

### 3. PAPAVER Linnaeus, Sp. Pl. 1: 506. 1753.

罂粟属 ying su shu

Zhang Mingli (张明理); Christopher Grey-Wilson

Herbs, annual, biennial, or perennial, rarely monocarpic. Roots fusiform or attenuate, simple. Stems 1 or more, erect or ascending, terete, branched or not, very constricted or extended, usually setose, rarely glabrous, ivory malodorous lactiferous, with leaves or not. Basal leaves petiolate, usually glaucous adaxially, variously shaped, both surfaces setose, pinnatifid, pinnatisect, or bipinnatifid, sometimes incised, serrate, or crenate, rarely entire. Cauline leaves if present, similar to basal leaves, but usually sessile, sometimes amplexicaul. Flowers solitary, rarely in cymose racemes, pedunculate or sometimes scapose, erect, extended, usually setose. Flower buds nutant, ovoid or spherical. Sepals 2, rarely 3, shedding as flowers open, mostly setose. Petals 4, rarely 5 or 6, on short receptacles, often caducous, mostly red, rarely white, yellow, orange, or lavender, vivid and beautiful, usually obovate, in 2 whorls, outer whorl larger. Stamens many; filaments white, yellow, green, purple, or red, occasionally blackish, mostly filamentous; anthers spheroidal or oblong. Ovary 1-loculed, superior, usually ovoid, rarely terete-oblong; carpels 4–18, united, setose or glabrous; ovules many, astylous; stigmas 4–18, actinomorphic, united into compressed or steeped disk covering ovary; disk margin crenate or divided. Capsule narrowly terete, obovoid, or spherical, setose or glabrous, rarely spiny, obviously costate or not costate, poricidal under actinomorphic stigmas. Seeds many, black, brown, dark gray, or white, reniform, small, longitudinally striate or alveolate; albumen white, fleshy and rich in oil; embryo hidden in albumen.

About 100 species: mainly in C and S Europe to temperate Asia, some in the Americas and Oceania, one in South Africa; seven species (three cultivated) in China.

- 1a. Perennial herb, ± stemless; leaves all basal; flowers scapose.
  - 2a. Plant 20–60 cm tall ..... 5. *P. nudicaule*
  - 2b. Plant 5–15 cm tall.
    - 3a. Petals yellow or orange; flowers 3–5 cm in diam. .... 6. *P. canescens*
    - 3b. Petals pistachio-colored; flowers 2–3 cm in diam. .... 7. *P. radicum*
- 1b. Annual or rarely perennial herb with an elongated stem; leaves basal and cauline; flowers solitary on leafy stem at branch apices, or axillary.
  - 4a. Perennial herb with simple stems; petals 4–6, red ..... 4. *P. orientale*
  - 4b. Annual herb, generally branched; petals 4.
    - 5a. Plant glabrous or sparsely setose; stems simple, with 1 or few flowers; cauline leaves amplexicaul, margin irregularly undulate-serrate; filaments white ..... 1. *P. somniferum*
    - 5b. Plant setose; stems branched, often multiflorous; cauline leaves pinnatifid, not amplexicaul; filaments mauve or purplish.
      - 6a. Ovary and capsule glabrous; flower buds oblong-obovoid; leaf blade bipinnatifid ..... 2. *P. rhoeas*
      - 6b. Ovary and capsule setose; flower buds oval; leaf blade pinnatifid or pinnatisect ..... 3. *P. pavinum*

#### 1. *Papaver somniferum* Linnaeus, Sp. Pl. 1: 508. 1753.

罂粟 ying su

Herbs, annual, 30–60(–100) cm tall (to 1.5 m in cultivation), glabrous or rarely slightly setose on plant below or on peduncle. Taproot erect, almost conical. Stems erect, glaucous, glabrous, occasionally somewhat setose. Leaves alternate; blade ovate or oblong, 7–25 cm, both surfaces glabrous, glaucous and rather waxy, veins distinct, slightly raised, base cordate, margin irregularly undulate-serrate, apex acuminate to obtuse; leaves below shortly petiolate but above sessile and amplexicaul. Flowers solitary, deeply cup-shaped, 5–12 cm in diam. Pedicel to 25 cm, glabrous or rarely sparsely setose. Flower buds nutant at first, erect at anthesis, oval-oblong or broadly ovoid, 1.5–3.5 × 1–3 cm, glabrous. Sepals 2, green, broadly ovate, margin membranous. Petals 4, white, pink, red, purple, or various, often with a dark basal blotch, suborbicular or almost flabellate, 4–7 × 3–11 cm, margin undulate or variously lobed. Stamens many; filaments white, linear, 1–1.5 cm; anthers yellowish or cream, oblong, 3–6 mm. Ovary green, spherical, 1–2 cm in diam., glabrous; stigmas 5–12(–18), actinomorphic, united into com-

pressed disk, disk margin deeply divided, lobes crenulate. Capsule brown when mature, spherical or oblong-elliptic, 4–9 × 4–5 cm, glabrous. Seeds many, black or deep gray, adaxially alveolate. Fl. Mar–Aug.  $2n = 18, 22–23, 25, 32$ .

Cultivated at many medicinal institutes in China and also illegally [cultivated in Afghanistan, India, Laos, Myanmar, and N Thailand; native to S Europe where it is also widely cultivated ornamentally and for the pharmaceutical industry].

This species is the source of heroin, morphine, and other alkaloids used in the drug trade and in medicine. The seeds are widely used as a condiment.

#### 2. *Papaver rhoeas* Linnaeus, Sp. Pl. 1: 507. 1753.

虞美人 yu mei ren

Herbs, annual, setose throughout, rarely glabrous. Stems erect, 25–90 cm tall, branched, yellowish setose. Leaves alternate; blade lanceolate or narrowly ovate, 3–15 × 1–6 cm, both surfaces yellowish setose, veins prominent abaxially and slightly concave adaxially, pinnatifid, below divided; lobes lanceolate and bipinnatifid, above parted or again lobed; lobes

lanceolate, uppermost one serrate-pinnatilobate, terminal lobes usually large; lobules apically acuminate; lower leaves petiolate but upper ones sessile. Flowers solitary on stem and branch apices, bowl-shaped, 6–9 cm in diam. Pedicel 10–15 cm, compressed yellowish setose. Flower buds nutant, oblong-obovoid, setose. Sepals 2, green, broadly elliptic, 1–1.8 cm, adaxially setose. Petals 4, rich scarlet, occasionally mauvish, pink, orange, or white, with or without a basal dark blotch or flecking, orbicular, transversely broadly elliptic or broadly obovate, 2.5–4.5 cm, overlapping, entire, rarely crenate or apex incised. Stamens many; filaments dark mauve or purplish, filamentous, ca. 8 mm; anthers blue, oblong, ca. 1 mm. Ovary obovoid, 7–10 mm, glabrous; stigmas 8–12, actinomorphic, united into compressed disk, margin crenate. Capsule broadly obovoid, 10–18 mm, glabrous, inconspicuously costate. Seeds many, reniform-oblong, ca. 1 mm. Fl. Mar–Aug.  $2n = 14$ .

Cultivated in China, sometimes escaping (in Taiwan) [native to N Africa, SW Asia, and Europe].

This species is used ornamentally and includes flowers in various colors as well as bicolored and semidouble forms.

**3. *Papaver pavoninum*** C. A. Meyer in Fischer & Avé-Lallemant, Index Sem. Hort. Petrop. 9: 82. 1843.

黑环罂粟 *hei huan ying su*

Herbs, annual, throughout long setose. Taproot terete, long and slender, attenuate toward base. Stems erect, 20–30(–45) cm tall, branched close to ground, moderately setose. Basal leaves long petiolate, narrowly ovate to narrowly lanceolate, including petiole 3–10 cm, both surfaces sparsely long setose, pinnatifid or pinnatisect to bipinnatifid; lobes lanceolate, sparsely serrate or rarely pinnatifid again. Lower cauline leaves long petiolate, upper ones shortly petiolate to almost sessile, like basal leaves but generally less dissected. Flowers 1(or 2) at stem or branch apices, 3.5–5.5 cm in diam. Pedicel 3–7 cm, slightly flat, sparsely long setose. Flower buds nutant, oval, 1–1.2 cm, densely long setose, terminating in a pair of hollow hornlike projections. Sepals 2, caducous, cymbiform. Petals 4, scarlet, with a prominent black, often white-edged, basal blotch, flabellate-obovate or suborbicular, 2–3.5 cm. Stamens many; filaments purplish red, filiform, 4–5 mm, gradually broader upward; anthers violet or blackish, oblong, ca. 1 mm; pollen blue. Ovary ovoid or oval in outline, 5–10 mm, densely yellow setose, usually longitudinally 5–7-costate; stigmas 4–8(–11)-rayed. Capsule oval or oblong, ca. 1 cm, costate, densely yellow setose. Fl. Apr–Jul.  $2n = 12$ .

Stony slopes on low mountains, grasslands at field sides, arable lands; ca. 900 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, S Russia, Turkmenistan, Uzbekistan; SW Asia (Iran)].

Various color forms have been recognized but are of little consequence taxonomically. White-flowered forms are assigned to *Papaver pavoninum* f. *album* X. J. Ge (Bull. Bot. Res., Harbin 11(1): 55. 1991) and are recorded from Xinjiang (Gongliu) at ca. 900 m.

**4. *Papaver orientale*** Linnaeus, Sp. Pl. 1: 508. 1753.

鬼罂粟 *gui ying su*

Herbs, perennial, setose throughout, ivory lactiferous. Roots whitish, fusiform, fleshy, with numerous fibrous roots.

Stems erect to ascending, tufted, 60–90 cm tall (cultivated plants over 100 cm), erect, terete, almost compressed- or appressed setose, leafy in lower 2/3. Basal leaves green on both surfaces, ovate to lanceolate, 20–30 cm including petiole (longer in cultivated plants), sparsely serrate or incised, teeth bristle-tipped, both surfaces setose, bipinnatifid; lobules lanceolate or oblong. Cauline leaves many, alternate, similar to basal leaves, but smaller; lower leaves long petiolate, uppermost sessile. Flowers solitary, terminal, bowl-shaped, large, 10–16 cm in diam. Pedicel densely setose. Flower buds erect, ovoid or broadly ovoid, 2–3 cm, spreading setose. Sepals 2, sometimes 3, outside green, inside whitish. Petals 4–6, red or carmine, with or without a basal dark blotch or flecking, broadly obovate or flabellate, (3–)5–8 cm, basally shortly clawed, abaxially with thick veins. Stamens numerous; filaments dark, filiform, below ampliate; anthers indigo-violet, oblong. Stigma 10–16-rayed, actinomorphic, indigo, uniting into compressed disk, margin sparsely thickly serrate. Capsule spheroidal, 2–3.5 cm in diam., glabrous, with a flat 10–16-rayed stigmatic disk. Seeds brown, orbicular-reniform, broadly striate, with small foveolae. Fl. Jun–Jul.  $2n = 28$ .

Widely cultivated as an ornamental in Taiwan [native to the Caucasus, N Iran, and NE Turkey].

Many cultivated forms are recorded in a wide range of colors, including orange, reds, mauve, purple, pink, and white. These are mostly of hybrid origin between *Papaver orientale* and the closely related *P. bracteatum* Lindley.

**5. *Papaver nudicaule*** Linnaeus, Sp. Pl. 1: 507. 1753.

野罂粟 *ye ying su*

*Papaver alpinum* Linnaeus *lusus chinense* Regel; *P. chinense* (Regel) Kitagawa; *P. croceum* Ledebour; *P. croceum* subsp. *chinense* (Regel) Rändel; *P. nudicaule* var. *chinense* (Regel) Fedde; *P. nudicaule* var. *corydalisifolium* Fedde; *P. nudicaule* var. *isopyroides* Fedde; *P. nudicaule* subsp. *rubroaurantiacum* (Fischer ex Candolle) Fedde; *P. nudicaule* var. *saxatile* Kitagawa; *P. nudicaule* var. *subcorydalisifolium* Fedde; *P. rubroaurantiacum* Fischer ex Candolle; *P. tenellum* Tolmatchew.

Herbs, perennial, 20–60 cm tall, very variable. Taproot terete, extended, upper part 2–5 mm in diam., attenuate or fusiform toward base; rootstock short, thickened, usually simple. Stems very short or apparently absent. Leaves tufted, all basal; petiole (1–)5–12 cm, basally ampliate to sheath, inclined-setose; blade slightly glaucous on both surfaces, ovate to lanceolate, 3–8 cm, both surfaces densely or sparsely gray setose, rarely nearly glabrous, pinnatilobate, pinnatifid, or pinnatisect; lobes 2–4 pairs, entire or pinnatilobate or pinnatifid again; lobules narrowly ovate, narrowly lanceolate, or oblong, apex acute, obtuse, or rounded. Scapes 1 to several, erect, terete, densely or sparsely inclined compressed-setose. Flowers solitary, terminal, scapose, cup-shaped, 4–6 cm in diam. Flower buds usually nutant, broadly ovoid to globose, 1.5–2 cm, densely brown setose. Sepals 2, caducous, corymbiform-elliptic. Petals 4, yellowish, yellow, or orange, rarely red, broadly cuneate or obovate, (1.5–)2–3 cm, basally shortly clawed, margin undulate-crenate. Stamens many; filaments yellow or oli-

vine, subulate, 6–10 mm; anthers yellow-white, yellow, or rarely reddish, oblong, 1–2 mm. Ovary obovoid to narrowly obovoid, 5–10 mm, densely appressed setose; stigmas 4–8, actinomorphic. Capsule narrowly obovoid, obovoid, or obovoid-oblong, 1–1.7 cm, densely appressed whitish- or red-brown setose, slightly broadly 4–8-costate; stigma disk flat, distantly incised-crenate. Seeds many, brown, almost reniform, small, striate with alveolate foveolae. Fl. May–Sep.  $2n = 14, 28^*, 42$ .

Forest margins, grasslands, grassy steppes, slopes, meadows, valleys, river gravel, moraines, roadsides; (200–)1000–2500(–3500) m. Gansu, Hebei, Heilongjiang, W Hubei, Jilin, Nei Mongol, Ningxia, Shaanxi, Shanxi, E Sichuan, Xinjiang; cultivated in many provinces [Afghanistan, Kazakhstan, Kyrgyzstan, Korea, Mongolia, Russia (including Siberia), Tajikistan, Uzbekistan].

Cultivated plants, commonly referred to as “Iceland poppies,” are of complex origin involving several other closely related species, including *Papaver radicum* Rottbøll.

This is a very variable species, with a number of variants recognized at the rank of forma, including plants with petals yellow or orange, ovary and capsule setose (*Papaver nudicaule* f. *nudicaule*, distribution as for the species); similar characters but petals white (*P. nudicaule* f. *seticapum* (P. Y. Fu) H. Chuang, recorded from Heilongjiang, Jilin, and Nei Mongol); petals yellow or orange, ovary and capsule glabrous (*P. nudicaule* var. *aquilegioides* Fedde, recorded from Gansu, Hebei, Heilongjiang, W Hubei, Nei Mongol, Ningxia, Shaanxi, Shanxi, and E Sichuan); and same characters but petals white (*P. nudicaule* f. *amurense* (N. Busch) H. Chuang, recorded from Heilongjiang, Jilin, and Nei Mongol).

**6. *Papaver canescens*** Tolmatchew, Zhurn. Russk. Bot. Obshch. 16: 77. 1931.

灰毛罂粟 hui mao ying su

*Papaver pseudocanescens* Popov; *P. tianschanicum* Popov ex Pavlov.

Herbs, perennial, small and tufted, 5–15(–20) cm tall, setose throughout. Taproot terete, prolonged, above 2–3 mm in diam.; rootstock branched or not. Leaves all basal; petiole 2–7 cm, flat, appressed setose, basally with an ampliate sheath; blade lanceolate to ovate, 2–5 × 1–2 cm, both surfaces appressed setose, pinnatifid; lobes 2 or 3 pairs, oblong, elliptic, or lanceolate, entire or 2–4-lobed or parted again. Scapes 1 to several, erect or sometimes curved, terete, appressed setose. Flowers solitary, terminal, scapose, 3–5 cm in diam. Flower buds elliptic or elliptic-orbicular, 1–1.2 cm, brown or golden setose. Sepals 2, cymbiform or broadly ovate. Petals 4, yellow or orange, broadly obovate or flabellate, 1.5–3 cm. Stamens numerous; filaments filiform, 7–10 mm, 3–5 appressed setose. Stigmas ca. 6, actinomorphic. Capsule oblong or obovoid-oblong, ca. 1 cm, appressed setose; stigma disk flat. Fl. Jun–Aug.

Alpine meadows, grasslands, slopes, stony slopes; 1500–3500 m. C and NW Xinjiang [Mongolia, Russia].

**7. *Papaver radicum*** Rottbøll var. ***pseudoradicatum*** (Kitagawa) Kitagawa, Neo-Lin. Fl. Manshur. 325. 1979 [“*pseudoradicatum*”].

长白山罂粟 chang bai shan ying su

*Papaver pseudoradicatum* Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 6: 122. 1942 [“*pseudo-radicatum*”].

Herbs, perennial, small and tufted, 5–15 cm tall, setose throughout. Taproot terete, to 15 cm, 2.5–3 mm in diam. at top, gradually narrowed toward base, with a few lateral roots and fibrous slender roots. Leaves all basal; petiole 2–4 cm, flat, appressed setose, basally with ampliate sheath; blade gray-green, ovate to broadly ovate, 1–2(–4) × 0.8–1.2 cm, both surfaces appressed setose, pinnatifid or bipinnatifid; primary lobes 2 or 3 pairs, narrowly elliptic or oblong, or ovate and 2–4-parted again. Scapes 1 to several from each rosette, densely appressed or inclined-spreading setose. Flowers solitary on scape, 2–3 cm in diam. Flower buds suborbicular to broadly elliptic, densely appressed or inclined-spreading setose. Sepals 2, cymbiform or broadly ovate, 1–1.2 cm. Petals 4, pistachio-colored or yellowish, broadly obovate, 1.8–2.3 cm. Stamens many; filaments filiform, 4–7 mm; anthers yellow, oblong, 1–1.5 mm. Ovary oblong, 4–5 mm, densely appressed setose; stigmas ca. 6, actinomorphic. Capsule obovoid, ca. 1 cm, densely appressed or inclined-spreading setose; stigma disk flat. Fl. Jun–Aug.

Gravel slopes, rocky slopes, alpine tundra; above 1600 m. Jilin (Changbai Shan) [Korea].

*Papaver radicum* as a species has a wide distribution in arctic and subarctic regions, which include North America, Greenland, and Russia (including Siberia).

