

25. DIANTHUS Linnaeus, Sp. Pl. 1: 409. 1753.

石竹属 shi zhu shu

Lu Dequan (鲁德全); Nicholas J. Turland

Herbs perennial, rarely annual. Roots sometimes woody. Stems mostly caespitose, terete or angular, articulated, dilated at nodes. Leaves opposite, usually glaucous, linear or lanceolate, veins parallel, base slightly connate, margin scabrid. Flowers solitary, several in a loose cyme, or numerous and clustered into capitula, subtended by 1–4 pairs of appressed bracts. Calyx cylindrical, apically 5-toothed, veins 7, 9, or 11, without scarious commissures. Petals 5, purple, red, pink, or white; claw long; limb dentate or lacerate, rarely entire. Stamens 10. Ovary 1-loculed; ovules numerous. Gynophore long. Styles 2. Capsule cylindrical, suboblong, or rarely ovoid, dehiscing by 4 teeth or valves. Seeds dorsiventrally compressed, orbicular or discoid, flat or concave; embryo erect; albumen eccentric.

About 600 species: widespread in N temperate regions, mostly in Asia and Europe and especially in the Mediterranean region, a few species in Africa and America; 16 species (two endemic) in China.

Dianthus harrissii K. H. Rechinger (Pl. Syst. Evol. 142: 240. 1983), described from N Pakistan (Chitral), was recorded by Rechinger (Fl. Iran. 163: 143. 1988) from W Xizang and Kashmir. The specimens cited by Rechinger have not been seen by the present authors, and the species is therefore not described here.

The following species have not yet been recorded for China but might be expected to occur in SW Xinjiang and/or W Xizang: *Dianthus angulatus* Royle (Ill. Bot. Himal. Mts. 1: 79. 1835), from Afghanistan, India, and Pakistan, including the W Himalayas; *D. cachemiricus* Edgeworth (in J. D. Hooker, Fl. Brit. India 1: 214. 1874), from E Afghanistan, Kashmir, and N Pakistan; and *D. crinitus* Smith (Trans. Linn. Soc. London, Bot. 2: 300. 1794), from C and SW Asia, as far E as Afghanistan, Tajikistan, and Pakistan.

Dianthus foliosus Turczaninow (Bull. Soc. Imp. Naturalistes Moscou 5: 184. 1832) was described from territory probably now within China ("Habitat in saxosis Mongoliae chinensis"), and *D. seisuimontanus* Masamune (Trans. Nat. Hist. Soc. Taiwan 31: 343. 1941) was described from Taiwan ("Mt. Seisui," ca. 2000 m). However, the types have not been seen by the present authors and their identities could not be ascertained.

Several species are cultivated in China for their attractive flowers, including *Dianthus barbatus*, *D. caryophyllus* Linnaeus (including *D. arbuscula* Lindley), *D. chinensis*, and *D. japonicus* Thunberg.

- 1a. Flowers numerous, clustered into capitula, very shortly pedicellate or subsessile 1. *D. barbatus*
- 1b. Flowers solitary or several in a loose cyme, long pedicellate.
 - 2a. Petal limb margin distally lobed to irregularly toothed.
 - 3a. Leaves linear-lanceolate, 2–4 mm wide; bracts more than 1/2 as long as calyx.
 - 4a. Stems densely caespitose; bracts 2(or 4); calyx 1.2–1.4 cm 2. *D. repens*
 - 4b. Stems loosely caespitose; bracts 4; calyx 1.5–2.5 cm 3. *D. chinensis*
 - 3b. Leaves linear or subulate, 1–2(–3) mm wide; bracts 1/3–1/2 as long as calyx.
 - 5a. Petals white; calyx tube ca. 3 mm in diam.; bracts elliptic, ca. 1/3 as long as calyx 7. *D. ramosissimus*
 - 5b. Petals purple, light purple-red, pink, or rose; calyx tube 4–7 mm in diam.; bracts ovate or obovate, ca. 1/2 as long as calyx.
 - 6a. Plants 5–15 cm tall 4. *D. semenovii*
 - 6b. Plants 20–50 cm tall.
 - 7a. Calyx not inflated near middle, ca. 4 mm in diam.; bracts obovate, apex subulate with short, sharp tip; leaves 1–2 mm wide 5. *D. turkestanicus*
 - 7b. Calyx slightly inflated near middle, 5–7 mm in diam.; bracts ovate, apex long acuminate with caudate tip; leaves 2–3 mm wide 6. *D. elatus*
 - 2b. Petal limb margin distally fimbriate to deeply fimbriate.
 - 8a. Plants more than 30 cm tall; leaves linear-lanceolate or lanceolate.
 - 9a. Bracts broadly ovate, 1/4–1/3 as long as calyx; calyx 2.3–2.5 cm; capsule longer than calyx 16. *D. hoeltzeri*
 - 9b. Bracts ovate or obovate, 1/5–1/4 as long as calyx; calyx 2.5–4 cm; capsule shorter to slightly longer than calyx.
 - 10a. Bracts in 2 or 3 pairs, obovate, ca. 1/4 as long as calyx, apex subulate or long acuminate; calyx usually reddish purple, 2.5–3 cm; capsule equaling or slightly longer than calyx 14. *D. superbus*
 - 10b. Bracts in 3 or 4 pairs, ovate, ca. 1/5 as long as calyx, apex mucronate; calyx green, 3–4 cm; capsule shorter than calyx 15. *D. longicalyx*
 - 8b. Plants less than 30 cm tall; leaves linear or acicular.
 - 11a. Plants to 15 cm tall; calyx ca. 1.8 cm (Taiwan) 13. *D. pygmaeus*
 - 11b. Plants (10–)15–30(–40) cm tall; calyx (1.5–)2–3.5 cm.

- 12a. Petals dark red, yellow-brown, or pink.
 13a. Petals dark red or yellow-brown; bracts in 2 pairs, oblong-elliptic, 1/5–1/4 as long as calyx 10. *D. soongoricus*
 13b. Petals pink; bracts in 3 or 4 pairs, ovate, 1/4–1/3 as long as calyx 11. *D. orientalis*
 12b. Petals white, rarely pale rose or claw pink.
 14a. Petal limb fimbriate for less than 1/4 its length (Taiwan) 12. *D. palinensis*
 14b. Petal limb fimbriate for at least 1/3 its length (Xinjiang).
 15a. Petal limb adaxially hairy, fimbriate for ca. 1/3 its length; bracts 1/4–1/3 as long as calyx; leaves acicular, basal ones densely fascicled 8. *D. acicularis*
 15b. Petal limb glabrous, fimbriate for ca. 1/2 its length; bracts 1/3–1/2 as long as calyx; leaves linear, basal ones not densely fascicled 9. *D. kuschakewiczii*

1. *Dianthus barbatus* Linnaeus var. **asiaticus** Nakai, Tyosen-Syokubutsu 143. 1914.

头石竹 *tou shi zhu*

Herbs perennial, 30–60 cm tall, glabrous. Stems erect, angular. Leaves lanceolate, 4–8 × ca. 1 cm, midvein prominent, base attenuate into a sheath, apex acute. Flowers numerous, clustered into capitula; pedicel very short or obscure; bracts 4, ovate, equaling or slightly longer than calyx, margin membranous, denticulate, apex caudate. Calyx tubular, ca. 1.5 cm; teeth sharply pointed. Petals purple-red, spotted with white; claw long; limb ovate, throat bearded, apex toothed. Stamens slightly exerted. Ovary suboblong. Styles linear. Capsule ovoid-suboblong, ca. 1.8 cm, 4-valved for ca. 1/2 its length. Seeds brown, compressed ovoid, smooth. Fl. and fr. May–Oct.

Broad-leaved forests, forest margins. E and S Jilin [N Korea, Russia (Far East)].

Dianthus barbatus var. *barbatus*, which is restricted to Europe as a native plant, is cultivated for ornament in China. It differs from var. *asiaticus* in being stouter, with broader, thicker leaves, and larger, more numerous flowers.

2. *Dianthus repens* Willdenow, Sp. Pl. 2: 681. 1799.

簇茎石竹 *cu jing shi zhu*

Dianthus chinensis Linnaeus subsp. *repens* (Willdenow) Voroschilov.

Herbs perennial, to 30 cm tall, glabrous, rarely stems pilose and scabrid. Stems numerous, densely caespitose. Leaves pendent, linear-lanceolate, 3–5 cm × 2–3 mm, soft, midvein prominent, base attenuate, apex acuminate. Flowers 1 or 2, terminal, 2–2.5 cm in diam.; bracts 2 (or 4), ovate, slightly shorter than or subequaling calyx, apex subulate. Calyx sometimes purplish, cylindrical, 1.2–1.4 cm × ca. 4 mm; teeth lanceolate, margin membranous, ciliate, apex sharply pointed. Petal claw 1.4–1.5 cm; limb purple-red, obovate-cuneate, 1.2–1.3 cm × 8–9 mm, adaxially shortly hairy, base dark purple ringed, caespitose long pilose, apex toothed. Gynophore ca. 1 mm. Capsule not seen. Fl. Jul–Aug.

Meadows at forest margins, mountain slopes, river banks, steppes. Nei Mongol [Russia (Far East, Siberia); North America].

Dianthus repens var. *scabripilosus* Y. Z. Zhao (Acta Sci. Nat. Univ. Intramong. 20(1): 110. 1989) was described from Nei Mongol. It differs only in having pilose, scabrid stems.

3. *Dianthus chinensis* Linnaeus, Sp. Pl. 1: 411. 1753.

石竹 *shi zhu*

Dianthus amurensis Jacques; *D. chinensis* var. *amurensis* (Jacques) Kitagawa; *D. chinensis* var. *dentosus* (Fischer ex Reichenbach) Debeaux; *D. chinensis* f. *ignescens* (Nakai) Kitagawa; *D. chinensis* var. *ignescens* Nakai; *D. chinensis* var. *jingpoensis* G. Y. Zhang & X. Y. Yuan; *D. chinensis* var. *liaotungensis* Y. C. Chu; *D. chinensis* var. *longisquama* Nakai & Kitagawa; *D. chinensis* var. *macrosepalus* Franchet ex L. H. Bailey; *D. chinensis* var. *morii* (Nakai) Y. C. Chu; *D. chinensis* var. *subulifolius* (Kitagawa) Y. C. Ma; *D. chinensis* var. *sylvaticus* W. D. J. Koch; *D. chinensis* var. *trinervis* D. Q. Lu; *D. chinensis* subsp. *versicolor* (Fisher ex Link) Voroschilov; *D. chinensis* var. *versicolor* (Fisher ex Link) Y. C. Ma; *D. dentosus* Fischer ex Reichenbach; *D. fischeri* Sprengel; *D. morii* Nakai; *D. sequieri* Chaix; *D. sequieri* var. *dentosus* (Fischer ex Reichenbach) Franchet; *D. subulifolius* Kitagawa; *D. subulifolius* f. *leucopetalus* Kitagawa; *D. versicolor* Fisher ex Link; *D. versicolor* f. *leucopetalus* (Kitagawa) Y. C. Chu; *D. versicolor* var. *subulifolius* (Kitagawa) Y. C. Chu.

Herbs perennial, 30–50 cm tall, glabrous. Stems laxly caespitose, erect, distally branched. Leaves linear-lanceolate, 3–5 cm × 2–4 mm, midvein prominent, base slightly narrowed, margin entire or denticulate, apex acuminate. Flowers solitary or several in cymes; pedicel 1–3 cm; bracts 4, ovate, ca. 1/2 as long as calyx, margin membranous, ciliate, apex long acuminate. Calyx cylindrical, 1.5–2.5 cm × 0.4–5 mm, striate; teeth lanceolate, ca. 5 mm, margin ciliate, apex sharply pointed. Petals 1.6–1.8 cm; limb bright red, purple-red, pink, or white, obovate-triangular, 1.3–1.5 cm, throat spotted and laxly bearded, apex irregularly toothed. Stamens exerted; anthers blue. Ovary suboblong. Styles linear. Capsule cylindrical, surrounded by calyx, apex 4-toothed. Seeds black, compressed globose. Fl. May–Jun, fr. Jul–Sep. $2n = 30^*$.

Sandy forest margins, forest grasslands, scrub on mountain slopes, hillside grasslands, dry hillsides, sandy hill summits, valleys, rocky ravines, meadows, streamsides, mountain stream wetlands, mountain waterfalls, rocks, steppes, steppe sands, fixed dunes, seashores, also widely cultivated. Native in Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, and Xinjiang; naturalized in S China [Kazakhstan, Korea, Mongolia, Russia (Siberia, Far East); Europe].

Dianthus chinensis is a very variable species represented in China by both cultivated and wild plants. In FRPS, the species was divided into eight varieties (treated in synonymy here), all of them occurring as wild plants and var. *chinensis* also including the cultivated material. No key to the varieties was provided, and the features given in the diagnoses were not always parallel, making it almost impossible to identify any given plant to variety. Moreover, the plants cultivated as ornamentals comprise numerous cultivars. Further research is needed on the species in China and surrounding countries before a satisfactory infraspecific classification can be presented. In the present account, therefore, *Dianthus chinensis* is treated in the broadest sense.

The species is used medicinally.

4. *Dianthus semenovii* (Regel & Herder) Vierhapper, Sitzungsber. Kaiserl. Acad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 107: 1147. 1898.

狭叶石竹 xia ye shi zhu

Dianthus alpinus Linnaeus var. *semenovii* Regel & Herder, Bull. Soc. Imp. Naturalistes Moscou 39: 531. 1866.

Herbs perennial, 5–15 cm tall. Stems numerous, densely caespitose, ascending. Leaves linear, 1.5–3 cm × 1–2 mm, 3–5-veined, base connate into a 1–2 mm sheath, apex acuminate. Flowers 1–4; bracts 4 or 6, leaflike, ovate, ca. 1/2 as long as calyx, apex sharply pointed. Calyx greenish or lilac, cylindrical, 1.5–1.9 cm × 4–5.5 mm; teeth lanceolate, apex acuminate. Petals purple-red, 1.1–1.2 cm × 7.5–8 mm, adaxially hairy, apex cristate toothed. Capsule not seen.

Grassy mountain slopes; 1300–1800 m. Xinjiang [Kazakhstan, Kyrgyzstan].

5. *Dianthus turkestanicus* Preobraschensky, Izv. Imp. Bot. Sada Petra Velikago 15: 366. 1915.

细茎石竹 xi jing shi zhu

Dianthus versicolor Fischer ex Link subsp. *turkestanicus* (Preobraschensky) Kozhevnikov.

Herbs perennial, 20–40 cm tall. Rhizome woody. Stems caespitose, branched, scabridulous. Leaves linear, 3–5 cm × 1–2 mm, base connate into a 2–4 mm sheath, apex sharply pointed; basal leaves early withered; apical leaves usually subulate. Flowers solitary, sometimes 2 or 3, terminal; bracts 4 or 6, obovate, ca. 8 × 6 mm, leathery, apex subulate with a short, sharp tip. Calyx cylindrical, 1.5–1.8 cm × ca. 4 mm, striate, glabrous or pubescent; teeth ciliate at margin, apex acute. Petal limb rose or purple, ca. 1 cm × 5 mm, adaxially shortly hairy, apex shallowly dentate. Ovary suboblong. Capsule cylindrical, subequaling calyx, apex 4-valved.

Seeds black, compressed globose, ca. 2 mm in diam. Fl. Jul–Aug, fr. Sep.

Mountain slope grasslands; 1000–2000 m. N Xinjiang [Kazakhstan].

6. *Dianthus elatus* Ledebour, Fl. Altaic. 2: 136. 1830.

高石竹 gao shi zhu

Herbs perennial, 25–50 cm tall. Stems distally branched, scabrous or subglabrous. Leaves linear, 2.5–4 cm × 2–3 mm, base connate into a 1–2 mm sheath, margin scabrous, apex acute. Flowers 1 or 2, terminal; bracts (4 or)6(or 8), ovate, ca. 1/2 as long as calyx, apex long acuminate-caudate. Calyx cylindrical, slightly inflated at middle, 1.6–2 cm × 5–7 mm; teeth ovate, margin membranous, ciliate, apex mucronate. Petals adaxially light purple-red or pink, abaxially yellowish green; limb 0.8–1.2 cm × 5–8 mm, adaxially hairy, apex irregularly toothed. Ovary oblong. Styles linear. Capsule shorter than calyx, apex 4-toothed. Fl. and fr. Jul–Aug.

Mountain slopes; 1200–1800 m. N Xinjiang [Kazakhstan, Russia (W Siberia)].

7. *Dianthus ramosissimus* Pallas ex Poiret in Lamarck, Encycl. Suppl. 4: 130. 1816.

多分枝石竹 duo fen zhi shi zhu

Herbs perennial, 20–50 cm tall. Stems caespitose, erect, much-branched, slender, subglabrous or pilose. Leaves linear, 1–4 cm × 1–1.5 mm, base connate into a 1–2 mm sheath, margin slightly revolute, apex sharply pointed. Flower solitary, terminal; pedicel 1–2 cm; bracts 4(or 6), elliptic, ca. 1/3 as long as calyx, leathery, margin membranous, apex mucronate. Calyx cylindrical, 1.2–1.4 cm × ca. 3 mm; teeth triangular, margin membranous. Petals white; limb obovate, 5–6 × 3–3.5 mm, throat pilose, apex irregularly toothed. Ovary suboblong. Styles linear. Capsule cylindrical, ca. 1.5 cm × 3.5 mm, apex 4-valved. Fl. and fr. Sep.

Dry grassy slopes; 1100–1900 m. N Xinjiang [Kazakhstan, W Mongolia, Russia (W Siberia)].

8. *Dianthus acicularis* Fischer ex Ledebour, Fl. Ross. 1: 284. 1842.

针叶石竹 zhen ye shi zhu

Herbs perennial, 15–30 cm tall. Stems numerous, erect, simple or branched above, glabrous. Leaves acicular, 2–4(–6) cm × 0.3–1 mm, base connate into a sheath; basal leaves clustered. Flowers 1–3, terminal, fragrant; pedicel 1–3 cm; bracts 4, ovate or elliptic (outer pair) or obovate (inner pair), 1/4–1/3 as long as calyx, leathery, apex sharply pointed. Calyx cylindrical, 2–2.5 cm × 3–5 mm; teeth lanceolate, apex sharply pointed. Petals white; limb elliptic or obovate, 1.2–1.5 cm, adaxially hairy, fimbriate for ca. 1/3 its length, fimbriae linear. Capsule cylindrical, subequaling calyx. Seeds ca. 2 mm. Fl. and fr. Jun–Aug.

Rocky mountain slopes, floodlands, deserts; 500–1300 m. N Xinjiang [Kazakhstan, Russia (W Siberia); E Europe].

9. *Dianthus kuschakewiczii* Regel & Schmalhausen, Trudy Imp. S.-Peterburgsk. Bot. Sada 5: 244. 1877.

长萼石竹 chang e shi zhu

Herbs perennial, 20–35 cm tall. Stems usually numerous, branched, glabrous. Leaves spreading, linear, 2–8 cm × 0.5–2 mm, flaccid, glabrous, midvein prominent, base connate into a ca. 1.5 mm sheath, apex acute. Flower solitary, terminal and lateral; bracts 4, oblong to elliptic (outer pair) or ovate-elliptic (inner pair), 1/3–1/2 as long as calyx, leathery, margin membranous, apex mucronate. Calyx cylindrical, 2.5–3.5 cm × 3–4 mm; teeth lanceolate, margin narrowly membranous, apex acuminate. Petals white, rarely pale rose; limb oblong, glabrous, fimbriate for ca. 1/2 its length, fimbriae linear. Capsule not seen. Fl. Jun–Aug.

Forests, forest margin grasslands, mountain slopes, mire drainage margins, steppes; 600–2800 m. N Xinjiang [Kazakhstan].

10. *Dianthus soongoricus* Schischkin in Komarov, Fl. URSS 6: 899. 1936.

准噶尔石竹 zhun ga er shi zhu

Dianthus crinitus Smith subsp. *soongoricus* (Schischkin) Kozhevnikov.

Herbs perennial, (10–)15–30 cm tall, subglabrous. Roots thick, woody. Stems caespitose, simple. Leaves linear, 1–3 cm × 0.5–1 mm, glabrous, apex sharply pointed. Flower solitary, terminal; bracts 4, oblong-elliptic, 1/5–1/4 as long as calyx, margin membranous, apex acuminate, rarely mucronate. Calyx cylindrical, 2–3 cm × 3–4 mm; teeth lanceolate, apex sharply pointed. Petals dark red or yellow-brown; limb ca. 1 cm, fimbriate. Stamens shorter than petals. Ovary cylindrical. Styles linear. Capsule cylindrical, subequaling calyx. Seeds compressed ellipsoid, ca. 3 × 1.5 mm, apex slightly emarginate. Fl. and fr. Jul–Aug.

Rocky mountain valley slopes, deserts, semideserts; 900–3200 m. N Xinjiang [Kazakhstan, W Mongolia].

11. *Dianthus orientalis* Adams in F. Weber & D. Mohr, Beitr. Naturk. 1: 54. 1805–1806.

沸裂石竹 sui lie shi zhu

Dianthus fimbriatus Marschall von Bieberstein (1808), not Lamarck (1779), nor Brotero (1805), nor Hohenacker (1833).

Herbs perennial, (10–)15–30(–40) cm tall. Roots thick, ca. 1 cm in diam., woody. Stems caespitose, erect, basally woody, distally branched, glabrous. Basal leaves caespitose, linear-subulate, 1–4 cm × 1–1.5 mm, stiff, midvein convex abaxially, base broadened, shortly membranous sheathed, margin revolute, apex sharply pointed; cauline leaves somewhat shorter than basal ones. Flowers solitary, rarely in cymes, terminal; pedicel ca. 1.5 cm; bracts 6 or 8, ovate, 1/4–1/3 as long as calyx, margin membranous, apex mucronate or long acuminate. Calyx slightly glaucous, cylindrical, (1.5–)2–2.5 cm × 4–5 mm, striate, glabrous; teeth lanceolate, margin membranous. Petals pink; claw long; limb

narrowly oblong, fimbriate for ca. 1/2 its length.

Stamens shorter than petals; anthers suboblong. Ovary suboblong. Styles linear. Capsule cylindrical, slightly shorter than or equaling calyx, apex 4-toothed. Seeds black-brown, compressed suboblong, 3–4 × ca. 1.5 mm, broadly winged. Fl. May–Aug, fr. Aug–Sep.

Mountain slope grasslands, rocky areas, river banks, dry rocky deserts; 900–2200 m (Xinjiang), 3100–4100 m (Xizang). N Xinjiang, W Xizang [SW Asia].

The Chinese populations of *Dianthus orientalis* appear to be disjunct from the main range of the species and therefore deserve further study. Rechinger (Fl. Iran. 163: 155–166. 1988) recorded nine subspecies from SW Asia, ranging from Turkey to Iran, but no further east, even though the coverage of that flora extends to the western border of China.

12. *Dianthus palinensis* S. S. Ying, Coloured Illustr. Fl. Taiwan 2: 693. 1987.

八里石竹 ba li shi zhu

Herbs perennial, 10–20 cm tall. Rhizomes slender. Stems few branched; branches erect. Basal leaves crowded, sessile, lanceolate, 5–8 cm × 5–7 mm, both surfaces glabrous, midvein prominently elevated abaxially, inconspicuous adaxially, base long attenuate, somewhat dilated and semiamplexicaul, margin entire, apex acuminate; cauline leaves linear to linear-lanceolate, 4–7 cm × 3–3.5 mm, usually smaller distally on stem, apex acuminate. Flowers 1–4, terminal, erect; pedicel 1.5–2 cm, glabrous; bracts ca. 10, proximal ones linear, 5–6 × ca. 1 mm, apex acute, distal ones ovate, 1–1.2 cm × 3–4 mm, apex shortly cuspidate. Calyx green, tinged purple, cylindrical, 2.8–3.2 cm × ca. 4 mm, many veined; teeth lanceolate, 6–8 × 1.2–1.5 mm, glabrous except margin ciliate, apex acute or acuminate. Petals 5–5.5 cm, glabrous; claw white, elongate linear, 3–3.5 cm × 0.3–2.5 mm; limb pink, ovate or orbicular-ovate, 1.8–2.2 × 1.2–1.5 cm, usually fimbriate for less than 1/4 its length. Stamens 4 or 5 (or 6); filaments white, tinged pink distally, 3.5–4 cm; anthers oblong, 1–1.5 × ca. 0.5 mm, glabrous. Styles 2, distinct, linear, 3–3.5 cm, white pubescent. Seeds black, oblong, ca. 1.5 mm, apex apiculate. Fl. Nov.

• About 600 m. N Taiwan (Taoyuan Xian: Bali).

13. *Dianthus pygmaeus* Hayata, Icon. Pl. Formos. 3: 34. 1913.

玉山石竹 yu shan shi zhu

Dianthus pygmaeus f. *albiflorus* (S. S. Ying) S. S. Ying; *D. pygmaeus* var. *albiflorus* S. S. Ying.

Herbs perennial, to 15 cm tall. Stem solitary, erect. Leaves linear, 2–3 cm × 1–4 mm, base attenuate, connate into a short sheath, margin minutely denticulate, apex acuminate. Flowers solitary or in cymes; pedicel 1.5–1.8 cm; bracts 4, outer pair oblong, 8–10 × 2–4 mm, apex sharply pointed, inner pair ovate, 1–1.2 cm × 4–6 mm, base cuneate, apex acute. Calyx cylindrical, ca. 1.8 cm × 3.5 mm, with numerous fine veins; teeth lanceo-

late, margin glabrous. Petals pink, rarely white, 3–3.5 cm × 2–3 mm; claw long; limb fimbriate for ca. 1/2 its length, fimbriae linear. Filaments 1.5–2 cm; anthers narrowly suboblong, 1–1.5 mm. Ovary cylindric, 7–8 mm. Styles linear, ca. 1 cm. Capsule cylindric, ca. 1 cm × 3 mm. Seeds minute.

• Meadows, grasslands, rocky places and ledges, roadsides; 1400–3900 m. Taiwan.

14. *Dianthus superbus* Linnaeus, Fl. Suec., ed. 2, 146. 1755.
瞿麦 qu mai

Herbs perennial, green to glaucous, to 60 cm tall or more. Stems caespitose, erect, distally branched, glabrous, large jointed. Leaves linear-lanceolate, 5–10 cm × 3–5 mm, sometimes glabrescent, midvein prominent, base connate into a sheath, apex sharply pointed. Flowers 1 or 2, terminal, sometimes axillary; bracts 4 or 6, elliptic to broadly ovate or obovate, 6–10 × 4–5 mm, ca. 1/4 as long as calyx, apex subulate or long acuminate. Calyx usually reddish purple, cylindric, 2.5–3 cm × 3–7 mm; teeth lanceolate, 4–5 mm. Petals 4–5 cm; claw 1.5–3 cm, surrounded by calyx tube; limb broadly obovate, 2–3 cm, fimbriate for at least 1/2 its length, throat bearded. Stamens and styles slightly exerted. Capsule cylindric, equaling or slightly longer than calyx, 4-toothed. Seeds black, glossy, compressed ovoid, ca. 2 mm. Fl. Jun–Sep, fr. Aug–Oct.

Wooded hills, forest openings and margins, grassy hillsides, meadows, mountain valley streams, river banks; 400–3700 m. Anhui, Gansu, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Zhejiang [Japan, Kazakhstan, Korea, N and W Mongolia, Russia (Far East, Siberia); Europe].

- 1a. Plants glaucous; petal limb ca. 3 cm 14b. subsp. *alpestris*
1b. Plants green or only slightly glaucous; petal limb ca. 2 cm 14a. subsp. *superbus*

14a. *Dianthus superbus* subsp. *superbus*

瞿麦(原亚种) qu mai (yuan ya zhong)

Dianthus szechuensis F. N. Williams.

Plants green or only slightly glaucous; petal limb ca. 2 cm.

Wooded hills, forest margins, meadows, mountain valley streams; 400–3700 m. Anhui, Gansu, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Zhejiang [Japan, Kazakhstan, Korea, N and W Mongolia, Russia (Far East, Siberia); Europe].

The species is used medicinally.

14b. *Dianthus superbus* subsp. *alpestris* Kablikova ex Celakovsky, Prodr. Fl. Böhmen 3: 508. 1875.

高山瞿麦 gao shan qu mai

Dianthus superbus var. *monticola* Makino; *D. superbus* subsp. *speciosus* (Reichenbach) Hayek; *Dianthus superbus* var. *speciosus* Reichenbach; *D. speciosus* (Reichenbach) Reichenbach.

Plants glaucous; petal limb ca. 3 cm.

Forest openings, high mountain forest margins, grassy hillsides, river banks; 2100–3200 m. Hebei, S Jilin (Changbai Shan), S Nei Mongol (Helan Shan), S Shaanxi (Taibai Shan), Shanxi [alpine regions of Asia and Europe].

15. *Dianthus longicalyx* Miquel, J. Bot. Néerl. 1: 127. 1861.
长萼瞿麦 chang e qu mai

Dianthus oreadum Hance; *D. superbus* Linnaeus f. *longicalycinus* Maximowicz; *D. superbus* var. *longicalycinus* (Maximowicz) F. N. Williams; *D. superbus* var. *oreadum* (Hance) Pampanini; *D. superbus* var. *taiwanensis* (Masamune) T. S. Liu & S. S. Ying; *D. taiwanensis* Masamune.

Herbs perennial, 40–80 cm tall. Stems erect, basally branched, glabrous, large jointed. Basal leaves several, withered at anthesis; cauline leaves linear-lanceolate or lanceolate, 4–10 cm × 2–5(–10) mm, base connate into a short sheath, margin serrulate, apex acuminate. Flowers 2 to several in lax cymes; bracts 6 or 8, appressed, leaflike, ovate, ca. 1/5 as long as calyx, margin broadly membranous, scabridulous, apex mucronate. Calyx green, long tubular, 3–4 cm, striate, glabrous; teeth lanceolate, 5–6 mm, apex sharply pointed. Petals pink, obovate or cuneate-oblong; limb fimbriate for ca. 1/2 its length. Stamens level with corolla throat. Styles linear, ca. 2 cm. Capsule narrowly cylindric, slightly shorter than calyx, 4-toothed. Fl. Jun–Aug, fr. Aug–Sep.

Forests, grassy mountain slopes, grasslands, exposed rocky places, river beds, fixed dunes; 800–2100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Zhejiang [Japan, Korea].

16. *Dianthus hoeltzeri* C. Winkler, Gartenflora 30: 1. 1881.

大苞石竹 da bao shi zhu

Herbs perennial, 30–60 cm tall. Rhizomes ropelike, bearing flowering stems and sterile dwarf shoots. Stems solitary or caespitose, erect, simple. Leaves linear-lanceolate, 4–6 cm × 2–4 mm, base connate into a 2–4 mm sheath, margin slightly uneven, apex sharply pointed. Flowers 1–4; bracts 4, broadly ovate, 1/4–1/3 as long as calyx, margin narrowly membranous, apex mucronate, sometimes subtruncate. Calyx reddish purple, cylindric, 2.3–2.5 cm × 4–5 mm; teeth triangular, margin ciliate. Petals deep rose, 2.5–3 × as long as calyx; claw usually longer than (rarely equaling) calyx; limb obovate or broadly ovate, rarely oblong, bearded, fimbriate for ca. 2/5 its length. Capsule cylindric, longer than calyx, 4-toothed. Fl. Jun–Jul, fr. Aug.

Grassy mountain slopes; 1500–3300 m. N Xinjiang [Kazakhstan, W Mongolia].

