightly curved at tip 2. *L. kulabensis*

6b. Flowers yellow.

8a. Plants glabrous except for corolla; calyx lobes narrowly oblong to ovate 3. *L. longicalcarata*

8b. Inflorescence axes, pedicels, or calyces ± glandular hairy, rarely glabrous; calyx lobes linear

to ovate-lanceolate.

9a. Seeds smooth in center; calyx lobes elliptic-lanceolate, apex acute to obtuse .. 4. *L. incompleta*

9b. Seeds verrucose in center; calyx lobes linear-lanceolate to ovate-lanceolate, apex acute to acuminate.

10a. Stems often more than 20 cm tall, branched from middle or apically; inflorescences, pedicels, and calyces glabrous or sparsely short glandular hairy; calyx lobes lanceolate

to ovate-lanceolate, more than 1.5 mm wide 7. *L. vulgaris*

10b. Stems often less than 20 cm tall, many branched at base; inflorescences, pedicels, and calyces densely long glandular hairy; calyx lobes linear-lanceolate, 1–1.5 mm wide 8. *L. buriatica*

1. *Linaria bungei* Kuprianova, Trudy Bot. Inst. Akad. Nauk SSSR, ser. 1, Fl. Sist. Vyssh. Rast. 2: 298. 1936.

紫花柳穿鱼 zi hua liu chuan yu

Linaria praecox Bunge (1834), not Hoffmannsegg & Link (1809); *L. transiliensis* Kuprianova.

Perennials, 30–50 cm tall. Stems often cespitose, sometimes sterile, often many branched from middle or apically, glabrous. Leaves alternate; leaf blade linear, 2–5 cm × 2–3 mm, glabrous. Inflorescences spicate, with several to numerous flowers, elongated in fruit,

axis and pedicels glabrous. Calyx glabrous or sparsely with short glandular hairs; lobes narrowly oblong to ovate-lanceolate, 2–3 × 1.2–2 mm. Corolla purple, 1.2–1.5 cm (excluding spur); spur straight, 1–1.5 cm; lateral lobes of lower lip ca. 1 mm; upper lip ovate-triangular, longer than lower lip. Capsule subglobose, 5–7 × 4–5 mm. Seeds disclike, margin broadly winged, center smooth. Fl. May–Aug.

Grasslands, stony mountain slopes; 500–2000 m. NW Xinjiang [Kazakstan, Kyrgyzstan, Russia].

2. *Linaria kulabensis* B. Fedtschenko, Repert. Spec. Nov. Regni Veg. 10: 380. 1912.

帕米尔柳穿鱼 pa mi er liu chuan yu

Perennials, 15–20 cm tall. Stems persistent underground, to 1 cm in diam., present year's growth branched at base. Leaves alternate; leaf blade linear-elliptic, 1.5–3 cm × 3–5 mm, base and apex acute; veins 3, inconspicuous. Inflorescences spicate, to 7 cm at anthesis, to 10-flowered; bracts ovate-lanceolate, longer than pedicel. Pedicel ca. 2 mm at anthesis. Calyx pubescent with granular-glandular hairs; lobes narrowly oblong, ca. 3 × 1–1.5 mm, apex obtuse. Corolla purple-red, to 1.4 cm (excluding spur); spur 7–8 mm, tip slightly curved; lower lip ca. 2 mm, shorter than upper, lateral lobes shorter and to 3 mm wide, middle lobe slightly narrower, lobe apices obtuse; upper lip with a deep notch ca. 1.8 mm, lobes ca. 3 mm wide in middle. Fl. May–Jun.

Gravelly slopes; ca. 2800 m. SW Xinjiang (Wuqia Xian) [Tajikistan].

3. *Linaria longicalcarata* D. Y. Hong, Fl. Reipubl. Popularis Sin. 67(2): 399. 1979.

长距柳穿鱼 chang ju liu chuan yu

Perennials, 15–35 cm tall, glabrous except for corolla. Stems branched above middle. Leaves alternate; leaf blade linear, 1–4.5 cm × 2–4 mm. Inflorescences lax spicate, several flowered; bracts lanceolate. Pedicel 1–3 mm. Calyx lobes narrowly oblong to ovate, 2.5–3 × 1.2–1.8 mm, apex obtuse. Corolla yellow, convex part orange, 1.1–1.4 cm (excluding spur); spur 1–2 cm, straight; upper lip slightly longer than lower; lobes obtuse at apex. Capsule 6–8 × ca. 5 mm. Seeds dislike, ca. 3 mm, center smooth. Fl. Jul–Aug.

• Shaded slopes, among grasses by streams and stony places; 1100–1400 m. NW Xinjiang (Burqin Xian, Toli Xian).

4. *Linaria incompleta* Kuprianova, Sovetsk. Bot. 4: 114. 1936.

光籽柳穿鱼 guang zi liu chuan yu

Perennials, 25–30 cm tall. Stems erect, apically with sterile or rarely fertile branches, glabrous. Leaves linear-filiform, 2–6 cm × 1–2 mm, glabrous. Inflorescences 3–10-flowered; bracts nearly as long as or longer than pedicels. Pedicel 2–3 mm. Calyx ± capitate glandular hairy; lobes elliptic-lanceolate, 3–4 × 1.5–2 mm, apex acute to obtuse. Corolla yellow, 1.2–1.4 cm (excluding spur); spur ca. 1.4 cm, slightly curved; upper lip ca. 9 mm. Capsule oblong-globose, ca. 8 mm. Seeds dislike, smooth, margin broad. Fl. Jun. Steppes. N Xinjiang [Mongolia, Russia; Europe].

Only two specimens have been examined by the authors. One collected by Karelin and Kirilow in 1840 and the other *Schrenk* 276. Because the specimens are not in good condition, the species description may need to be amended when additional material becomes available.

5. *Linaria thibetica* Franchet, Bull. Soc. Bot. France 47: 11. 1900.

宽叶柳穿鱼 kuan ye liu chuan yu

Linaria yunnanensis W. W. Smith var. *caerulea* H. L. Li.

Perennials, to 1 m tall. Stems often several, cespitose, simple or apically branched, glabrous. Leaves alternate, sessile, narrowly elliptic to ovate-elliptic, 2–5 × 0.6–1.3 cm, glabrous, veins 3–5. Inflorescences spicate, terminal, with numerous crowded flowers, to 12 cm in fruit, axis and pedicels with sparse multicellular glandular hairs; bracts lanceolate. Pedicel short. Calyx with multicellular glandular hairs on both surfaces or only on inside; lobes linear-lanceolate, 5–7 × 1–2 mm. Corolla pale purple or yellow, 8–10 mm (excluding spur); spur 5–6 mm, slightly curved; lips equal in length; lower lip lobes ovate, ca. 2 mm wide, apex ± acute. Capsule globose, ca. 9 × 6 mm. Seed dislike, margin broadly winged, center verrucose. Fl. Jul–Sep.

• Meadow slopes, forest margins, sparse thickets; 2500–3800 m. W Sichuan, SE Xizang, NW Yunnan.

Flowers in Sichuan and Yunnan are pale purple, while in Xizang they are yellow.

6. *Linaria yunnanensis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 110. 1916.

云南柳穿鱼 yun nan liu chuan yu

Perennials, to 1 m tall. Stems often several, cespitose, simple or apically branched, glabrous. Leaves alternate, sessile, elliptic, 2–5 × 1.5–3 cm. Inflorescence axes and pedicels long glandular hairy; bracts ovate-lanceolate. Calyx with multicellular glandular hairs on both surfaces or only inside; lobes lanceolate to narrowly ovate, 5–7 × 2–3 mm, widest in middle. Corolla yellow, ca. 1.2 cm (excluding spur); spur 2–4 mm, slightly curved; lips equal in length; lower lobes ovate, apex obtuse. Capsule globose. Seeds dislike, center verrucose, margin broadly winged. Fl. and fr. Jul–Sep.

• Open stony slopes; ca. 3000 m. NW Yunnan.

Linaria yunnanensis has nearly the same habit as *L. thibetica*. Further study is needed to determine if *L. yunnanensis* is a distinct species or should be a variety of *L. thibetica*.

7. *Linaria vulgaris* Miller, Gard. Dict. ed. 8, 1. 1768.

柳穿鱼 liu chuan yu

Perennials, 20–80 cm tall, glabrous except for inflorescences. Stems erect, often apically branched. Leaves usually numerous and alternate, rarely basal ones whorled, rarely all in whorls of 4; leaf blade linear, 2–8 × 0.2–1.5 cm, veins 1(–3). Inflorescences racemose, flowers crowded, axis elongating in fruit; axis and pedicels glabrous to densely with short glandular hairs; bracts linear to narrowly lanceolate, longer than pedicel. Pedicel 2–8 mm. Calyx glabrous or inside sparsely glandular hairy; lobes lanceolate to ovate-lanceolate. Corolla yellow, 1–1.5 cm (excluding spur); spur 1–1.5 cm, slightly curved; lateral lower lip lobes ovate-orbicular, 3–4 mm wide, middle lobe ligular; upper lip longer than lower lip, lobes ca. 2 mm, ovate. Capsule ovoid-globose. Seeds dislike, margin broadly winged, center verrucose when mature. Fl. Jun–Sep.

Mountain slopes, trailsides, meadows, gravelly steppes, forests; below 2200 m. NE Gansu, Hebei, Heilongjiang, Henan, N Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, NW Xinjiang [Korea, Russia; Europe].

Linaria vulgaris is a widely distributed species with a number of local races often treated as species; *L. vulgaris* subsp. *vulgaris* does not occur in China.

- 1a. Leaf blade linear; calyx lobes less than 1.5 mm wide, inside sparsely glandular hairy; lower leaves usually 1-veined 7a. subsp. *chinensis*
1b. Leaf blade linear-lanceolate to lanceolate; calyx lobes more than 1.5 mm wide, inside subglabrous; leaves 3-veined .. 7b. subsp. *acutiloba*

7a. *Linaria vulgaris* subsp. *chinensis* (Bunge ex Debeaux) D. Y. Hong, Fl. Reipubl. Popularis Sin. 67(2): 206. 1979.

柳穿鱼(原亚种) liu chuan yu (yuan ya zhong)

Linaria vulgaris var. *chinensis* Bunge ex Debeaux, Actes Soc. Linn. Bordeaux 31: 336. 1876.

Leaves alternate, rarely lower ones or all whorled; leaf blade linear, 2–6 cm × 2–4(–10) mm, 1(–3)-veined. Inflorescence axis and pedicels glabrous or sparsely short glandular hairy. Calyx lobes lanceolate, ca. 4 × 1–1.5 mm, inside sparsely with glandular hairs. Fl. Jun–Sep.

Mountain slopes, trailsides, meadows, gravelly steppes; below 1000 m. NE Gansu, Hebei, Heilongjiang, Henan, N Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong [Korea].

Used medicinally for treating heart disease caused by rheumatism.

7b. *Linaria vulgaris* subsp. *acutiloba* (Fischer ex Reichenbach) D. Y. Hong, Fl. Reipubl. Popularis Sin. 67(2): 208. 1979.

新疆柳穿鱼 xin jiang liu chuan yu

Linaria acutiloba Fischer ex Reichenbach, Iconogr. Bot. Pl. Crit. 5: 14. 1827.

Leaves alternate; leaf blade linear-lanceolate to lanceolate, 3–8 × 0.5–1.5 cm, 3-veined. Inflorescence axis and pedicels glabrous. Calyx lobes lanceolate to ovate-lanceolate, more than 1.5 mm wide, inside subglabrous. Fl. Jun–Aug.

Ravine meadows, forests; 1000–2200 m. NW and NE Xinjiang [Mongolia, Russia].

8. *Linaria buriatica* Turczaninow ex Benth in A. de Candolle, Prodr. 10: 281. 1846.

多枝柳穿鱼 duo zhi liu chuan yu

Perennials, 8–20 cm tall. Stems many branched at base, often diffuse. Leaves alternate, numerous, crowded; leaf blade filiform to narrowly linear, 1.5–5 cm, glabrous, 1-veined. Inflorescences racemose, terminal, 3–7 cm, axis and pedicels densely glandular villous; bracts linear-lanceolate, lowermost ca. 1 cm. Pedicel and calyx glandular hairy. Calyx lobes linear-lanceolate, 4–6 × ca. 1 mm. Corolla yellow, 1.2–1.5 cm (excluding spur); spur 0.8–1.5 cm, slightly curved; lateral lobes of lower lip oblong, 2–5 mm wide, middle lobe narrower; upper lip longer than lower, lobes ca. 2 mm, apex rounded or obtuse. Capsule ovoid-globose, ca. 9 × 7

mm. Seeds disclike, margin broadly winged, center verrucose. Fl. Jun–Aug.

Steppes, wasted fields, dunes; 100–200 m. N Nei Mongol [Mongolia, Russia (E Siberia)].

9. *Linaria japonica* Miquel, Ann. Mus. Bot. Lugduno-Batavum 2: 115. 1865.

海滨柳穿鱼 hai bin liu chuan yu

Perennials, 15–40 cm tall, grayish, glabrous. Stems ascending, often branched. Leaves opposite or in whorls of 3 or 4, often irregularly whorled or alternate upward, sessile, ovate, obovate, or oblong, 1.5–3 × 0.5–1.5 cm, base obtuse to subcuneate, apex obtuse to subacute; veins obscurely 3-campylodromous. Inflorescences racemose; bracts similar to but much smaller than leaves. Pedicel 3–5 mm. Calyx lobes ovate to lanceolate, 2.5–4 × 1.5–2.5 mm. Corolla bright yellow, 1.2–1.7 cm (excluding spur); spur 3–6 mm, straight; lateral lobes of lower lip 3–5 mm wide, middle lobe narrower; upper lip longer than lower. Capsule globose, ca. 6 mm in diam. Seeds reniform, ca. 2.5 × 1.5 mm, margin thickened. Fl. Aug.

Sandy beaches; near sea level. Liaoning [Japan, Korea, Russia (Far East)].

10. *Linaria genistifolia* (Linnaeus) Miller, Gard. Dict. 14. 1768.

卵叶柳穿鱼 luan ye liu chuan yu

Antirrhinum genistifolium Linnaeus, Sp. Pl. 2: 616. 1753.

Perennials, 50–100 cm tall. Stems erect, apically branched, glabrous. Leaves alternate; leaf blade ovate-lanceolate, 2.5–3.5 × 0.8–1 cm, glabrous, distinctly 3-veined. Inflorescences paniculate, with few to numerous flowers, glabrous except for corolla. Pedicel 3–5 mm, shorter than bracts. Calyx lobes narrowly lanceolate, 5–6 mm. Corolla pale yellow, 1.1–1.2 cm (excluding spur); spur 7–12 mm, slightly curved; tube wide; lower lip with whitish yellow pubescence in throat, lobes ovate, ca. 4 mm wide; apex of upper lip lobes acuminate. Capsule globose, as long as or slightly longer than calyx, 5–6 mm in diam. Seeds brown-gray, 3-angled, edges narrowly winged, reticulate-rugose. Fl. Jul.

Sandy areas, forests. N Xinjiang [Kazakstan, Russia; Europe].

