

17. FRITILLARIA Linnaeus, Sp. Pl. 1: 303. 1753.

贝母属 *bei mu shu*

Chen Xinqi (陈心启 *Chen Sing-chi*); Helen V. Mordak

Herbs perennial, bulbiferous. Bulbs with (1 or)2 or 3(or more) fleshy, farinaceous scales, often covered with a translucent tunic, sometimes also with numerous small bulbels. Stem erect, simple, leafy. Basal leaves petiolate; cauline leaves sessile, spirally alternate, opposite, or whorled; leaf blade oblong to lanceolate. Inflorescence 1- to several flowered, racemose or umbellate; bracts (floral leaves) usually present. Flowers bisexual, usually nodding, campanulate to saucer-shaped. Tepals 6, free, often tessellated with dark and light colors, with a nectary near base adaxially. Stamens 6, inserted at base of tepals; anthers basifixed, rarely dorsifixed. Style 3-lobed or subentire, caducous; stigmas linear or very short. Fruit a capsule, erect, 3-loculed, 6-angled, winged or wingless, loculicidal. Seeds arranged in 2 rows in each valve, flat.

About 130 species: temperate regions of the N hemisphere, mainly in C Asia and the Mediterranean region; 24 species (15 endemic) in China.

Some species are cultivated for their bulbs, which are used medicinally.

- 1a. Bulb of 3–10 fleshy scales and numerous small bulbels.
 - 2a. Leaves basal; bracts petaloid; tepals papillose-tuberculate adaxially 24. *F. davidii*
 - 2b. Leaves cauline; bracts not petaloid; tepals not papillose-tuberculate adaxially.
 - 3a. Leaves 6–18, basal usually opposite, middle and distal whorled or alternate 22. *F. anhuiensis*
 - 3b. Leaves in 1(or 2) whorls of 3–6 23. *F. maximowiczii*
- 1b. Bulb of 2–4 fleshy, farinaceous scales, \pm covered by marcescent remains of old scales, without bulbels.
 - 4a. Stem and pedicels papillose-pubescent; leaves of 2 shapes, basal 2 different from and much larger than others; flowers slightly zygomorphic; nectary on 1 outer tepal much larger than others and spurred abaxially 21. *F. karelinii*
 - 4b. Stem and pedicels glabrous; leaves similar to or slightly different from each other; flowers actinomorphic; nectaries similar.
 - 5a. Bracts ovate to elliptic, 3–5 \times as long as wide, apex obtuse or rounded.
 - 6a. Anthers basifixed; capsule narrowly winged, \pm enclosed by persistent tepals 19. *F. delavayi*
 - 6b. Anthers subdorsifixed; capsule neither winged nor enclosed by persistent tepals 20. *F. fusca*
 - 5b. Bracts linear to linear-lanceolate, 8–20 \times as long as wide, apex acuminate or cirrose.
 - 7a. Style subentire or slightly 3-lobed apically; lobes less than 1 mm.
 - 8a. Filaments shorter than anthers; ovary longer than style 18. *F. dajinensis*
 - 8b. Filaments equaling or longer than anthers; ovary shorter than style.
 - 9a. Leaves 9–11, opposite, whorled, and alternate; bracts 3, apex cirrose 15. *F. yuminesis*
 - 9b. Leaves 4–7, opposite and alternate, never whorled; bract 1, apex acuminate or curved.
 - 10a. Tepals pale yellow, with a few blackish speckles 16. *F. przewalskii*
 - 10b. Tepals blackish purple, tessellated with yellowish brown 17. *F. unibracteata*
 - 7b. Styles 3-lobed apically; lobes (2–)3–8 mm.
 - 11a. Bracts usually 1 per flower.
 - 12a. Leaves 2–4 cm wide; inflorescence usually 2–5-flowered 1. *F. pallidiflora*
 - 12b. Leaves 0.5–1 cm wide; inflorescence usually 1-flowered.
 - 13a. Leaves all alternate; capsule wingless 2. *F. meleagroides*
 - 13b. Leaves opposite and alternate, sometimes also whorled; capsule narrowly winged 3. *F. sichuanica*
 - 11b. Bracts 2 or 3 per flower.
 - 14a. Tepals white, sometimes tessellated with reddish color.
 - 15a. Basal leaves much wider than others, \pm spirally twisted basally 13. *F. tortifolia*
 - 15b. Basal leaves slightly wider than others, not twisted basally 11. *F. verticillata*
 - 14b. Tepals greenish or yellowish, usually tessellated with purple or brown.
 - 16a. Leaves rather broad, basal ones 1.5–3 cm wide; tepals more than 4 cm.
 - 17a. Nectaries 6–10 mm; style lobes 3–8 mm; bracts slightly cirrose at apex 9. *F. monantha*
 - 17b. Nectaries 2–3 mm; style lobes 2–3 mm; bracts not cirrose at apex.
 - 18a. Tepals yellow or greenish yellow, slightly tessellated with purple adaxially; leaves 10–18 7. *F. crassicaulis*
 - 18b. Tepals olive green, marked and tessellated with deep purple; leaves 3–8 8. *F. sinica*
 - 16b. Leaves narrow, basal ones less than 1.5 cm wide; tepals often less than 4 cm.
 - 19a. Distal leaves and bracts strongly cirrose; leaves mostly whorled.
 - 20a. Tepals greenish, tessellated with pink or purple; capsule winged 10. *F. walujewii*
 - 20b. Tepals dark purple, heavily tessellated; capsule wingless 14. *F. ussuriensis*

- 19b. Distal leaves and bracts curled or slightly cirrose; leaves mostly opposite or alternate, rarely whorled.
- 21a. Inflorescence 1–6-flowered; tepals yellowish white, veined with green, 2.5–3 cm 12. *F. thunbergii*
- 21b. Inflorescence 1- or 2-flowered; tepals green to blackish purple, 3–5 cm.
- 22a. Bracts not cirrose at apex; tepals with dense, irregular, purple spots often merging to form larger mottling 5. *F. taipaiensis*
- 22b. Bracts slightly cirrose at apex; tepals with regular, purple spots and tessellations not merging.
- 23a. Nectaries elliptic to ovate, 3–5 × 2–3 mm; filaments sometimes papillose 4. *F. cirrhosa*
- 23b. Nectaries suborbicular, ca. 2 × 2 mm; filaments glabrous 6. *F. yuzhongensis*

1. *Fritillaria pallidiflora* Schrenk ex Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 5. 1841.

伊贝母 *yi bei mu*

Fritillaria bolensis G. Z. Zhang & Y. M. Liu; *F. halabulanicica* X. Z. Duan & X. J. Zheng; *F. pallidiflora* var. *plena* X. Z. Duan & X. J. Zheng.

Bulb of 2 scales, ovoid or oblong-ovoid, 1–4 cm in diam.; tunic rather thick. Stem 15–45(–60) cm. Leaves 8–13, alternate, sometimes also subopposite or subwhorled; leaf blade broadly lanceolate or oblong-lanceolate, 5–7(–12) × 2–4 cm, apex obtuse. Inflorescence (1 or) 2–5-flowered; bract solitary, apex acuminate. Flowers nodding, campanulate; pedicel 2–4.5 cm. Tepals pale yellow, with darker veins and some dark red spots, oblong-obovate or oblong-spatulate, 3–5 × 1.5–2 cm; nectaries ovate-oblong, deeply concave adaxially, projecting at a right angle abaxially. Stamens 2–3.5 cm; filaments glabrous; anthers subdorsifixed. Style 3-lobed; lobes ca. 2 mm. Capsule broadly winged; wings 4–7 mm wide. Fl. May–Jun, fr. Sep. $2n = 24^*$.

Forests, thickets, meadows, grassy slopes, mountain steppes; 1300–2500 m. NW Xinjiang [Kazakhstan].

This species is cultivated in NE China, and the bulbs are used medicinally.

2. *Fritillaria meleagroides* Patrin ex Schultes & J. H. Schultes in Roemer & Schultes, Syst. Veg. 7: 395. 1829.

额敏贝母 *e min bei mu*

Fritillaria meleagroides var. *flavovirens* X. Z. Duan & X. J. Zheng; *F. meleagroides* var. *plena* X. Z. Duan & X. J. Zheng; *F. meleagroides* var. *rhodantha* X. Z. Duan & X. J. Zheng.

Bulb of 2 or 3 scales, subglobose, 0.5–1.5 cm in diam. Stem 20–40 cm. Leaves 3–7, alternate; leaf blade linear, 5–15 cm × 1–5 mm, apex sometimes curved. Inflorescence usually 1-flowered; bract solitary, apex acuminate. Flower nodding, campanulate; pedicel variable in length. Tepals deep purple or dark brownish violet, slightly tessellated or speckled; outer ones oblong-elliptic, 2–3.5 cm × 5–8 mm; inner ones obovate, 2–3.5 × 0.7–1.2 cm; nectaries linear, ca. 15 × 2 mm. Stamens ca. 2/3 as long as tepals; filaments papillose. Style 3-lobed; lobes 4–8 mm. Capsule wingless. Fl. May–Jun. $2n = 18, 24^*$.

Mud flats, wet meadows, swampy fields; 900–2400 m. NW Xinjiang [Kazakhstan, Russia; E Europe].

Chinese records of *Fritillaria meleagris* Linnaeus (e.g., in FRPS)

are referable to *F. meleagroides*.

3. *Fritillaria sichuanica* S. C. Chen, Acta Bot. Yunnan. 5: 371. 1983.

华西贝母 *hua xi bei mu*

Fritillaria chuanbeiensis Y. K. Yang et al.; *F. chuanbeiensis* var. *huyabeimu* Y. K. Yang & D. H. Jiang; *F. cirrhosa* D. Don var. *ecirrhosa* Franchet; *F. fujiangensis* Y. K. Yang et al.; *F. glabra* (P. Y. Li) S. C. Chen var. *qingchuanensis* (Y. K. Yang & J. K. Wu) S. Y. Tang & S. C. Yueh; *F. mellea* S. Y. Tang & S. C. Yueh; *F. pingwuensis* Y. K. Yang & J. K. Wu; *F. przewalskii* Maximowicz var. *longistigma* Y. K. Yang & J. K. Wu; *F. qingchuanensis* Y. K. Yang & J. K. Wu; *F. taipaiensis* P. Y. Li var. *zhouquensis* S. C. Chen & G. D. Yu; *F. wenxianensis* Y. K. Yang & J. K. Wu; *F. xibeiensis* Y. K. Yang et al.

Bulb of 2 or 3 scales, ovoid-globose, 1–2 cm in diam. Stem 20–50 cm. Leaves 4–10, basal ones generally opposite, middle and distal ones usually alternate and opposite, very rarely also whorled; leaf blade linear to linear-lanceolate, 3–14 cm × 2–8 mm, apex not cirrose. Inflorescence 1- or 2(or 3)-flowered; bract solitary. Flowers nodding, campanulate; pedicel 0.8–2.5 cm. Tepals yellowish green, spotted and tessellated with purple (sometimes very densely so to become purple), oblong or obovate-elliptic, 2.5–4 cm × 5–13 mm; nectaries ovate to oblong, slightly projecting abaxially. Stamens 1.5–2.5 cm; filaments glabrous or papillose. Style 3-lobed; lobes 2–4 mm. Capsule narrowly winged. Fl. May–Jun, fr. Aug–Oct. $2n = 24^*$.

• Hill thickets, grassy slopes; 2000–4000 m. S Gansu, S Qinghai, W Sichuan.

The bulbs are used medicinally.

4. *Fritillaria cirrhosa* D. Don, Prodr. Fl. Nepal. 51. 1825.

川贝母 *chuan bei mu*

Fritillaria cirrhosa var. *bonatii* (H. Léveillé) S. C. Chen; *F. cirrhosa* var. *dingriensis* Y. K. Yang & J. Z. Zhang; *F. cirrhosa* var. *viridiflava* S. C. Chen; *F. duilongdeqingensis* Y. K. Yang & Gesan; *F. lhiinzeensis* Y. K. Yang et al.; *F. zhufenensis* Y. K. Yang & J. Z. Zhang; *Lilium bonatii* H. Léveillé.

Bulb of 2 scales, 1–2 cm in diam. Stem 15–60 cm. Leaves 7–11, opposite or sometimes also 3- or 4-whorled and alternate; leaf blade linear to linear-lanceolate, 4–12 cm × 3–5(–15) mm, apex often curved or cirrose. Inflorescence 1(–3)-flowered; bracts 3, apex curved or cirrose. Flower nodding, campanulate or narrowly so; pedicel much shorter than tepals. Tepals yellow

or yellowish green, slightly or heavily spotted or tessellated with purple, usually oblong-elliptic, 3–5 × 1.2–1.8 cm; nectaries elliptic to ovate, 3–5 × 2–3 mm, projecting abaxially. Stamens 2–3 cm; filaments sometimes slightly papillose. Style 3-lobed; lobes 3–5 mm. Capsule narrowly winged; wings 1–1.5 mm wide. Fl. May–Jul, fr. Aug–Oct. $2n = 24^*$.

Forests, alpine thickets, meadows, flood lands, moist places; 3200–4600 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan [Bhutan, India, Nepal, Sikkim].

The bulbs are used medicinally.

5. *Fritillaria taipaiensis* P. Y. Li, Acta Phytotax. Sin. 11: 251. 1966.

太白贝母 tai bai bei mu

Fritillaria cirrhosa D. Don f. *glabra* P. Y. Li; *F. glabra* (P. Y. Li) S. C. Chen; *F. shaanxiica* Y. K. Yang et al.; *F. taipaiensis* var. *fengxianensis* Y. K. Yang & J. K. Wu; *F. taipaiensis* f. *platyphylla* Y. K. Yang & S. X. Zhang.

Bulb of 2 scales, ovoid, 1–1.5 cm in diam. Stem 20–50 (–100) cm. Leaves 5–10 (–20), usually opposite, sometimes middle and distal ones also whorled and alternate; leaf blade linear to linear-lanceolate, 5–13 cm × 3–7 (–12) mm, apex sometimes curved. Inflorescence 1 (or 2)-flowered; bracts 3, apex often curved. Flower nodding, campanulate; pedicel 2–4 cm. Tepals yellowish green, densely spotted purple, narrowly oblong or obovate-oblong, 2.5–5 × 0.6–1.8 cm; nectaries slightly projecting abaxially. Stamens ca. 3/5 as long as tepals; filaments slightly papillose distally. Style 3-lobed; lobes 2–4 mm. Capsule winged; wings 0.5–2 mm wide. Fl. May–Jun, fr. Jun–Jul. $2n = 24^*$.

• Hill thickets, grassy slopes; 2000–3200 m. Gansu, Hubei, Shaanxi, Sichuan.

The bulbs are used medicinally.

6. *Fritillaria yuzhongensis* G. D. Yu & Y. S. Zhou in S. C. Chen et al., Acta Bot. Yunnan. 7: 146. 1985.

榆中贝母 yu zhong bei mu

Fritillaria cirrhosa D. Don var. *brevistigma* Y. K. Yang & J. K. Wu; *F. glabra* (P. Y. Li) S. C. Chen var. *shanxiensis* S. C. Chen; *F. lanzhouensis* Y. K. Yang et al.; *F. lishiensis* Y. K. Yang & J. K. Wu; *F. lishiensis* var. *yichengensis* Y. K. Yang & P. P. Ling; *F. taipaiensis* P. Y. Li var. *ningxiaensis* Y. K. Yang & J. K. Wu; *F. taipaiensis* var. *yuxiensis* Y. K. Yang et al.

Bulb of 2 or 3 scales, ovoid, 0.7–1.3 cm in diam. Stem 20–50 cm. Leaves 6–9, basal 2 opposite, others alternate or sometimes subopposite; leaf blade linear to narrowly lanceolate, 3–8 cm × 2–4 (–6) mm, apex usually curved or cirrose. Inflorescence 1 (or 2)-flowered; bracts 3, apex cirrose. Flower nodding, campanulate; pedicel 7–10 mm. Tepals yellowish green, slightly tessellated with purple, suboblong to subovate, 2–4 × 0.6–1.8 cm; nectaries suborbicular, projecting abaxially. Stamens 1.2–2.4 cm; filaments sometimes laxly papillose. Style 3-lobed; lobes 2–4 mm. Capsule narrowly winged. Fl. Jun. $2n = 24^*$.

• Grassy slopes; 1800–3500 m. Gansu, Henan, Ningxia, Shaanxi, Shanxi.

The bulbs are used medicinally.

7. *Fritillaria crassicaulis* S. C. Chen in S. C. Chen & K. C. Hsia, Acta Phytotax. Sin. 15(2): 36. 1977.

粗茎贝母 cu jing bei mu

Fritillaria omeiensis S. C. Chen; *F. wabuensis* S. Y. Tang & S. C. Yueh.

Bulb of 2 scales, ovoid, 2–5 cm in diam.; tunic rather thick. Stem 30–80 cm, usually white farinose distally. Leaves 10–18, basal 2 usually opposite, middle and distal ones whorled, opposite, or alternate; leaf blade oblong-lanceolate to lanceolate, 7–13 × 1–2.6 cm, apex acuminate. Inflorescence 1 (–3)-flowered; bracts 3, apex acuminate. Flower nodding, campanulate; pedicel 2–2.5 cm. Tepals yellow or greenish yellow, spotted or slightly tessellated with purple, suboblong, 4–5 × 1.3–1.8 cm; nectaries brownish yellow. Stamens ca. 2 cm; filaments slightly papillose; anthers 8–10 mm. Style 3-lobed; lobes 2–3 mm. Capsule narrowly winged. Fl. May–Jun, fr. Jul–Aug.

• Forests, alpine grasslands; 2500–3400 m. SW Sichuan, NW Yunnan.

The bulbs are used medicinally.

8. *Fritillaria sinica* S. C. Chen, Acta Phytotax. Sin. 19: 500. 1981.

中华贝母 zhong hua bei mu

Bulb of 2 or 3 scales, ovoid, ca. 1.5 cm in diam. Stem to 30 cm. Leaves 3–8, opposite or sometimes also whorled, distal ones occasionally alternate; leaf blade broadly linear to oblong-lanceolate, 3–8 × 0.5–2 cm, apex acuminate, not cirrose. Inflorescence 1 (or 2)-flowered; bracts (1–)3, apex acuminate. Flower campanulate; pedicel 1.4–2 cm. Tepals olive green, marked and tessellated with deep purple, oblong-elliptic to obovate, 2.5–4.5 × 1.3–2 cm; nectaries ovate or orbicular. Stamens 1.2–2.4 cm; filaments glabrous. Style 3-lobed; lobes ca. 3 mm. Capsule narrowly winged, with persistent tepals. Fl. May–Jun, fr. Jul–Aug.

• Open thickets, hill grasslands; 3400–3600 m. W Sichuan.

The bulbs are used medicinally.

9. *Fritillaria monantha* Migo, J. Shanghai Sci. Inst., Sect. 3, 4: 139. 1939.

天目贝母 tian mu bei mu

Fritillaria guizhouensis Y. K. Yang et al.; *F. huangshanensis* Y. K. Yang & C. J. Wu; *F. huangshanensis* f. *tonglingensis* (S. C. Chen & S. F. Yin) Y. K. Yang & Y. H. Zhang; *F. hupehensis* P. K. Hsiao & K. C. Hsia; *F. lichuanensis* P. Li & C. P. Yang; *F. monantha* var. *ningguoica* Y. K. Yang & M. M. Fang; *F. monantha* var. *tonglingensis* S. C. Chen & S. F. Yin; *F. ningguoensis* S. C. Chen & S. F. Yin; *F. puqiensis* G. D. Yu & C. Y. Chen; *F. qimenensis* D. C. Zhang & J. Z. Shao; *F. thunbergii* Miquel var. *puqiensis* (G. D. Yu & C. Y. Chen) P. K. Hsiao & S. C. Yu; *F. wanjiangensis* Y. K. Yang et al.

Bulb of 2 or 3 scales, 1.2–2 cm in diam. Stem 20–60 (–100) cm. Leaves opposite, whorled, and alternate; leaf blade oblong-lanceolate to lanceolate, 5–12 × 1.5–3 cm, apex slightly

cirrose. Inflorescence 1(–4)-flowered; bracts (1–)3, apex often slightly or strongly cirrose. Flower nodding, tubular-campanulate; pedicel 1–3.5 cm or more. Tepals greenish yellow to pale purple, tessellated or spotted with yellowish brown or dark purple, sometimes very heavily so, oblong-obovate to oblong, 3.5–5 × 1–2 cm, apex obtuse; nectaries projecting abaxially. Stamens ca. 2 mm; filaments glabrous or slightly papillose. Style 3-lobed; lobes 3–8 mm. Capsule broadly winged; wings 6–8 mm wide. Fl. Apr–Jun, fr. Jun–Jul. $2n = 24^*$.

• Forests, moist places on limestone hills, flood lands; 100–1600 m. Anhui, Henan, Hubei, Jiangxi, Sichuan, Zhejiang.

The bulbs are used medicinally.

10. *Fritillaria walujewii* Regel, Gartenflora 28: 353. 1879.

新疆贝母 xin jiang bei mu

Fritillaria tianshanica Y. K. Yang & L. R. Hsu; *F. walujewii* var. *plena* X. Z. Duan & X. J. Zheng; *F. walujewii* var. *shawanensis* X. Z. Duan & X. J. Zheng; *F. xinyuanensis* Y. K. Yang & J. K. Wu.

Bulb of 2 scales, 1–2.5 cm in diam. Stem 20–50 cm. Leaves 7–13, basal 2 opposite, middle ones commonly in whorls of 3–5, distal ones opposite or alternate; leaf blade linear to lanceolate, 5.5–10 cm × 2–9 mm, attenuate to a sharp and slightly cirrose point. Inflorescence 1-flowered (or with 2 or more flowers on robust plants); bracts 3, apex strongly cirrose. Flower nodding, campanulate; pedicel 2–3 cm. Tepals usually purple, occasionally whitish green, spotted and slightly tessellated with purple, suboblong or oblong-elliptic, 3–5 × 1–1.5 cm; nectaries projecting at a right angle abaxially. Stamens 1/2–2/3 as long as tepals; filaments glabrous. Style 3-lobed; lobes 2–3 mm. Capsule broadly winged; wings 4–5 mm wide. Fl. May–Jun, fr. Jul–Aug. $2n = 24^*$.

Openings in *Picea* forests, thickets, meadows, steppes; 1300–2000 m. Xinjiang [Kazakstan].

Chinese records of *Fritillaria ferganensis* Losinskaja (e.g., in FRPS) are referable to *F. walujewii*.

Fritillaria walujewii is a vulnerable species in China.

11. *Fritillaria verticillata* Willdenow, Sp. Pl. 2: 91. 1799.

黄花贝母 huang hua bei mu

Fritillaria albidiflora X. Z. Duan & X. J. Zheng; *F. albidiflora* var. *jimunaica* (X. Z. Duan & X. J. Zheng) X. Z. Duan & X. J. Zheng; *F. albidiflora* var. *purpurea* X. Z. Duan & X. J. Zheng; *F. albidiflora* var. *rhodantha* X. Z. Duan & X. J. Zheng; *F. amoena* C. Y. Yang; *F. borealixingjiangensis* Y. K. Yang et al.; *F. heboksarensis* X. Z. Duan & X. J. Zheng; *F. tortifolia* X. Z. Duan & X. J. Zheng var. *albiflora* X. Z. Duan & X. J. Zheng; *F. tortifolia* var. *citrina* X. Z. Duan & X. J. Zheng; *F. tortifolia* var. *parviflora* X. Z. Duan & X. J. Zheng; *F. verticillata* var. *jimunaica* X. Z. Duan & X. J. Zheng.

Bulb of 2 scales, ca. 2 cm in diam. Stem 15–50 cm. Leaves rather densely arranged, basal 2 opposite, others in whorls of 4–7; leaf blade narrowly lanceolate to linear, 5–9 cm × 2–10 mm, apex strongly cirrose. Inflorescence 1–5-flowered; bracts 2 or 3, apex strongly cirrose. Flowers nodding,

campanulate; pedicel 1–2 cm. Tepals white or pale yellow, occasionally tinged with pale purple, oblong-elliptic, 2–5 × 1.5–2 cm; nectaries ovate, projecting at a right angle abaxially. Stamens 1–2.5 cm; filaments dilated proximally, glabrous. Style 3-lobed, lobes 2–4 mm. Capsule winged; wings 2–4 mm wide. Fl. Apr–Jun, fr. Jul. $2n = 24^*$.

Hill thickets, gravelly meadows; 1300–2000 m. NW Xinjiang [Kazakstan, Russia (W Siberia)].

Martyn Rix (pers. comm.) notes that *Fritillaria verticillata* commonly has an inflorescence with only one flower, and that reports of several-flowered plants are the result of longstanding confusion between this species and *F. thunbergii*. Rix also notes that *F. albidiflora* may be distinct from *F. verticillata*, differing as follows: flowers opening nearly flat (vs. campanulate), tepals 2–3 cm (vs. 3–5 cm), and nectaries orbicular (vs. ovate), ca. 6 mm above base of tepal.

12. *Fritillaria thunbergii* Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 157. 1867.

浙贝母 zhe bei mu

Bulb of 2 or 3 scales, ovoid or globose, 1–3 cm in diam. Stem 15–80 cm. Leaves 12–20, opposite, alternate, or sometimes also 3-whorled; leaf blade linear-lanceolate to lanceolate, 7–11 × 1–2.5 cm, apex usually slightly cirrose. Inflorescence 1–6-flowered; bracts 2–4, apex cirrose. Flowers nodding, campanulate; pedicel 1–3.5 cm. Tepals pale yellow, sometimes tinged with pale purple or slightly tessellated with purplish brown, oblong-elliptic to narrowly obovate-oblong, 2.5–3.5 × 1–1.8 cm; nectaries small. Stamens 1–1.5 cm; filaments glabrous. Style 3-lobed; lobes 1.5–2 mm. Capsule broadly winged; wings 6–8 mm wide. Fl. Mar–Apr, fr. May–Jun.

• Bamboo forests, shady and moist places; near sea level to 600 m. Anhui, Jiangsu, Zhejiang.

This species was originally described from Japan (as *Uvularia cirrhosa*), where it is not native but cultivated and occasionally naturalized.

- 1a. Bulb of 2(or 3) scales, 1.5–3 cm in diam.; stem 50–80 cm; leaves mostly alternate 12a. var. *thunbergii*
- 1b. Bulb of 3 scales, ca. 1 cm in diam.; stem 15–30 cm; leaves mostly opposite 12b. var. *chekiangensis*

12a. *Fritillaria thunbergii* var. *thunbergii*

浙贝母(原变种) zhe bei mu (yuan bian zhong)

Uvularia cirrhosa Thunberg, Fl. Jap. 136. 1784; *Fritillaria austroanhuiensis* Y. K. Yang & J. K. Wu; *F. collicola* Hance; *F. verticillata* Willdenow var. *thunbergii* (Miquel) Baker.

Bulb of 2(or 3) scales, 1.5–3 cm in diam. Stem 50–80 cm. Leaves mostly alternate. $2n = 24^*$.

• Bamboo forests, shady and moist places; near sea level to 600 m. Anhui, Jiangsu, Zhejiang.

Widely cultivated in China for its bulbs, which are used medicinally.

12b. *Fritillaria thunbergii* var. *chekiangensis* P. K. Hsiao & K. C. Hsia in S. C. Chen & K. C. Hsia, Acta Phytotax. Sin. 15(2): 42. 1977.

东阳贝母 *dong yang bei mu*

Fritillaria chekiangensis (P. K. Hsiao & K. C. Hsia) Y. K. Yang et al.; *F. xiaobeimu* Y. K. Yang et al.

Bulb of 3 scales, ca. 1 cm in diam. Stem 15–30 cm. Leaves mostly opposite.

- C Zhejiang (Dongyang Xian).

Cultivated in Zhejiang for its bulbs, which are used medicinally.

13. *Fritillaria tortifolia* X. Z. Duan & X. J. Zheng, *Acta Phytotax. Sin.* 25: 59. 1987.

托里贝母 *tu o li bei mu*

Fritillaria tortifolia var. *barlikensis* X. Z. Duan & X. J. Zheng; *F. tortifolia* var. *plena* X. Z. Duan & X. J. Zheng; *F. tortifolia* var. *wusunica* X. Z. Duan & X. J. Zheng.

Bulb of 2 or 3 scales, ovoid, 1–3 cm or more in diam. Stem 20–40(–100) cm. Leaves 8–11, basal opposite or in a whorl of 3, others whorled and opposite; leaf blade linear to lanceolate, 5–5.5 × 0.8–2 cm, base spirally twisted, apex usually cirrose. Inflorescence 1(or more)-flowered; bracts 3, narrowly lanceolate, apex twisted, cirrose. Flower nodding, campanulate; pedicel 2.5–3 cm. Tepals whitish or yellowish, tessellated with purple or brown, suboblong, ca. 3 × 1–2 cm; nectaries projecting at a right angle abaxially. Stamens ca. 1.8 cm; filaments white, glabrous; anthers purplish, ca. 8 mm. Style 3-lobed; lobes ca. 3 mm. Capsule broadly winged; wings ca. 5 mm wide. Fl. Apr–May, fr. Jun. $2n = 24^*$.

- Thickets, alpine grassy slopes; 1500–2100 m. NW Xinjiang.

14. *Fritillaria ussuriensis* Maximowicz in Trautvetter et al., *Decas Pl.* Nov. 9. 1882.

平贝母 *ping bei mu*

Fritillaria ussuriensis f. *lutosa* C. F. Fang.

Bulb of 2 scales, 1–1.5 cm in diam., usually with a few bulbels around it. Stem 50–60(–100) cm. Leaves 14–17, basal ones usually in a whorl of 3, middle and distal ones whorled or opposite, sometimes also alternate; leaf blade linear to lanceolate, 7–14 × 3–6.5 cm, apex sometimes slightly cirrose. Inflorescence 1(–3)-flowered; bracts 2 per flower (often with 4 or 5 extra bracts on extension of stem above flower), apex strongly cirrose. Flower nodding, tubular-campanulate; pedicel 2.5–3.5 cm. Tepals purple adaxially, brownish violet abaxially, tessellated with yellow, oblong-obovate to subelliptic, ca. 3.5 × 1.5 cm; nectaries projecting at a right angle abaxially. Filaments papillose, longer than anthers. Style 3-lobed, ± papillose; lobes ca. 5 mm. Capsule wingless. Fl. May–Jun, fr. Jul. $2n = 24^*$.

Forests, thickets, meadows, streamsides, shady and moist places; near sea level to 500 m. Heilongjiang, Jilin, Liaoning [Korea, Russia (Far East)].

Fritillaria ussuriensis is cultivated in China for its bulbs, which are used medicinally. It is a vulnerable species in China.

15. *Fritillaria yuminensis* X. Z. Duan, *Acta Phytotax. Sin.* 19: 257. 1981.

裕民贝母 *yu min bei mu*

Fritillaria tachengensis X. Z. Duan & X. J. Zheng; *F. ta-*

chengensis var. *nivea* Y. K. Yang & S. X. Zhang; *F. yuminensis* var. *albiflora* X. Z. Duan & X. J. Zheng; *F. yuminensis* var. *roseiflora* X. Z. Duan & X. J. Zheng; *F. yuminensis* var. *varians* Y. K. Yang & G. J. Liu.

Bulb of 2 or 3 scales, subglobose, ca. 1.5 cm in diam. Stem 30–50 cm. purple. Leaves 9–11, basal 2 opposite, middle ones in a whorl of 3 or 4, distal ones opposite or alternate; leaf blade lanceolate to linear, 5–5.5 × 0.8–2 cm, apex cirrose. Inflorescence 1(or more)-flowered; bracts 3, apex cirrose. Flower nodding, campanulate; pedicel 1–2 cm. Tepals pink, light blue, or dark blue, not tessellated, oblong or ovate-oblong, 1.5–2.2 × 0.6–1.5 cm; nectaries projecting at a right angle abaxially. Style scarcely 3-lobed; lobes less than 1 mm. Capsule broadly winged; wings 3–4 mm wide. Fl. Apr–May, fr. Jun–Jul. $2n = 24^*$.

- Forest margins, open gravelly slopes; 1700–2800 m. NW Xinjiang.

The bulbs are used medicinally.

16. *Fritillaria przewalskii* Maximowicz in Trautvetter et al., *Decas Pl.* Nov. 9. 1882.

甘肃贝母 *gan su bei mu*

Fritillaria gansuensis S. C. Chen & G. D. Yu; *F. przewalskii* var. *discolor* Y. K. Yang & Y. S. Zhou; *F. przewalskii* f. *emacula* Y. K. Yang & J. K. Wu; *F. przewalskii* var. *gamanica* Y. K. Yang & J. Z. Ren; *F. przewalskii* var. *tessellata* Y. K. Yang & Y. S. Zhou.

Bulb of 2 scales, ovoid-globose, 6–13 mm in diam. Stem 15–50 cm. Leaves 4–7, basal 2 usually opposite, others alternate or occasionally subopposite; leaf blade linear to narrowly lanceolate, 3–9 cm × 3–6 mm, apex sometimes slightly curved. Inflorescence 1(or 2)-flowered; bract 1, apex slightly curved. Flower nodding, campanulate or narrowly so; pedicel 2–3 cm. Tepals pale yellow, speckled with blackish purple, narrowly oblong to obovate, 2–3 × 0.6–1.3 cm; nectaries inconspicuous. Stamens ca. 2/3 as long as tepals; filaments papillose. Style scarcely 3-lobed; lobes less than 1 mm. Capsule narrowly winged; wings ca. 1 mm wide. Fl. Jun–Jul, fr. Aug.

- Thickets, grasslands; 2800–4400 m. S Gansu, E Qinghai, Sichuan.

The bulbs are widely used medicinally.

17. *Fritillaria unibracteata* P. K. Hsiao & K. C. Hsia in S. C. Chen & K. C. Hsia, *Acta Phytotax. Sin.* 15(2): 39. 1977.

暗紫贝母 *an zi bei mu*

Bulb of 2 scales, 6–8 mm in diam. Stem 15–40 cm. Leaves 5–7, basal 2 usually opposite, others alternate or also opposite; leaf blade linear to linear-lanceolate, 3.6–5.5 cm × 3–5 mm, apex not cirrose. Inflorescence 1- or more flowered; bract 1, apex acuminate. Flowers campanulate; pedicel rather long. Tepals blackish purple, tessellated with yellowish brown or sometimes with a colored, V-shaped stripe near apex, suboblong, ca. 2.6 × 1 cm; nectaries inconspicuous or strongly projecting abaxially. Stamens 1.2–1.4 cm; filaments sometimes papillose. Style scarcely or shortly lobed; lobes 0.5–2 mm. Capsule narrowly winged; wings ca. 1 mm wide. Fl. May–Jun, fr. Aug.

• Thickets, meadows; 3200–4700 m. S Gansu, SE Qinghai, NW Sichuan.

- 1a. Flowers narrowly campanulate; nectaries
ca. 2.5 × 2 mm, inconspicuous 17a. var. *unibracteata*
1b. Flowers campanulate; nectaries
6–11 × 1–3 mm, strongly projecting
abaxially 17b. var. *longinectarea*

17a. *Fritillaria unibracteata* var. *unibracteata*

暗紫贝母(原变种) an zi bei mu (yuan bian zhong)

Fritillaria lixianensis Y. K. Yang & J. K. Wu; *F. sulcisquamosa* S. Y. Tang & S. C. Yueh; *F. unibracteata* var. *ganziensis* Y. K. Yang & J. K. Wu; *F. unibracteata* var. *maculata* S. Y. Tang & S. C. Yueh.

Flowers narrowly campanulate. Nectaries ca. 2.5 × 2 mm, inconspicuous. 2n = 24*.

• Thickets, meadows; 3200–4500 m. S Gansu, SE Qinghai, NW Sichuan.

The bulbs are used medicinally.

17b. *Fritillaria unibracteata* var. *longinectarea* S. Y. Tang & S. C. Yueh in J. M. Xu, Fl. Sichuan. 7: 60. 1991.

长腺贝母 chang xian bei mu

Flowers campanulate. Nectaries 6–11 × 1–3 mm, strongly projecting abaxially. 2n = 24*.

• Thickets, meadows; 3200–4700 m. NW Sichuan.

18. *Fritillaria dajinensis* S. C. Chen, Acta Bot. Yunnan. 5: 369. 1983.

大金贝母 da jin bei mu

Bulb of 2 or 3 scales, ovoid, ca. 1 cm in diam. Stem 20–50 cm. Leaves 4–10, basal 2 opposite, middle and distal ones alternate or opposite; leaf blade linear to linear-lanceolate, 3.5–11 cm × 2–10 mm, apex not cirrose. Inflorescence 1(–4)-flowered; bract 1, apex acuminate. Flower campanulate; pedicel 1.5–2 cm. Tepals yellowish green, spotted with purple near base abaxially, oblong or obovate-oblong, 1.8–2.3 cm × 5–6 mm, apex obtuse; inner ones much wider; nectaries not projecting abaxially. Stamens 7–9 mm; filaments 2–3 mm, papillose; anthers 6–10 mm. Style scarcely lobed. Capsule narrowly winged, with persistent tepals. Fl. Jun, fr. Jul. 2n = 24*.

• Thickets, meadows; 3600–4400 m. NW Sichuan.

19. *Fritillaria delavayi* Franchet, J. Bot. (Morot) 12: 222. 1898.

梭砂贝母 suo sha bei mu

Fritillaria delavayi var. *banmaensis* Y. K. Yang & J. K. Wu.

Bulb of 2 or 3 scales, subglobose or ovoid, 1–2 cm in diam. Stem 15–35 cm, often covered with a waxlike layer near base. Leaves 3–5, closely arranged in middle or distal part of stem, alternate or subopposite; leaf blade ovate or ovate-elliptic, 2–7 × 1–3 cm, apex obtuse or rounded. Inflorescence 1-flowered. Flower campanulate; pedicel long. Tepals yellowish, spotted or

tessellated with reddish brown, narrowly elliptic or oblong-elliptic, 3.2–4.5 × 1.2–1.8 cm; nectaries inconspicuous. Stamens 1.6–2.2 cm; filaments glabrous; anthers basifixed. Style 3-lobed; lobes 0.5–4 mm. Capsule narrowly winged, ± enclosed by persistent tepals. Fl. Jun–Jul, fr. Aug–Sep.

Sandy and gravelly places, flood lands; 3400–5600 m. Qinghai, Sichuan, Xizang, Yunnan [Bhutan, Sikkim].

20. *Fritillaria fusca* Turrill, Hooker's Icon. Pl. 35: t. 3427, f. 8–11. 1943.

高山贝母 gao shan bei mu

Fritillaria himalaica Y. K. Yang et al.

Bulb of 2 scales, ovoid. Stem 8–22 cm. Leaves 2 or 3, subopposite or alternate; leaf blade elliptic to suboblong, 1.9–3.3 × 0.7–2 cm, apex obtuse. Inflorescence 1-flowered. Flower nodding. Tepals yellowish, heavily tessellated with purplish brown, ca. 1.7 × 0.7 cm. Stamens ca. 1/2 as long as tepals; filaments glabrous; anthers dorsifixed. Style 3-lobed; lobes ca. 2.5 mm. Capsule wingless. Fl. Jul.

• Moist and gravelly places, open flood lands; 5000–5100 m. S Xizang.

21. *Fritillaria karelinii* (Fischer ex D. Don) Baker, J. Linn. Soc., Bot. 14: 268. 1874.

砂贝母 sha bei mu

Rhinopetalum karelinii Fischer ex D. Don in Sweet, Brit. Fl. Gard., ser. 2, t. 283. 1835; *Fritillaria karelinii* var. *albiflora* X. Z. Duan & X. J. Zheng.

Bulb of 2 scales, ca. 1 cm in diam. Stem 12–35 cm, papillose-pubescent. Leaves 5–8, basal 2 subopposite, lanceolate, 4–6 × 0.8–1.5 cm, distal ones alternate, linear, 2.5–3 cm × 1–5 mm, minutely papillose-pubescent. Inflorescence 3–13-flowered; bracts usually 2, linear. Flowers slightly zygomorphic; pedicel 7–12 mm. Tepals rose violet, spotted or tessellated with dark color, oblong-ovate, 1–1.5 cm × 3–5 mm; nectary on 1 outer tepal much larger than others and spurred abaxially. Stamens slightly shorter than tepals; filaments usually papillose-ciliate proximally; anthers subglobose or broadly ovate, ca. 1.2 mm in diam. Style scarcely lobed. Capsule wingless. Fl. Apr, fr. May–Jun. 2n = 24*.

Sandy soil, stony slopes, gravelly screes. NW Xinjiang [Afghanistan, Kazakhstan, Pakistan, Tajikistan, Turkmenistan, Uzbekistan; SW Asia (Iran)].

22. *Fritillaria anhuiensis* S. C. Chen & S. F. Yin in S. F. Yin, Acta Phytotax. Sin. 21: 100. 1983.

安徽贝母 an hui bei mu

Fritillaria anhuiensis var. *albiflora* S. C. Chen & S. F. Yin; *F. anhuiensis* f. *jinzhaiensis* Y. K. Yang & J. Z. Shao; *F. ebeiensis* G. D. Yu & G. Q. Ji; *F. ebeiensis* var. *purpurea* G. D. Yu & P. Li; *F. hupehensis* P. K. Hsiao & K. C. Hsia var. *dabieshanensis* M. B. Deng & K. Yao; *F. shuchengensis* Y. K. Yang et al.; *F. wuyangensis* Z. Y. Gao.

Bulb of 2 or 3 subreniform scales, 1–2 cm in diam., with

many smaller bulbels inside; bulbels ricelike, ovoid, obtusely conical or somewhat rhombic, varying in size. Stem 10–50 cm. Leaves 6–18, basal ones usually opposite or whorled, middle and distal ones verticillate, opposite, or alternate; leaf blade oblong-lanceolate, 10–15 × 0.5–2(–3.5) cm, apex acuminate. Inflorescence 1- or 2(–4)-flowered; bracts usually 3, apex acuminate. Flowers nodding, tubular-campanulate; pedicel 1–3 cm. Tepals commonly yellowish white or yellowish green spotted or tessellated with purple, rarely pure white or purple, oblong to elliptic, 3–5 × 1–1.5 cm; nectaries projecting abaxially. Filaments ca. 2 mm, glabrous. Style 3-lobed; lobes 2–6 mm. Capsule broadly winged; wings 5–10 mm wide. Fl. Mar–Apr, fr. May–Jun. $2n = 24^*$.

- Forests, thickets, grassy slopes; 600–900 m. Anhui, Henan.

Cultivated in Anhui for its bulbs, which are used medicinally.

23. *Fritillaria maximowiczii* Freyn, Oesterr. Bot. Z. 53: 21. 1903.

轮叶贝母 *lun ye bei mu*

Fritillaria maximowiczii f. *flaviflora* Q. S. Sun & H. C. Lo.

Bulb of 4–6 or more scales, 1–2 cm in diam., surrounded by many small bulbels usually detached during flowering. Stem 27–55 cm, slender, glabrous. Leaves 3–6 in 1 whorl (very rarely in 2 whorls) and occasionally 1 or 2 smaller leaves between whorl and flower; leaf blade linear to linear-lanceolate, 4.5–10 cm × 3–13 mm, apex not cirrose. Inflorescence usually 1-flowered; bract 1. Flower nodding, campanulate; pedicel long. Tepals reddish adaxially, purplish violet abaxially, slightly or markedly tessellated with yellow, lanceolate-elliptic or ovate-elliptic, 3.5–4 × 1–1.4 cm, margin erose, papillose; nectaries projecting abaxially. Stamens 2–2.5 cm; filaments glabrous. Style 3-lobed; lobes 6–8 mm. Capsule winged; wings ca. 4 mm wide. Fl. Jun. $2n = 24$.

Broad-leaved deciduous forests, moist and sandy places on forest margins, thickets, grassy slopes; 1400–1500 m. Hebei, Heilongjiang, Jilin, Liaoning [Russia (Far East, E Siberia)].

24. *Fritillaria davidii* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 93. 1887.

米贝母 *mi bei mu*

Bulb of 3–10 globose scales, 1–2 cm in diam., surrounded by many small bulbels. Stem 10–33 cm, glabrous. Basal leaves 1–4; petiole 10–24 cm, slender; leaf blade elliptic or ovate, 3–5.5 × 2–2.8 cm, apex acute. Inflorescence 1-flowered; bracts 3 or 4, crowded, suboblong, 2–3 cm × 5–8 mm. Flowers campanulate; pedicel short. Tepals yellow, tessellated with purple, suboblong-elliptic, 3–4 × 0.7–1.4 cm, papillose-tuberculate adaxially, apex obtuse; nectaries inconspicuous. Stamens 1.5–2 cm; filaments glabrous; anthers subdorsifixed. Style 3-lobed; lobes 5–6 mm. Fl. Mar–May.

- *Betula alnoides* forests, grassy slopes, loose peaty soil with ferns, rocky moist places along streams, crevices of cliffs; 1600–2600 m. W Sichuan.

