

### 39. FRAGARIA Linnaeus, Sp. Pl. 1: 494. 1753.

草莓属 cao mei shu

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Herbs perennial, mostly stoloniferous, polygamo-dioecious, usually spreading or appressed hairy. Stolons often rooting at nodes and forming plantlets. Leaves alternate, petiolate; stipules adnate to base of petiole, often membranous, sheathing; leaf blade 3-foliolate or pinnately 5-foliolate. Inflorescence erect, cymose or corymbiform, few flowered, rarely a solitary flower. Hypanthium obconic or turbinate. Sepals 5, valvate, persistent; epicalyx segments 5, alternating with and smaller than sepals, margin entire. Petals 5, white, rarely yellow, broadly obovate or suborbicular. Stamens numerous; anther 2-loculed. Carpels numerous, free, borne on convex receptacle; ovule ascending from middle of locule; style adaxial, short, persistent. Aggregate fruit formed from enlarged receptacle, berry-like, long conic to globose, fleshy. Achenes numerous, seated in pits on surface of aggregate fruit, minute, brittle. Seed testa membranous; cotyledons convex.  $x = 7$ .

About 20 species: temperate and subtropical regions of N hemisphere, extending to South America; nine species (three endemic, one introduced) in China.

- 1a. Stems and petioles appressed hairy.
  - 2a. Sepals appressed to aggregate fruit ..... 9. *F. nubicola*
  - 2b. Sepals reflexed from aggregate fruit.
    - 3a. Leaflets 5; aggregate fruit ovoid ..... 3. *F. pentaphylla*
    - 3b. Leaflets 3, or if 5 then aggregate fruit globose or ellipsoid.
      - 4a. Aggregate fruit long conic, ovoid, or rarely fusiform; epicalyx segments oblong, apex 2- or 3-lobed; leaflets 3 ..... 7. *F. daltoniana*
      - 4b. Aggregate fruit globose or ellipsoid; epicalyx segments linear-lanceolate or linear, apex entire or lobed; leaflets 3 or 5 ..... 8. *F. gracilis*
- 1b. Stems and petioles spreading hairy.
  - 5a. Pedicels appressed hairy ..... 1. *F. vesca*
  - 5b. Pedicels densely spreading hairy.
    - 6a. Sepals spreading or reflexed from aggregate fruit.
      - 7a. Leaflets 3, thin, both surfaces hairy, abaxially more densely so on veins; sepals spreading in fruit ..... 2. *F. orientalis*
      - 7b. Leaflets 5, thick, abaxially sparsely pilose, adaxially glabrous; sepals reflexed in fruit ..... 3. *F. pentaphylla*
    - 6b. Sepals appressed to aggregate fruit.
      - 8a. Leaflets (3 or)5, thin; plants silvery hairy throughout ..... 6. *F. moupinensis*
      - 8b. Leaflets 3, thick; plants brown-yellow hairy throughout.
        - 9a. Aggregate fruit 1–1.5 cm in diam.; plants wild ..... 4. *F. nilgerrensis*
        - 9b. Aggregate fruit to 3 cm in diam.; plants cultivated ..... 5. *F. ×ananassa*

#### 1. *Fragaria vesca* Linnaeus, Sp. Pl. 1: 494. 1753.

野草莓 ye cao mei

*Fragaria chinensis* Losinskaja; *F. concolor* Kitagawa.

Herbs perennial, 5–30 cm tall. Stems together with petioles spreading pilose, rarely glabrescent. Petiole 3–20 cm; leaf blade 3-foliolate, rarely pinnately 5-foliolate; leaflets sessile or central one shortly petiolulate, abaxially greenish, adaxially green, obovate, elliptic or broadly ovate, 1–5 × 0.6–4 cm, abaxially pubescent or sometimes glabrescent, adaxially sparsely pubescent, base cuneate or broadly so, margin obtusely or acutely incised serrate, apex obtuse. Inflorescence corymbiform, 2–4(or 5)-flowered, with a greenish, subulate or petiolate, leafletlike bract. Pedicel 1–3 cm, appressed pilose. Sepals ovate-lanceolate, apex caudate; epicalyx segments linear-lanceolate or subulate, shorter than sepals. Petals white, obovate, base tapering into a short claw. Stamens ca. 20, unequal. Carpels numerous. Aggregate fruit ripening red, ovoid. Achenes ovoid, not prominently rugose. Fl. Apr–Jun, fr. Jun–Sep.  $2n = 14$ .

Forests, mountain slopes, meadows. Gansu, Guizhou, Jilin, Shaanxi, Sichuan, Xinjiang, Yunnan [widely distributed in N temperate zone].

#### 2. *Fragaria orientalis* Losinskaja, Izv. Glavn. Bot. Sada SSSR 25: 70. 1926.

东方草莓 dong fang cao mei

*Fragaria corymbosa* Losinskaja; *F. uniflora* Losinskaja.

Herbs perennial, 5–30 cm tall. Stems together with petioles spreading pilose, more densely so in upper parts, sometimes glabrescent. Leaf blade 3-foliolate; leaflets subsessile, abaxially greenish, adaxially green, obovate or rhombic-ovate, 1–5 × 0.8–3.5 cm, abaxially pilose, more densely so on veins, adaxially sparsely pilose, base cuneate on central leaflet, oblique on lateral ones, margin incised serrate, apex rounded or acute. Inflorescence corymbiform, (1 or)2–5(or 6)-flowered, with a pale green or petiolate, leafletlike bract at base. Flowers bisexual, rarely unisexual, 1–1.5 cm in diam.; pedicel 0.5–1.5 cm, spreading pilose. Sepals ovate-lanceolate, apex caudate; epicalyx segments linear-lanceolate, occasionally 2-fid. Petals white, suborbicular, base tapering into a short claw. Stamens

18–22, subequal. Carpels numerous. Aggregate fruit ripening purple, hemispheric; persistent sepals spreading or slightly reflexed. Achenes ovoid, ca. 0.5 mm wide, prominently rugose or only so at base. Fl. May–Jul, fr. Jul–Sep.  $2n = 28$ .

Forests, meadows on mountain slopes; 600–4000 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shanxi [Korea, Mongolia, E Russia].

**3. *Fragaria pentaphylla*** Losinskaja, Izv. Glavn. Bot. Sada SSSR 25: 69. 1926.

五叶草莓 wu ye cao mei

Herbs perennial, (6–)10–15 cm tall. Stems taller than leaves, together with petioles densely spreading pilose or sometimes appressed-ascending pilose. Petiole 2–8 cm; leaf blade pinnately 5-foliolate; terminal leaflet shortly petiolulate, distal lateral ones sessile, obovate or elliptic, 1–4 × 0.6–3 cm, base cuneate on terminal leaflet, oblique on lateral ones, margin acutely or obtusely incised serrate, apex rounded; proximal lateral leaflets shortly petiolulate or subsessile, much smaller than distal ones, 6–10 × 4–8 mm. Inflorescence corymbiform, (1 or)2 or 3(or 4)-flowered, with pale brown or petiolate, leaflet-like bract at base. Flowers bisexual; pedicel 1.5–2 cm. Sepals 5, ovate-lanceolate, abaxially pubescent; epicalyx segments lanceolate, occasionally 2-fid, nearly equaling but narrower than sepals. Petals white, suborbicular, base tapering into a short claw. Stamens ca. 20, unequal. Carpels numerous. Aggregate fruit ripening red, ovoid; persistent sepals prominently reflexed. Achenes ovoid, ca. 0.5 mm wide, rugose only at base. Fl. Apr–May, fr. May–Jun.  $2n = 14^*$ .

• Forests, forest clearings, scrub, mountain meadows, open gravels; 1000–2700 m. Chongqing, Gansu, Shaanxi, Sichuan.

White-fruited plants from SE Xizang (Mt. Gyala Peri) were described as *Fragaria pentaphylla* f. *alba* Staudt & Dickoré (Bot. Jahrb. Syst. 123: 348. 2001). *Fragaria tibetica* Staudt & Dickoré (loc. cit.: 349) was described from S Xizang, extending to NW Yunnan and possibly W Sichuan. It differs from *F. pentaphylla* in having unisexual flowers (plants dioecious) and a tetraploid chromosome number ( $2n = 28$ ). White-fruited plants from the Lancang Jiang-Nu Jiang divide in SE Xizang and NW Yunnan were described as f. *alba* Staudt & Dickoré (loc. cit.: 351).

**4. *Fragaria nilgerrensis*** Schlechtendal ex J. Gay, Ann. Sci. Nat. Bot., sér. 4, 8: 206. 1857.

黄毛草莓 huang mao cao mei

Herbs perennial, robust, 5–25 cm tall. Stems densely tufted, nearly equaling leaves, together with petioles densely yellow-brown sericeous. Petiole 4–18 cm; leaf blade 3-foliolate; leaflets shortly petiolulate, abaxially pale green, adaxially dark green, obovate or elliptic, 1–4.5 × 0.8–3 cm, thick, abaxially yellow-brown sericeous or waxy white papillate, adaxially sparsely pubescent, base cuneate on central leaflet, oblique on lateral ones, margin obtusely or acutely incised serrate, apex rounded. Inflorescence cymose, (1 or)2–5(or 6)-flowered, proximally with a petiolate, 1- or 3-foliolate bract. Flowers bisexual, 1–2 cm in diam. Sepals ovate-lanceolate, as broad as or broader than epicalyx segments; epicalyx segments lanceolate, margin entire or 2-fid. Petals white, rarely reddish purple at base, orbicular, rarely obovate or broadly so, base tapering into

a short claw. Stamens ca. 20, unequal. Aggregate fruit ripening white, tinged yellow or red, globose; persistent sepals erect, appressed to aggregate fruit. Achenes ovoid, glabrous. Fl. Apr–Jul, fr. Jun–Aug.  $2n = 14$ .

Valley forests, forest margins, thickets, meadows on mountain slopes, valleys; 700–3000 m. Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Taiwan, Yunnan [E India, Nepal, Sikkim, N Vietnam].

- 1a. Leaves abaxially yellow-brown sericeous, not papillate, hairs dense and long on veins ..... 4a. var. *nilgerrensis*  
1b. Leaves abaxially waxy white papillate ..... 4b. var. *mairei*

**4a. *Fragaria nilgerrensis* var. *nilgerrensis***

黄毛草莓(原变种) huang mao cao mei (yuan bian zhong)

*Fragaria hayatae* Makino; *F. nilgerrensis* subsp. *hayatae* (Makino) Staudt; *F. vesca* Linnaeus var. *minor* Hayata.

Leaves abaxially yellow-brown sericeous, not papillate, hairs dense and long on veins.

Valley forests, meadows on mountain slopes; 700–3000 m. Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Taiwan, Yunnan [E India, Nepal, Sikkim, N Vietnam].

Two of us (Ikeda and Ohba) believe that the plants from Taiwan should be separated as *Fragaria hayatae* (Makino, Bot. Mag. (Tokyo) 26: 285. 1912; *F. nilgerrensis* subsp. *hayatae*; *F. vesca* var. *minor*), which differs from *F. nilgerrensis* in having 1(–3)-flowered inflorescences and petals obovate to broadly so, white with a reddish purple base; *F. nilgerrensis*, on the other hand, has (1 or)2–5(or 6)-flowered inflorescences and petals orbicular, white throughout.

**4b. *Fragaria nilgerrensis* var. *mairei*** (H. Lévillé) Handel-Mazzetti, Symb. Sin. 7: 507. 1933.

粉叶黄毛草莓 fen ye huang mao cao mei

*Fragaria mairei* H. Lévillé, Repert. Spec. Nov. Regni Veg. 11: 300. 1912.

Leaves abaxially waxy white papillate.

• Forest margins, thickets, meadows on mountain slopes, valleys; 800–2700 m. Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Yunnan.

**5. *Fragaria ×ananassa*** (Weston) Duchesne in Lamarck, Encycl. 2: 538. 1788.

草莓 cao mei

*Fragaria chiloensis* (Linnaeus) Miller var. *ananassa* Weston, Bot. Univ. 2: 329. 1771; *F. ×grandiflora* Ehrhart (1792), not (Linnaeus) Crantz (1766); *F. vesca* Linnaeus var. *sativa* Linnaeus.

Herbs perennial, 10–40 cm tall. Stems shorter than or equaling leaves, densely spreading yellow villous. Petiole 2–10 cm; leaf blade 3-foliolate; leaflets shortly petiolulate, abaxially pale green, adaxially dark green, obovate or rhombic, rarely suborbicular, 3–7 × 2–6 cm, thick, abaxially sparsely hairy, more densely so on veins, adaxially subglabrous, base broadly cuneate on central leaflet, oblique on lateral ones, margin acutely incised serrate, apex rounded. Inflorescence cymose, 5–15-

flowered, proximally with a shortly petiolate, leafletlike bract. Flowers bisexual, 1.5–2 cm in diam. Sepals ovate, slightly longer than epicalyx segments; epicalyx segments elliptic-lanceolate, enlarged in fruit, margin entire, rarely 2-parted. Petals white, suborbicular or obovate-elliptic, base not prominently clawed. Stamens ca. 20, unequal. Carpels numerous. Aggregate fruit ripening red, large, to 3 cm in diam.; persistent sepals erect, appressed to aggregate fruit. Achenes acutely ovoid, glabrous. Fl. Apr–May, fr. Jun–Jul.

Cultivated throughout China [of cultivated origin].

*Fragaria ×ananassa* is a hybrid originally produced in cultivation between *F. chiloensis* (Linnaeus) Miller, native to W North and South America, and *F. virginiana* Miller, native to E North America.

**6. *Fragaria moupinensis*** (Franchet) Cardot, Bull. Mus. Nat. Hist. Nat. 22: 397. 1916.

西南草莓 xī nán cǎo měi

*Potentilla moupinensis* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 7: 222. 1886.

Herbs perennial, 5–15 cm tall. Stems spreading white sericeous. Leaf blade (3 or) 5-foliolate; leaflets shortly petiolulate or sessile, obovate or elliptic, 0.7–4 × 0.6–2.5 cm, abaxially white sericeous, adaxially pilose, base cuneate on terminal leaflet, oblique on lateral ones, margin incised serrate, apex rounded. Inflorescence corymbiform, 1–4-flowered, with a green, leaflet-like bract at base. Flowers bisexual, 1–2 cm in diam.; pedicel 2–8 cm, spreading (rarely appressed) white hairy. Sepals ovate-lanceolate; epicalyx segments lanceolate or linear-lanceolate. Petals white, obovate or suborbicular, base tapering into a short claw. Stamens 20–34, unequal. Aggregate fruit ellipsoid or ovoid; persistent sepals erect, appressed to aggregate fruit. Achenes ovoid, inconspicuously rugose. Fl. May–Jul(–Aug), fr. Jun–Jul.  $2n = 28^*$ .

• Forests, meadows, mountain slopes; 1400–4000 m. Gansu, Shaanxi, Sichuan, Xizang, Yunnan.

**7. *Fragaria daltoniana*** J. Gay, Ann. Sci. Nat. Bot., sér. 4, 8: 204. 1857.

裂萼草莓 liè ē cǎo měi

*Fragaria sikkimensis* Kurz.

Herbs perennial, 4–6 cm tall. Stems slender, subglabrous or sparsely appressed pilose. Petiole appressed pilose; leaf blade 3-foliolate; leaflets shortly petiolulate, abaxially greenish, adaxially dark green, oblong or ovate, 1–2.5 × 0.6–1.5 cm, abaxially appressed pilose along midvein and lateral veins, adaxially subglabrous, base cuneate or oblique, margin incised serrate, apex rounded or acute. Flower solitary, axillary; pedicel 2–5 cm, appressed pilose. Sepals ovate, abaxially sparsely appressed pilose, apex shortly caudate; epicalyx segments oblong, nearly equaling sepals, apex 2- or 3-lobed. Petals white, suborbicular. Stamens and carpels numerous, inserted on convex, pulpy receptacle. Aggregate fruit ripening red, long conic, ovoid, or rarely fusiform, 0.7–2.5 × 0.5–1 cm; persistent sepals spreading. Achenes glabrous.  $2n = 14$ .

Thickets, meadows on mountain summits; 3300–5000 m. Xizang

[Bhutan, NW India, N Myanmar, Nepal, Sikkim].

**8. *Fragaria gracilis*** Losinskaja, Izv. Glavn. Bot. Sada SSSR 25: 63. 1926.

纤细草莓 xiān xì cǎo měi

Herbs perennial, 5–20 cm tall. Stems slender, appressed pilose. Leaf blade 3-foliolate or pinnately 5-foliolate; leaflets sessile or terminal one shortly petiolulate, elliptic, long elliptic, or obovate-elliptic, 1.5–5 × 0.8–3 cm, abaxially appressed pubescent with hairs dense and long on veins, adaxially pilose, base cuneate or oblique, margin incised serrate, apex rounded or acute. Inflorescence corymbiform, 1–3(or 4)-flowered. Flowers 1–2 cm in diam.; pedicel appressed pubescent. Sepals ovate-lanceolate, apex caudate; epicalyx segments linear-lanceolate or linear, equaling sepals, margin entire or lobed. Petals suborbicular, base tapering into a short claw. Stamens ca. 20, unequal. Aggregate fruit globose or ellipsoid; persistent sepals markedly reflexed. Achenes ovoid, glabrous, inconspicuously rugose at base. Fl. Apr–Jul, fr. Jun–Aug.

• Valley forests, meadows on mountain slopes; 1600–3900 m. Gansu, Henan, Hubei, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan.

**9. *Fragaria nubicola*** (J. D. Hooker) Lindley ex Lacaita, J. Linn. Soc., Bot. 43: 476. 1916.

西藏草莓 xī zāng cǎo měi

*Fragaria vesca* Linnaeus var. *nubicola* J. D. Hooker, Fl. Brit. India 2: 344. 1878.

Herbs perennial, 4–25 cm tall. Stems appressed white sericeous. Petiole appressed (rarely spreading) white sericeous; leaf blade 3-foliolate; leaflets shortly petiolulate or sessile, elliptic or obovate, 1–6 × 0.5–3 cm, abaxially appressed white sericeous, sparsely so between veins, adaxially appressed pilose, base broadly cuneate or rounded, margin sharply incised serrate, apex obtuse. Inflorescence 1- to several flowered. Pedicel appressed white sericeous. Sepals ovate-lanceolate or ovate-oblong, apex acuminate; epicalyx segments lanceolate, abaxially sparsely villous, margin entire, rarely dentate, apex acuminate. Petals obovate-elliptic. Stamens ca. 20. Carpels numerous. Aggregate fruit ovoid; persistent sepals appressed to aggregate fruit. Achenes ovoid, glabrous or rugose. Fl. and fr. May–Aug.  $2n = 14$ .

Valley forests, forest margins, meadows on mountain slopes; 2500–3900 m. Xizang [Afghanistan, Bhutan, Kashmir, Myanmar, Nepal, Pakistan, Sikkim].

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