

51. EUPHRASIA Linnaeus, Sp. Pl. 2: 604. 1753.

小米草属 xiao mi cao shu

Herbs, annual or perennial, hemiparasitic. Leaves opposite, lower ones usually small, increasing in size upward. Inflorescences terminal spikes or racemes; bracts larger than leaves, opposite, palmately veined, margin callous thickened dentate. Calyx tubular to campanulate, 4-lobed, more deeply parted medianly than laterally. Corolla tube tubular, apically inflated; limb 2-lipped; lower lip 3-lobed, lobe apices often emarginate; upper lip straight, galeate, lobes ± revolute. Stamens 4, didynamous, anthers connivent and enclosed by galea; locules parallel and free, pointed at base but posterior 2 anthers each with 1 locule spurred, all 4 with barbate hairs along slit. Stigma slightly dilated, entire or 2-lobed. Capsule ± compressed, 2-grooved, loculicidal, apex obtuse. Seeds numerous, small, ellipsoid, with cross striate wings.

About 200 species: cosmopolitan; 11 species in China, belonging to 2 disjunct sections.

The taxa in this genus often are hemiparasitic on grasses.

The Taiwan species of *Euphrasia* all belong to *E. sect. Paradoxae* Pugsley, which includes perennial taxa that also occur in tropical alpine mountains on SE Asian islands, New Guinea, New Zealand, and Juan Fernandez Island of Chile. All the other Chinese species of *Euphrasia* belong to *E. sect. Semicalcaratae* Benthams, which includes annual taxa that occur in the northern hemisphere temperate zones as well as alpine mountains in the northern subtropics.

1a. Annuals; bracts conspicuously larger than leaves (sect. *Semicalcaratae*).

2a. Plants pubescent throughout with eglandular hairs ..... 1. *E. pectinata*

2b. Plants sparsely pubescent on upper stems, leaves, bracts, and calyx with capitate glandular hairs mixed with eglandular hairs.

3a. Stalks of glandular hairs short, 1- or 2-loculed.

4a. Corolla upper side 0.5–1 cm, middle lobe of lower lip less than 3 mm wide ..... 2. *E. regelii*

4b. Corolla upper side 0.9–1.1 cm, middle lobe of lower lip 3–4 mm wide ..... 3. *E. jaeschkei*

3b. Stalks of glandular hairs long, (2 or)3- to several loculed.

5a. Corolla upper side 4–8 mm; stems often slender, simple, rarely apically branched ..... 4. *E. hirtella*

5b. Corolla upper side 8–12 mm; stems often stout, usually branched from middle and apically ..... 5. *E. amurensis*

1b. Perennials, stems often woody at base; bracts as large as leaves or slightly larger (sect. *Paradoxae*).

6a. Calyx lobes ca. 2 × as long as tube ..... 10. *E. nankotaizanensis*

6b. Calyx lobes nearly as long as tube.

7a. Plants lacking glandular hairs ..... 6. *E. matsudae*

7b. Plants with glandular hairs.

8a. Calyx hispid ..... 8. *E. pumilio*

8b. Calyx glandular hairy.

9a. Leaves glabrous or sparsely pubescent ..... 7. *E. transmorrisonensis*

9b. Leaves densely pubescent on both surfaces.

10a. Leaf pubescence soft, mixed with glandular hairs ..... 9. *E. tarokoana*

10b. Leaf pubescence glandular viscose ..... 11. *E. durietziana*

1. *Euphrasia pectinata* Tenore, Fl. Napol. 1: 36. 1811.

小米草 xiao mi cao

Annuals, 10–50 cm tall, pubescent with eglandular hairs. Stems erect, white pubescent. Leaves sessile, ovate to deltoid-orbicular, 1–2 × 0.7–1.5 cm, hispid, margin toothed. Spikes 3–15 cm, flowers crowded, elongated and lax in fruit; bracts leaflike, conspicuously larger than leaves. Calyx tubular, 5–7 mm, hispid; lobes narrowly triangular, apex acuminate. Corolla white or pale purple, pubescent outside and upper side more densely so; upper side 5–10 mm; lower lip ca. 1 mm, longer than galea, lobes conspicuously notched.

Anthers brown. Capsule narrowly oblong, 4–8 mm, emarginate. Seeds white, ca. 1 mm. Fl. Jun–Sep.

Shaded grassy slopes, thickets, slopes in steppes or meadows, rarely by water or sparse woods; 2400–3200(–4000) m. W Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai,

Shandong, Shanxi, NW Sichuan, Xinjiang [Korea, Mongolia, Russia (Far East); Europe].

1a. Leaf and bract base cuneate; stems simple or branched from base ..... 1a. subsp. *pectinata*

1b. Leaf and bract base subtruncate, rarely broadly cuneate; stems usually branched from middle and above.

2a. Leaves and bracts subglabrous 1b. subsp. *simplex*

2b. Leaves and bracts adaxially densely hispidulous ..... 1c. subsp. *sichuanica*

1a. *Euphrasia pectinata* subsp. *pectinata*

小米草(原亚种) xiao mi cao (yuan ya zhong)

*Euphrasia officinalis* Linnaeus, nom. ambig.; *E. tatarica* Fischer ex Sprengel.

Stems 10–30(–45) cm tall, simple or branched from base. Leaves and bracts ovate to ovate-orbicular,

sparsely hispid along veins, base cuneate, margin with several obtuse to acute teeth. Fl. Jun–Sep.

Shaded grassy slopes, thickets. W Gansu, N Hebei, Nei Mongol, Ningxia, Qinghai, N Shanxi, Xinjiang [Mongolia, Russia (Far East); Europe].

**1b. *Euphrasia pectinata* subsp. *simplex*** (Freyn) D. Y. Hong, Fl. Reipubl. Popularis Sin. 67(2): 374. 1979.

高枝小米草 *gao zhi xiao mi cao*

*Euphrasia maximowiczii* Wettstein var. *simplex* Freyn, Oesterr. Bot. Z. 52: 404. 1902; *E. subpetiolaris* Pugsley; *E. tatarica* var. *simplex* (Freyn) T. Yamazaki.

Stems (15–)25–50 cm tall, usually branched from middle and above. Leaves and bracts ovate-orbicular to deltoid-orbicular, subglabrous, base subtruncate, margin teeth acute, acuminate, or awn-shaped. Fl. Aug–Sep.

Slopes in steppes or meadows, rarely by water or sparse woods; ca. 2600 m. Hebei, Heilongjiang, Jilin, Liaoning, S Nei Mongol, Shandong, Shanxi, Xinjiang [Korea, Russia (Far East)].

**1c. *Euphrasia pectinata* subsp. *sichuanica*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 67(2): 406. 1979.

四川小米草 *si chuan xiao mi cao*

Stems (15–)25–45 cm tall, branched from middle and above. Leaves and bracts ovate-orbicular to deltoid-orbicular, 1–2 × 0.7–1.5 cm, adaxially densely hispidulous, base usually subtruncate to rarely broadly cuneate, margin teeth acute, acuminate, or awn-shaped.

• Meadows; 2400–3200 m. NW Sichuan.

**2. *Euphrasia regelii*** Wettstein, Monogr. Euphrasia 81. 1896.

短腺小米草 *duan xian xiao mi cao*

*Euphrasia kingdon-wardii* Pugsley.

Annuals, 3–35 cm tall. Stems erect, simple or branched, white pubescent. Leaves sessile, ovate to orbicular, 5–15 × 3–13 mm, hispid with mixed eglandular and short capitate-glandular hairs, stalks of glandular hairs 1- or rarely 2-loculed, base broadly cuneate to subtruncate, margin 3–6-toothed on each side, apex obtuse. Spikes usually short in flower, to 15 cm in fruit; bracts leaflike, conspicuously larger than leaves. Calyx tubular, 4–5 mm, to 8 mm in fruit, with same kind of hairs as leaves and bracts; lobes lanceolate to subulate, 3–5 mm, apex acuminate. Corolla white, galea often purplish, upper side 5–10 mm, sparsely white pubescent and most densely so on outer surface; lower lip longer than galea, lobes conspicuously notched, middle lobe less than 3 mm wide. Capsule narrowly oblong, 4–9 × 2–3 mm, emarginate. Fl. May–Sep.

Subalpine and alpine meadows, forests; 1200–4000 m. Gansu, Hebei, W Hubei, S Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, SE Xizang, NW Yunnan [Kashmir, Kazakstan, Kyrgyzstan, Mongolia, Russia (Far East), Tajikistan, Uzbekistan].

1a. Leaf and bract base cuneate to broadly cuneate; plants almost black when dry 2a. subsp. *regelii*

1b. Leaf and bract base subtruncate; plants yellow-green when dry .... 2b. subsp. *kangtienensis*

**2a. *Euphrasia regelii* subsp. *regelii***

短腺小米草(原亚种) *duan xian xiao mi cao* (yuan ya zhong)

*Euphrasia fangii* H. L. Li; *E. forrestii* H. L. Li; *E. rockii* H. L. Li.

Stems 3–35 cm tall, almost black when dry. Leaves and bracts ovate to ovate-orbicular, base cuneate to broadly cuneate, teeth acute, acuminate, or awn-shaped. Corolla 5–10 mm on dorsal side. Fl. May–Sep.

Subalpine and alpine meadows, forests; 1200–3500 m. Gansu, Hebei, W Hubei, S Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, NW Yunnan [Kashmir, Kazakstan, Russia (Far East)].

Specimens from Hebei usually have very few glandular hairs and are hardly distinguished from *Euphrasia pectinata*.

**2b. *Euphrasia regelii* subsp. *kangtienensis*** D. Y. Hong, Fl. Reipubl. Popularis Sin. 67(2): 406. 1979.

川藏短腺小米草 *chuan zang duan xian xiao mi cao*

Stems 5–20(–35) cm tall, yellow-green when dry.

Leaves and bracts ovate-orbicular to orbicular, base subtruncate, margin teeth obtuse to acute. Corolla 6–8 mm on dorsal side. Fl. Jul–Aug.

• Meadows; 2900–4000 m. W Sichuan, SE Xizang.

**3. *Euphrasia jaeschkei*** Wettstein, Monogr. Euphrasia 80. 1896.

大花小米草 *da hua xiao mi cao*

Annuals, 10–20 cm tall. Stems erect, simple or branched from base to middle or rarely from apical part, white pubescent. Leaves ovate-orbicular, 6–12 × 4–10 mm, hispid with capitate glandular and eglandular hairs, stalks of glandular hairs 1- or 2-loculed, margin with 3–5 obtuse to acute teeth per side. Spikes terminal; bracts conspicuously larger than leaves, pubescence as on leaves, marginal teeth acute to acuminate. Calyx ca. 7 mm, pubescence as on leaves; lobes subulate-triangular. Corolla pale purple to pink-white, upper side 0.9–1.1 cm; lower lip conspicuously longer than galea, middle lobe 3–4 mm wide; galea lobes ca. 1.2 mm wide. Capsule emarginate. Fl. Jun.

Meadows; 3200–3400 m. Xizang (Gyirong Xian) [India, Nepal, Pakistan].

**4. *Euphrasia hirtella*** Jordan ex Reuter, Compt.-Rend. Trav. Soc. Haller 4: 120. 1854–1856.

长腺小米草 *chang xian xiao mi cao*

*Euphrasia hirtella* var. *paupera* T. Yamazaki.

Annuals, 3–40 cm tall, pubescent with long stalked capitate glandular hairs. Stems erect, usually slender, simple, rarely apically branched, hirsute with both long capitate glandular and eglandular hairs. Leaves sessile, ovate to orbicular, base cuneate to rounded, margin with 2 to several obtuse to acuminate teeth on each side. Spikes with several to numerous flowers; bracts leaflike, conspicuously larger than leaves. Calyx 3–4 mm; lobes lanceolate to subulate. Corolla white or galea pale purple, upper side 4–8 mm. Capsule oblong, 4–6 mm, emarginate. Fl. Jun–Aug.

Meadows, steppes, forest edges, conifer forests; 1400–1800 m. Heilongjiang, Jilin, Nei Mongol, Xinjiang, Xizang [Kazakstan, Korea, Mongolia, Russia; Europe].

**5. *Euphrasia amurensis*** Freyn, Oesterr. Bot. Z. 52: 404. 1902.

东北小米草 *dong bei xiao mi cao*

Annuals, 10–40 cm tall, stout, hirsute with both capitate glandular and eglandular hairs, stalks of glandular hairs 2–4 loculed. Stems often stout, usually branched at middle and apically. Leaves oblong to ovate, base cuneate to broadly cuneate, sometimes attenuate into a short petiole, margin with 3–6 obtuse, acute, or acuminate teeth on each side. Spikes with numerous flowers; bracts leaflike, conspicuously larger than leaves. Calyx tubular-campanulate, 3–4 mm; lobes subulate. Corolla often white, galea sometimes pale purple, upper side 0.8–1.2 cm; lower lip conspicuously longer than galea; galea apex conspicuously notched. Capsule oblong, ca. 4 mm, emarginate. Fl. Jun–Aug. Steppes. NW Heilongjiang, N Nei Mongol [Russia (Far East)].

**6. *Euphrasia matsudae*** Yamamoto, Trans. Nat. Hist. Soc. Taiwan 20: 107. 1930.

光叶小米草 *guang ye xiao mi cao*

*Euphrasia bilineata* Ohwi; *E. exilis* Ohwi; *E. filicaulis* Y. Kimura; *E. masamuneana* Ohwi.

Perennials, to 29 cm tall, hairs eglandular. Stems cespitose, slender, prostrate, or prostrate at base and apically ascending to suberect, simple or branched, entirely pubescent or pubescent along 2 lines, or basally entirely pubescent and apically pubescent along 2 lines. Leaves ovate, ovate-orbicular, or obovate-orbicular, 3–8.5 × 2–5 mm, glabrous or nearly so, base rounded to broadly cuneate, margin acutely to obtusely 1–3(or 4)-toothed on each side, apex obtuse to rounded. Spikes terminal; bracts usually wider than leaves, glabrous. Pedicel 0.5–7 mm. Calyx 3.5–5 mm, glabrous or sparsely hispid along veins and margin; lobes as long as tube, oblong-lanceolate, apex obtuse. Corolla white, yellow, or light yellow with purple spots and venation, upper side 6–11 mm. Anther locules with barbate hairs along slit after dehiscence. Capsule conspicuously shorter than calyx, hirsute. Fl. Feb–Nov.

• Subalpine and alpine zones, forests, forest edges, steep slopes; 2000–3000 m. Taiwan.

*Euphrasia matsudae* is a common and variable species, particularly in habit, leaf margin (number of teeth), indumentum of stems, and pedicel length.

**7. *Euphrasia transmorrisonensis*** Hayata, Icon. Pl. Formosan. 5: 129. 1915.

台湾小米草 *tai wan xiao mi cao*

*Euphrasia tatakensis* Masamune.

Perennials, to 16 cm tall. Stems usually prostrate and apically ascending, simple or branched, entirely pubescent or with hairs along 2 lines. Leaves ovate, 3–10 × 2–8 mm, papery, glabrous or sparsely pubescent, rarely hispid on margin, base broadly cuneate to rounded, margin acutely 1–3(or 4)-toothed on each side,

apex obtuse. Spikes terminal; bracts similar to leaves in shape and size, slightly wider, sparsely to rarely densely glandular hairy. Calyx 3.5–5 mm, sparsely to densely glandular hairy; lobes as long as tube, lanceolate, apex acute. Corolla mostly white, galea purplish-maroon on outer surface, upper side 0.8–1.3 cm; lower lip with a yellow palate and dark longitudinal lines, outer surface with glandular hairs ca. 8 mm. Anther locules with barbate hairs along slit after dehiscence. Capsule oblong-ovoid, shorter than calyx, hirsute. Fl. Aug–Nov.

• Alpine areas; 2600–3300 m. Taiwan.

*Euphrasia transmorrisonensis* is relatively common, variable, and similar to *E. matsudae* from which it seems to be distinguished by its glandular hairy bracts and calyces.

**8. *Euphrasia pumilio*** Ohwi, Acta Phytotax. Geobot. 2: 306. 1933.

矮小米草 *ai xiao mi cao*

*Euphrasia fukuyamai* Masamune; *E. kanzanensis* Masamune.

Perennials, 5–11 cm tall. Stems cespitose, simple, erect or ascending, basally white pubescent, apically pubescent only along 2 lines. Leaves at base of stem sessile, 1–2 mm, sparsely hispid with capitate glandular and eglandular hairs, margin crenately 1- or 2-toothed on each side; middle and upper leaves oblong-orbicular, 6–11 × 5–9 mm, abaxially hispid along veins, adaxially densely hispid or glabrous, base rounded, margin crenately 2- or 3-toothed, apex rounded. Racemes terminal; bracts as large as leaves, glabrous or hispid. Pedicel ca. 4 mm in fruit. Calyx 4–5 mm, hispid along veins and on margin; lobes as long as tube, obovate-linear, apex rounded. Corolla upper side ca. 9 mm. Anther locules with barbate hairs along slit after dehiscence. Ovary brown hirsute.

• Stream banks, alpine meadows; 3100–3800 m. Taiwan (Nantou Xian, Taizhong Xian).

**9. *Euphrasia tarokoana*** Ohwi, Acta Phytotax. Geobot. 2: 149. 1933.

大鲁阁小米草 *da lu ge xiao mi cao*

Perennials, 10–30 cm tall, herbage densely hispid or rarely mixed with capitate glandular hairs, abaxially pubescent only along veins. Stems usually cespitose, erect or ascending, branched, 1–1.5 mm in diam. Leaves ovate-orbicular to orbicular, 3–8 × 3–8 mm, subleathery, densely pubescent on both surfaces, pubescence soft and mixed with glandular hairs, base rounded, margin crenately 1–3-toothed on each side, apex rounded. Spikes terminal; bracts similar to leaves, wider, densely glandular hairy and hispid. Pedicel short or nearly absent. Calyx 3.5–6 mm, densely glandular hairy and eglandular hispid; lobes as long as tube, narrowly oblong, apex obtuse. Corolla outer surface glandular and pubescent, upper side 1.2–1.4 cm. Anther locules with barbate hairs along slit after dehiscence.

Capsule obovate, 4–6.5 mm, hirsute. Seeds ca. 1 mm.

Fl. Nov–Apr.

• Mountain ridges; 1300–2000 m. Taiwan (Hualian Xian).

**10. *Euphrasia nankotaizanensis*** Yamamoto, Trans. Nat. Hist. Soc. Taiwan 20: 104. 1930.

高山小米草 gao shan xiao mi cao

Perennials, 5–20 cm tall. Stems ascending or erect, often basally prostrate, simple or branched, densely white pubescent. Leaves increasing in size upward; leaf blade ovate to narrowly ovate, 5–12 × 4–8 mm, hispid, base rounded, margin acutely 3- or 4(-6)-toothed on each side, apex rounded. Spikes terminal; bracts similar to leaves in shape, slightly larger, hispid with eglandular and capitate glandular hairs. Calyx to 7 mm in fruit, densely capitate glandular; lobes ca. 2 × as long as tube, ovate-lanceolate, apex obtuse. Corolla yellow, capitate glandular, upper side 1.2–1.4 cm; tube ca. 1 cm; lower lip oblong, ca. 2 × 1.5 mm; galea shallowly notched. Anther locules with barbate hairs along slit after dehiscence. Capsule narrowly ovoid, nearly as long as calyx, sparsely hirsute. Fl. Jul–Oct.

• Gravelly slopes; 2800–3600 m. Taiwan (Ilan Xian, Taizhong Xian).

**11. *Euphrasia durietziana*** Ohwi, Acta Phytotax. Geobot. 2: 149. 1933.

多腺小米草 duo xian xiao mi cao

*Euphrasia durietzii* Yamamoto.

Perennials, 10–20 cm tall, densely viscose glandular and hirsute throughout, glandular hairs capitate. Stems basally procumbent, apically ascending, or ascending from base, usually simple, rarely few branched. Leaves at base of stem ovate-orbicular, 2–5 mm; middle and upper leaves 5–7 × 4–6 mm, densely pubescent on both surfaces, base rounded, margin with 2 or 3(or 4) triangular and obtuse teeth, apex obtuse. Spikes terminal; bracts similar to leaves. Pedicel to 6 mm. Calyx ca. 4 mm; lobes nearly as long as tube, oblong-lanceolate, apex obtuse. Corolla outer surface glandular hairy, upper side 0.8–1.2 cm. Anther locules with barbate hairs along slit after dehiscence. Capsule nearly as long as calyx, hirsute. Fl. Jun–Sep.

• Alpine scrub; 2800–3500 m. Taiwan (Hualian Xian, Ilan Xian).

