

### 3. CHAMERION (Rafinesque) Rafinesque ex Holub, Folia Geobot. Phytotax. 7: 85. 1972.

柳兰属 liu lan shu

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*Epilobium* subg. *Chamerion* Rafinesque, Amer. Monthly Mag. & Crit. Rev. 2: 266. 1818.

Herbs perennial, erect, usually clumped, with shoots from woody caudex or spreading lateral roots. Stems simple or rarely branched, pubescent to subglabrous, hairs always eglandular. Leaves spirally arranged, rarely subopposite or subverticillate, subleathery, basal ones sessile, upper ones usually petiolate; stipules absent; bracteoles absent. Inflorescence a simple raceme or spike, rarely branched. Flowers 4-merous, slightly zygomorphic, strongly protandrous, lacking a floral tube, producing nectar from raised disk at base of style and stamens. Petals pink to rose-purple, rarely white, obcordate or obtrullate, entire. Stamens 8, subequal in single whorl, erect at onset of anthesis, later reflexed; pollen blue or yellow, shed in monads. Style initially deflexed, becoming erect as stigma deflexes; stigma deeply 4-lobed and revolute, receptive on inner surfaces. Fruit an elongate capsule, slender, 4-loculed, loculidical. Seeds many, with terminal coma of silky hairs.  $2n = 36, 72, 108$ .

Eight species: montane to arctic N hemisphere, widespread in Asia and Europe, barely reaching N Africa, and in North America south to the high mountains of C Mexico; four species in China.

The species occur primarily in moist, rocky areas in high-montane regions, with one species (*Chamerion angustifolium*) more widespread in disturbed, temperate habitats.

Raven (Ann. Missouri Bot. Gard. 63: 326–340. 1977 [“1976”]) divided this group into two subsections under *Epilobium* sect. *Chamaenerion* Tausch, elevated to sections by Holub (Folia Geobot. Phytotax. 7: 81–90. 1972), with *Chamerion* sect. *Rosmarinifolium* (Tatick) Holub occurring in SW Asia and Europe, and *C.* sect. *Chamerion*, the only section found in China, widespread in the N hemisphere. Although sometimes included within *Epilobium*, *Chamerion* forms a well-differentiated sister group to that genus, based on both morphological and molecular evidence.

- 1a. Bracts much smaller than cauline leaves, leathery, sublinear; leaves linear to lanceolate, with distinct submarginal vein; seeds with inconspicuous chalazal collar (less than 0.05 mm) ..... 4. *C. angustifolium*
- 1b. Bracts ca. as long as cauline leaves, foliaceous, lanceolate to elliptic; leaves narrowly ovate or elliptic to lanceolate-elliptic, lacking submarginal vein; seeds with distinct chalazal collar (more than 0.08 mm).
  - 2a. Style glabrous; stems subglabrous to sparsely strigillose, only rarely densely strigillose; seeds 1.2–2.1 mm; primary leaf veins obscure ..... 1. *C. latifolium*
  - 2b. Style pubescent on lower half; stems densely strigillose; seeds 1–1.3 mm; primary leaf veins distinct.
    - 3a. Secondary leaf veins conspicuously reticulate or anastomosing; plants 30–120 cm tall; sepals 11–15 mm; petals 8–14 mm; fruiting pedicels 1.5–5 cm ..... 3. *C. conspersum*
    - 3b. Secondary leaf veins obscure, not conspicuously anastomosing; plants 20–45 cm tall; sepals 15–20 mm; petals 17–25 mm; fruiting pedicels 1–3 cm ..... 2. *C. speciosum*

**1. *Chamerion latifolium* (Linnaeus) Holub, Folia Geobot. Phytotax. 7: 86. 1972.**

宽叶柳兰 kuan ye liu lan

*Epilobium latifolium* Linnaeus, Sp. Pl. 1: 347. 1753; *Chamaenerion latifolium* (Linnaeus) Franchet & Lange; *E. changaicum* Grubov; *E. kesamitsui* Yamazaki.

Herbs perennial, erect, clumped, with a thick woody rhizome and wiry mass of roots. Stems 12–35 cm tall, glabrous below to sparsely or rarely densely strigillose on upper stem and inflorescence. Leaves sessile or petioles to 2 mm; basal leaf blade brown, triangular-ovate, 5–10 mm, submembranous; cauline blade green or pale green, elliptic or ovate to lanceolate-elliptic, 2–5(–8) × 0.6–1.7(–2.6) cm, subglabrous or strigillose, especially on veins, lateral veins obscure, 3 or 4 per side, base cuneate or sometimes subobtuse, margin subentire to remotely punctate-denticulate with 4–7 teeth, apex obtuse or acuminate. Bracts ca. 1/2 as long as cauline leaves, foliaceous. Inflorescence sparsely to moderately strigillose. Flowers erect in bud, nodding at early anthesis. Sepals 1–1.6 cm × 1.5–3.5 mm. Petals rose-purple or pink, 1–2.4(–3.2) cm × 7–15(–23) mm. Ovary purplish green, 1–2 cm, densely canescent; style 3.5–8 mm, gla-

brous. Capsules 2.5–8 cm, strigillose; pedicels 1.2–2.5 cm. Seeds 1.2–2.1 × 0.4–0.6 mm, irregularly low-reticulate, with distinct chalazal collar 0.1–0.12 mm; coma tawny or dingy, 9–15 mm, not readily deciduous. Fl. Jun–Aug, fr. Aug–Oct.  $2n = 36, 72$ .

Moist gravelly areas along rivers and in mountains; 1600–5200 m. Qinghai, Xinjiang, Xizang, NW Yunnan [Afghanistan, Bhutan, India, Japan, Mongolia, Nepal, Pakistan, Russia (Amur region, Siberia), Tajikistan; C and SW Asia, Europe, North America (including Greenland)].

Populations of this species occur mainly in two disjunct areas in China: the Tian Shan–Altay–Pamir region of Xinjiang, and the E Himalayan region of Xizang and Yunnan (with one outlier in Qinghai). There are some morphological differences in pubescence, leaf margin and veins, and pollen size and number of pores between populations from the two regions, which may be correlated with ploidy levels, those from Xinjiang apparently being diploid and those from SW China being tetraploid. However, more chromosome counts and further careful analyses of populations are needed to clarify this situation.

**2. *Chamerion speciosum* (Decaisne) Holub, Folia Geobot. Phytotax. 7: 86. 1972.**

喜马拉雅柳兰 xi ma la ya liu lan

*Epilobium speciosum* Decaisne in Jacquemont, Voy. Inde 4(Bot.): 57. 1844; *E. latifolium* Linnaeus subsp. *speciosum* (Decaisne) P. H. Raven.

Herbs perennial, erect, clumped, with a thick, woody rhizome. Stems 20–45 cm tall, densely strigillose throughout, especially on inflorescence. Leaves sessile, or petioles to 2 mm; basal leaf blade brownish green, triangular-ovate to lanceolate, 1–2 cm, submembranous; cauline blade pale green or brown when dry, narrowly ovate to lanceolate-elliptic, 3.5–7.5 × 0.7–1.8(–3) cm, both surfaces strigillose, lateral veins distinct, 3–5 per side, base cuneate, margin remotely punctate-denticulate with 7–15 teeth per side, apex acute, acuminate, or sometimes subobtusate. Bracts ca. 1/2 as long as cauline leaves. Inflorescence densely strigillose. Flowers erect in bud, nodding at early anthesis. Sepals 1.5–2 cm × 3–5 mm. Petals purplish red or rose, 1.7–2.5 × 1.2–2.2 cm. Ovary purplish green, 1.7–2.5 cm, densely canescent; style 5–7 mm, lower half villous. Capsules 5–9 cm, strigillose; pedicels 1–3 cm. Seeds 1.2–1.3 × 0.4–0.6 mm, irregularly low-reticulate; coma tawny, 1–1.3 cm, not readily deciduous. Fl. Aug–Sep, fr. Sep–Oct. Chromosome number unknown.

Moist gravelly or sandy soils, scree slopes in mountains; 3900–4500 m. Xizang [India, Nepal, Pakistan; endemic to Himalayan region].

**3. *Chamerion conspersum*** (Haussknecht) Holub, Folia Geobot. Phytotax. 7: 86. 1972.

网脉柳兰 wang mai liu lan

*Epilobium conspersum* Haussknecht, Oesterr. Bot. Z. 29: 51. 1879; *Chamaenerion conspersum* (Haussknecht) Kitamura; *C. reticulatum* (C. B. Clarke) Kitamura; *E. reticulatum* C. B. Clarke.

Herbs perennial, robust, with a somewhat woody rhizome. Stems 30–120 cm tall, densely strigillose throughout. Leaves sessile or petioles to 3 mm; basal leaf blade narrowly triangular to narrowly lanceolate, 8–10 mm; cauline blade pale green abaxially, dark green adaxially, narrowly oblong or elliptic-lanceolate, 4.5–11 × 0.7–1.4 cm, both surfaces strigillose, lateral veins distinct, 4 or 5 per side, secondary veins conspicuous, anastomosing, base cuneate, margin often revolute, denticulate with 15–35 teeth per side, apex acuminate. Bracts somewhat less than 1/2 as long as cauline leaves. Inflorescence densely strigillose. Flowers suberect in bud, nodding at early anthesis. Sepals 1.1–1.5 cm × 3–5 mm. Petals rose-purple, 8–14 × 6–13 mm. Ovary purplish green, 1–2 cm, densely canescent; style 5–8 mm, lower half densely villous. Capsules 2.5–7.5 cm, strigillose; pedicels 1.5–5 cm. Seeds 1–1.2 × 0.4–0.5 mm, low papillose to reticulate, with distinct chalazal collar 0.08–0.1 mm; coma tawny, 1–1.2 cm, not readily deciduous. Fl. Jul–Sep, fr. Sep–Oct.  $2n = 36$ .

Open, moist gravel beds, sandy streambeds, talus ridges; 2300–4700 m. Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, NE India (Sikkim), Myanmar, Nepal].

Some morphologically intermediate populations appear to be hybrids between this species and *Chamerion angustifolium* or *C. speciosum* in areas where these species overlap. More analyses are needed to verify these observations.

**4. *Chamerion angustifolium*** (Linnaeus) Holub, Folia Geobot. Phytotax. 7: 86. 1972.

柳兰 liu lan

Herbs perennial, erect, forming large clones by vigorous stolons from a woody caudex or by long lateral roots. Stems 20–200 cm tall, glabrous to densely strigillose especially on inflorescence. Leaves sessile or petioles to 7 mm; basal leaf blade scalelike below ground, lanceolate-oblong to obovate, 0.5–2 cm; cauline blade green, linear to lanceolate, 3–23 × 0.3–3.4 cm, glabrous throughout or abaxially strigillose on midvein, lateral veins 10–25 per side, confluent to submarginal vein, base obtuse or cuneate to attenuate, margin entire or scarcely denticulate, apex attenuate-acute. Bracts much smaller than cauline leaves. Inflorescence glabrous or strigillose. Flowers nodding in bud, suberect at anthesis. Sepals 6–19 × 1.5–3 mm. Petals pale pink to purple or rarely white, 9–25 × 3–15 mm. Ovary 0.6–2.5 cm, densely canescent; style 8–16 mm, lower part villous. Capsules 4–9.5 cm, densely appressed-canescenscent; pedicels 0.5–3 cm. Seeds 0.9–1.3 × 0.3–0.45 mm, irregularly reticulate, with indistinct chalazal collar; coma dingy or white, 1–1.7 cm, not easily detaching.

Moist often disturbed places; near sea level to 4700 m. Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, Bhutan, India, Japan, Korea, Mongolia, Myanmar, Nepal, Pakistan, Russia; N Africa, C, N, and SW Asia, Europe, North America].

- 1a. Leaves abaxially glabrous on midvein, (3–)7–14(–18.5) × (0.3–)0.7–1.3(–2.5) cm, base obtuse or subrounded, margin subentire, subsessile; stems subglabrous, petals 9–15(–19) × 3–9(–11) mm ..... 4a. subsp. *angustifolium*
- 1b. Leaves abaxially usually pubescent on midvein, (6–)9–23 × (0.7–)1.5–3.4 cm, base cuneate, margin denticulate, petioles 2–7 mm; stems strigillose at least above; petals 14–25 × 7–15 mm ..... 4b. subsp. *circumvagum*

**4a. *Chamerion angustifolium* subsp. *angustifolium***

柳兰(原亚种) liu lan (yuan ya zhong)

*Epilobium angustifolium* Linnaeus, Sp. Pl. 1: 347. 1753; *Chamaenerion angustifolium* (Linnaeus) Scopoli; *C. angustifolium* var. *album* Yue Zhang & J. Y. Ma; *E. nerifolium* H. Léveillé; *E. spicatum* Lamarck.

Stems 20–130 cm tall, subglabrous. Leaves subsessile; cauline blade linear-lanceolate or narrowly lanceolate, (3–)7–14(–18.5) × (0.3–)0.7–1.3(–2.5) cm, glabrous throughout, lateral veins often indistinct but submarginal vein distinct, base obtuse to cuneate, margin subentire to obscurely denticulate, somewhat revolute. Inflorescence subglabrous. Sepals 6–15 mm. Petals 9–15(–19) × 3–9(–11) mm. Capsules 4–8 cm; pedicels 0.5–1.9 cm. Seeds 0.9–1 mm. Fl. Jul–Sep, fr. Aug–Oct.  $2n = 36^*$ .

Moist often disturbed places in mountains, 500–4700 m. Gansu, Hebei, Heilongjiang, Jilin, Nei Mongol, Ningxia, Qinghai, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Afghanistan, Bhutan, India, Japan, Korea, Myanmar, Nepal, Pakistan, Russia; C, N, and SW Asia, Europe, North America].

**4b. *Chamerion angustifolium* subsp. *circumvagum*** (Mosquin) Hoch, Fl. Japan 2c: 241. 1999.

毛脉柳兰 mao mai liu lan

*Epilobium angustifolium* subsp. *circumvagum* Mosquin, Brittonia 18: 167. 1966; *Chamaenerion angustifolium* subsp. *circumvagum* (Mosquin) Moldenke; *C. angustifolium* var. *platyphyllum* Daniels.

Stems 30–200 cm tall, glabrous below, sparsely strigillose throughout upper stem and inflorescence. Leaves with petioles 2–7 mm; cauline blade oblong- or elliptic-lanceolate, (6–)9–23 × (0.7–)1.5–3.4 cm, sparsely strigillose adaxially, with strigillose leaf midvein especially abaxially, lateral and submarginal veins distinct, base subcuneate to attenuate, margin ± denticulate, flat or scarcely revolute. Inflorescence strigillose. Sepals 9–19 mm. Petals 14–25 × 7–15 mm. Capsules 5–9.5 cm; pedicels 1–3 cm. Seeds 1–1.3 mm. Fl. Jul–Sep, fr. Aug–Oct. *2n* = 72, 108\*.

Moist often disturbed places in mountains; near sea level to 3600(–4400) m. Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Japan, Korea, Myanmar, Nepal, Pakistan, Russia; N Africa, C, N, and SW Asia, Europe, North America].

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