

PAEONIACEAE

芍药科 shao yao ke

Hong Deyuan (洪德元)¹, Pan Kaiyu (潘开玉)¹; Nicholas J. Turland²

Shrubs or perennial herbs, to 3.5 m tall. Roots fleshy, thick but attenuate toward tip, or tuberous. Stems (in herbs) or current year's branchlets (in shrubs) terete, with several persistent scales at base. Leaves alternate, compound; proximal 1–3 best developed, 1–3-ternate or 1- or 2-pinnate; leaflets entire or divided. Flowers solitary and terminal, or 2 or more per shoot and both terminal and axillary, more than 4 cm in diam. Bracts 1–6, leaflike, varying in shape and size, grading into sepals. Sepals 2–9, varying in shape and size. Petals 4–13, varying in color. Stamens up to 230; filaments and anthers varying in color. Disc leathery or fleshy, annular (in herbs) or extended into a sheath and 1/3 to wholly enveloping carpels (in shrubs). Carpels 1–5(–8), free, glabrous or hairy; ovules numerous, borne in two rows along ventral suture. Styles present or absent; stigmas laterally flattened, recurved, crested. Fruit a follicle. Seeds black or dark brown, globose or ovoid-globose, to 1.3 cm in diam.

One genus and ca. 30 species: NW Africa, temperate Asia and Europe, W North America; 15 species (ten endemic) in China.

Pan Kai-yu. 1979. Ranunculaceae subfam. Paeonioideae. *In*: *Fl. Reipubl. Popularis Sin.* 27: 37–59.

1. PAEONIA Linnaeus, *Sp. Pl.* 1:530. 1753

芍药属 shao yao shu

Morphological characters and geographical distribution are the same as those of the family.

Paeonia is a very complex genus and many of the species are not yet well defined. A consistent taxonomic treatment will require further studies throughout the world distribution of the genus in order to resolve questions about the limits of, and relationships between, the species.

1a. Herbs perennial; disc not well developed, annular.

2a. Leaflets and segments up to 9, entire; carpels glabrous 9. *P. obovata*

2b. Leaflets and segments (of proximal leaves) more than 9, at least some of them segmented; carpels hairy or glabrous.

3a. Leaflets and segments of proximal leaves up to 20, some of them entire, mostly more than 2 cm wide.

4a. Carpel 1 (or 2) 12. *P. emodi*

4b. Carpels 2–5.

5a. Flowers usually several per shoot, both terminal and axillary; leaflets and segments with bristles along veins adaxially 11. *P. lactiflora*

5b. Flowers usually solitary, terminal; leaflets and segments glabrous 10. *P. mairei*

3b. Leaflets and segments of proximal leaves more than 20, all or nearly all of them segmented, mostly less than 2 cm wide.

6a. Plants glabrous throughout 13. *P. sterniana*

6b. Leaflets and segments usually with bristles along veins adaxially; carpels usually brown-yellow hirsute.

7a. All or most sepals caudate at apex; roots cylindric, attenuate toward tip 14. *P. anomala*

7b. Most sepals (at least 2) not caudate at apex; roots obviously tuberous 15. *P. intermedia*

1b. Shrubs; disc well developed, 1/3 to wholly enveloping carpels.

8a. Flowers usually 2 or 3 per shoot, both terminal and axillary, ± pendent; disc fleshy, enveloping only base of carpels.

9a. Carpels usually 2–5(–7); follicles to 4 × 1.5 cm; petals, filaments, and stigmas often not pure yellow; plants less than 2 m tall 7. *P. delavayi*

9b. Carpel nearly always 1; follicles 4.7–7 × 2–3.3 cm; petals, filaments, and stigmas always yellow; plants

1.5–3.5 m tall 8. *P. ludlowii*

8b. Flower 1 per shoot, terminal, erect; disc leathery, 1/2 to wholly enveloping carpels.

10a. Disc ca. 1/2 enveloping carpels at anthesis; carpels 2–4(or 5), glabrous; leaflets (30–)35–65, all lobed 6. *P. decomposita*

¹ Herbarium, Institute of Botany, Chinese Academy of Sciences, 20 Nanxincun, Xiangshan, Beijing 100093, People's Republic of China.

² Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

- 10b. Disc wholly enveloping carpels at anthesis; carpels 5(–7), densely tomentose; leaflets usually less than 20 or, if more, at least some of them entire.
- 11a. Proximal leaves pinnate; leaflets more than 9.
- 12a. Proximal leaves 2-pinnate; leaflets up to 15, ovate-lanceolate to ovate, mostly entire 4. *P. ostii*
- 12b. Proximal leaves (2 or)3-pinnate; leaflets (17–)19–33, lanceolate or ovate-lanceolate and mostly entire, or ovate to ovate-orbicular and mostly lobed 5. *P. rockii*
- 11b. Proximal leaves 2-ternate; leaflets usually ca. 9.
- 13a. Leaflets adaxially often reddish, ovate or ovate-orbicular, mostly entire, abaxially densely tomentose at axils of major veins; petals often with a red spot at base 3. *P. qiui*
- 13b. Leaflets adaxially green, long ovate, ovate, or ovate-orbicular, mostly divided, abaxially glabrous, villous along veins, or villous throughout; petals unspotted at base.
- 14a. Leaflets long ovate or ovate, abaxially glabrous; terminal leaflets deeply 3-lobed, with an additional 1 to several lobes; lateral leaflets 2- or 3-lobed, sometimes entire; lobes acute at apex 1. *P. suffruticosa*
- 14b. Leaflets ovate-orbicular, abaxially villous along veins or throughout; all leaflets deeply 3-lobed; lobes again lobed, apex rounded to acute 2. *P. jishanensis*

1. *Paeonia suffruticosa* Andrews, Bot. Repos. 6: t. 373. 1804.

牡丹 mu dan

Shrubs to 1.5 m tall. Stems brown-gray. Proximal leaves 2-ternate; leaflets long ovate or ovate, 4.5–8 × 2.5–7 cm, both surfaces glabrous; terminal leaflets deeply 3-lobed, lobes again 2- or 3-lobed; some lateral leaflets 2- or 3-lobed, others entire; all lobes acute at apex. Flowers solitary, terminal, single or (in cultivated plants) double, 10–17 cm wide. Bracts 5, long elliptic, unequal. Sepals 5, green, broadly ovate, unequal. Petals (in single flowers) 5–11, white, pink, red, or red-purple, obovate, 5–8 × 4.2–6 cm, apex irregularly incised. Filaments pink or purple, white distally, ca. 1.3 cm; anthers long ellipsoid, ca. 4 mm. Disc wholly enveloping carpels at anthesis, purple-red, leathery, apex dentate or lobed. Carpels 5, rarely more, densely tomentose. Stigmas red. Follicles oblong, densely brown-yellow tomentose. Fl. Apr–May, fr. Aug. $2n = 10^*$.

• Cliffs; ca. 300 m. Native in C Anhui and W Henan; widely cultivated in China and elsewhere.

- 1a. Flowers double; petals variously colored, white, pink, red, or red-purple 1a. subsp. *suffruticosa*
- 1b. Flowers single; petals white or pale red-purple 1b. subsp. *yinpingmudan*

1a. *Paeonia suffruticosa* subsp. *suffruticosa*

牡丹(原亚种) mu dan (yuan ya zhong)

Paeonia chinensis Oken (1841), not Vilmorin (1870), nor *P. sinensis* Steudel (1841); *P. fruticosa* Dumont de Courset; *P. moutan* Sims; *P. suffruticosa* var. *purpurea* Andrews; *P. yunnanensis* W. P. Fang.

Flowers double; petals variously colored, white, pink, red, or red-purple. Fl. Apr–May.

• Known only in cultivation in China; widely cultivated in temperate regions elsewhere.

This subspecies has been cultivated for more than 2000 years and hundreds of cultivars are known.

1b. *Paeonia suffruticosa* subsp. *yinpingmudan* D. Y. Hong & al., Acta Phytotax. Sin. 36: 519. 1998.

银屏牡丹 yin ping mu dan

Flowers single; petals white or pale red-purple. Fl. Apr–May.

• Cliffs; ca. 300 m. C Anhui (Yinping Shan), W Henan (Song Xian).

At present only two individuals of this subspecies are known. The plant in Anhui grows on a cliff and is said by local people to be at least 500 years old; the plant in Henan is cultivated but is said by its owner to have been collected on a nearby mountain during the early 1960s (Hong et al., Acta Phytotax. Sin. 36: 517. 1998).

2. *Paeonia jishanensis* T. Hong & W. Z. Zhao in T. Hong & al., Bull. Bot. Res., Harbin 12: 225. 1992.

矮牡丹 ai mu dan

Paeonia spontanea (Rehder) T. Hong & W. Z. Zhao, nom. illeg. (included *P. jishanensis*); *P. suffruticosa* Andrews var. *jishanensis* (T. Hong & W. Z. Zhao) Halda; *P. suffruticosa* subsp. *spontanea* (Rehder) S. G. Haw & Lauener; *P. suffruticosa* var. *spontanea* Rehder. Shrubs to 1.8 m tall. Roots attenuate toward tip. Turions present. Stems gray or gray-brown. Proximal leaves 2-ternate; leaflets ovate-orbicular to orbicular, 4–6 × 3.5–4.5 cm, villous along veins or throughout, deeply 3-lobed; lobes again lobed, acute to rounded at apex. Flowers solitary, terminal, single, 10–16 cm wide. Bracts 2 or 3, long elliptic, unequal. Sepals 4 or 5, green, broadly ovate, 2.5–5 × 1.8–2.5 cm, apex rounded. Petals 5–11, white, occasionally pinkish at base or margin, obovate, 4.5–7.2 × 4–6 cm, apex irregularly incised. Filaments pink or purple, white distally, 8–10 mm; anthers yellow, linear, 8–11 mm. Disc wholly

enveloping carpels, red-purple, leathery, apex dentate. Carpels 5, densely tomentose. Stigmas red. Follicles oblong, densely brown-yellow tomentose. Fl. Apr–May, fr. Aug. $2n = 10^*$.

• Secondary deciduous broad-leaved forests, well-developed thickets, sometimes cultivated; 900–1700 m. N Henan (Jiyuan Xian), C Shaanxi (Huayin Xian, Tongchuan Shi), SW Shanxi (Jishan Xian, Yongji Xian).

Hybrids between this species and *Paeonia rockii*, naturalized in *Platycladus orientalis* forests in Shaanxi (Yan'an Shi), were treated as *P. ×papaveracea* Andrews (Bot. Repos. 7: t. 463. 1807; *P. suffruticosa* var. *papaveracea* (Andrews) Kerner; *P. yanensis* T. Hong & M. R. Li) by Hong and Pan (Nordic J. Bot. 19: 297. 1999), who believed them to have originated from wild individuals of *P. jishanensis* and cultivated *P. rockii*.

3. *Paeonia qiui* Y. L. Pei & D. Y. Hong, Acta Phytotax. Sin. 33: 91. 1995.

卵叶牡丹 luan ye mu dan

Paeonia ridleyi Z. L. Dai & T. Hong; *P. suffruticosa* Andrews var. *qiui* (Y. L. Pei & D. Y. Hong) Halda. Shrubs to 1.2 m tall. Roots attenuate toward tip. Stems gray or brown-gray, longitudinally striate. Proximal leaves 2-ternate; leaflets adaxially often reddish, ovate or ovate-orbicular, mostly entire, sometimes terminal ones shallowly 3-lobed, 6.5–8.2 × 3–6.5 cm, abaxially densely villous at axils of major veins, adaxially glabrous, base rounded, apex obtuse or acute. Flowers solitary, terminal, single, 8–12 cm wide. Petals 5–9, spreading, pink or pale pink, often with a red spot at base, 3.5–5.5 × 2–3.1 cm. Filaments pale pink to pink; anthers yellow. Disc wholly enveloping carpels, red-purple, leathery. Carpels 5, densely tomentose. Stigmas red. Follicles densely brown-yellow tomentose. Seeds black, glossy, ovoid, 0.6–0.8 × 0.5–0.7 cm. Fl. Apr–May, fr. Jul–Aug.

• Deciduous broad-leaved forests, secondary forests, sunny grassy slopes, limestone cliffs, sometimes cultivated; 1000–2200 m. W Henan (Xixia Xian), W Hubei (Baokang Xian, Shennongjia Linqu). *Paeonia ×baokangensis* Z. L. Dai & T. Hong (Bull. Bot. Res., Harbin 17: 2. 1997) was treated as a hybrid between *P. qiui* and *P. rockii* by Hong and Pan (Nordic J. Bot. 19: 297. 1999). The hybrid plants are known only in cultivation in W Hubei (Baokang Xian), where they occur with both parents.

4. *Paeonia ostii* T. Hong & J. X. Zhang in T. Hong & al., Bull. Bot. Res., Harbin 12: 223. 1992.

凤丹 feng dan

Paeonia ostii var. *lishizhenii* B. A. Shen; *P. suffruticosa* Andrews subsp. *ostii* (T. Hong & J. X. Zhang) Halda. Shrubs to 1.5 m tall. Stems brown-gray. Proximal leaves 2-pinnate, with 11–15 leaflets; leaflets lanceolate or ovate-lanceolate, mostly entire, often terminal ones 2- or 3-lobed, very occasionally 1 or 2 lateral ones also 2-lobed, 5–12 × 2.5–5 cm, both surfaces glabrous, base rounded, apex acute. Flowers solitary, terminal, single, 12–14 cm wide. Bracts 1–4, green, leaflike. Sepals 3 or 4, green-yellow, broadly elliptic or ovate-orbicular, 1.5–3.1 × 1.5–2.5 cm, apex acute or shortly caudate. Petals ca. 11, white, obovate, 5.5–6.5 × 3.8–5 cm, apex emarginate. Filaments purple-red; anthers yellow. Disc

wholly enveloping carpels, purple-red, leathery, apex dentate or lobed. Carpels 5, densely tomentose. Stigmas red. Follicles oblong, densely brown-yellow tomentose. Fl. Apr–May, fr. Aug. $2n = 10^*$.

• Deciduous broad-leaved forests, thickets on slopes, usually cultivated; 800–1600 m. Native in W Henan (Lushi Xian); cultivated in Anhui, Henan, Hubei, Shaanxi, Sichuan, and other provinces. This species is widely but sporadically cultivated in China as a traditional medicine.

5. *Paeonia rockii* (S. G. Haw & Lauener) T. Hong & J. J. Li in T. Hong & al., Bull. Bot. Res., Harbin 12: 227. 1992.

紫斑牡丹 zi ban mu dan

Shrubs to 1.8 m tall. Roots attenuate toward tip. Turions absent. Stems gray or gray-brown, peeling off in flakes. Proximal leaves 2- or 3-pinnate, with (17–)19–33 leaflets; leaflets lanceolate or ovate-lanceolate and mostly entire, or ovate to ovate-orbicular and mostly lobed, 2–11 × 1.5–4.5 cm, abaxially villous along veins, adaxially glabrous, base truncate to cuneate, apex acute or acuminate. Flowers solitary, terminal, single, 13–19 cm wide. Bracts 3, leaflike. Sepals 3, green, ovate-orbicular, 3–4 × 2–3 cm, apex acute or caudate. Petals white with a large, dark purple spot at base. Filaments yellow; anthers yellow. Disc wholly enveloping carpels, pale yellow, leathery, apex dentate or lobed. Carpels 5(or 6), densely tomentose. Stigmas pale yellow. Follicles oblong, densely yellow tomentose. Fl. Apr–May, fr. Aug. $2n = 10^*$.

• Deciduous broad-leaved forests, forest margins, thickets, shady slopes, limestone rocks, sometimes cultivated; 1100–2800 m. S Gansu, W Henan, W Hubei, C and S Shaanxi.

- 1a. Leaflets lanceolate to ovate-lanceolate, mostly entire 5a. subsp. *rockii*
- 1b. Leaflets ovate to ovate-orbicular, mostly lobed 5b. subsp. *taibaishanica*

5a. *Paeonia rockii* subsp. *rockii*

紫斑牡丹(原亚种) zi ban mu dan (yuan ya zhong)

Paeonia suffruticosa Andrews subsp. *rockii* S. G. Haw & Lauener, Edinburgh J. Bot. 47: 279. 1990; *P. moutan* Sims subsp. *atava* Brühl; *P. suffruticosa* subsp. *atava* (Brühl) S. G. Haw & Lauener; *P. rockii* subsp. *linyanshanii* T. Hong & Osti.

Leaflets lanceolate or ovate-lanceolate, mostly entire.

• Deciduous broad-leaved forests, *Pinus armandii* forest margins, thickets, shady slopes, limestone rocks, sometimes cultivated; 1100–2800 m. S Gansu, W Henan, W Hubei, S Shaanxi.

5b. *Paeonia rockii* subsp. *taibaishanica* D. Y. Hong, Acta Phytotax. Sin. 36: 542. 1998.

太白山紫斑牡丹 tai bai shan zi ban mu dan

Leaflets ovate to ovate-orbicular, mostly lobed.

• Deciduous broad-leaved forests, forest margins; 1300–2000 m. S Gansu, C Shaanxi (N slopes of Qin Ling).

6. *Paeonia decomposita* Handel-Mazzetti, Acta Horti Gothob. 13: 39. 1939.

四川牡丹 si chuan mu dan

Shrubs to 1.8 m tall, glabrous throughout. Stems gray-black, peeling off in flakes; young shoots purple-red. Proximal leaves 3(or 4) times compound (1st and 3rd divisions ternate, 2nd division pinnate), with (30–)35–65 leaflets; terminal leaflets elliptic to ovate-orbicular, 2.5–6.5 × 1.2–4.5 cm, 3-partite to base or 3-fid, terminal lobes 3-lobed; lateral leaflets elliptic to orbicular, 1.8–5.5 × 0.6–4.5 cm, 3-lobed or coarsely toothed. Flowers solitary, terminal, single, 10–15 cm wide. Bracts 2 or 3(–5), unequal, linear-lanceolate. Sepals 3(–5), green, broadly obovate, ca. 2.5 × 1.5–2.0 cm, apex mucronate. Petals 9–12, rose, obovate, 4–7 × 3–5 cm, apex usually 2-lobed and irregularly incised or toothed. Disc 1/2–2/3 enveloping carpels, white, papery, with triangular teeth. Carpels (2 or)3–5, green or purple, glabrous. Stigmas red. Follicles black-brown when mature, ellipsoid, 2–3 × 1.3–1.7 cm. Seeds black, glossy, broadly ellipsoid or globose, 8–10 × 6–8 mm. Fl. Apr–May, fr. Aug.

• Sparse *Cupressus chengiana* forests, young secondary deciduous broad-leaved forests, thickets; 2000–3100 m. NW Sichuan.

- 1a. Carpels nearly always 5; terminal leaflets elliptic to ovate, length:width ratio (1.5–)1.7–2.7(–3.3):1, terminal lobes length:width ratio (1.6–)2.4–3.7(–4.3):1 6a. subsp. *decomposita*
1b. Carpels (2 or)3 or 4(or 5); terminal leaflets ovate to ovate-orbicular, length:width ratio (1–)1.2–1.8(–2.2):1, terminal lobes length:width ratio (1–)1.3–2.4(–3):1 6b. subsp. *rotundiloba*

6a. *Paeonia decomposita* subsp. *decomposita*

四川牡丹(原亚种) si chuan mu dan (yuan ya zhong)

Paeonia szechuanica W. P. Fang.

Terminal leaflets elliptic to ovate, 2.5–6.5 × 1.2–3 cm, length:width ratio (1.5–)1.7–2.7(–3.3):1; terminal lobes length:width ratio (1.6–)2.4–3.7(–4.3):1. Lateral leaflets elliptic, 1.8–4.4 × 0.6–2.5 cm. Carpels nearly always 5. $2n = 10^*$.

• Young secondary deciduous broad-leaved forests, thickets; 2000–3100 m. NW Sichuan (valley of Dadu He).

6b. *Paeonia decomposita* subsp. *rotundiloba* D. Y. Hong, Kew Bull. 52: 961. 1997.

圆裂四川牡丹 yuan lie si chuan mu dan

Terminal leaflets ovate to ovate-orbicular, 3–5.5 × 2.4–4.5 cm, length:width ratio (1–)1.2–1.8(–2.2):1; terminal lobes length:width ratio (1–)1.3–2.4(–3):1. Lateral leaflets ovate to orbicular, 1.8–5.5 × 1.4–4.5 cm. Carpels (2 or)3 or 4(or 5). $2n = 10^*$.

• Sparse *Cupressus chengiana* forests, young secondary deciduous broad-leaved forests, well-developed thickets; 2000–3100 m. NW Sichuan (valley of Ming Jiang).

7. *Paeonia delavayi* Franchet, Bull. Soc. Bot. France 33: 382. 1886.

滇牡丹 dian mu dan

Paeonia delavayi var. *alba* Bean; *P. delavayi* var. *angustiloba* Rehder & E. H. Wilson; *P. delavayi* var. *atropurpurea* Schipczinsky; *P. delavayi* var. *lutea* (Delavay ex Franchet) Finet & Gagnepain; *P. delavayi* var. *lutea* f. *superba* Lemoine; *P. franchetii* Halda; *P. handel-mazzettii* Halda; *P. lutea* Delavay ex Franchet; *P. potaninii* Komarov; *P. potaninii* f. *alba* (Bean) Stern; *P. potaninii* var. *trollioides* (Stapf ex Stern) Stern; *P. trollioides* Stapf ex Stern.

Shrubs 0.2–1.8 m tall, glabrous throughout. Roots tuberous. Turions present. Stems brown-gray. Proximal leaves 2-ternate; leaflets always segmented, base usually decurrent; segments again segmented or lobed; ultimate segments and lobes (17–)25–100(–300), linear or linear-lanceolate, 0.5–10 × 0.2–2.7 cm, margin entire or occasionally dentate. Flowers 1–3 per shoot, both terminal and axillary, basipetal, ± pendulous, single, 6–10 cm wide. Bracts 1–5, varying in shape and size. Sepals 2–9, green abaxially, green with a pink base adaxially, or wholly purple or purple-red, triangular-orbicular or orbicular, 1.3–3.7 × 0.6–2.3 cm, apex rounded to mucronate or acuminate. Petals (4–)7–11(–13), yellow, yellow with a red or purple-red spot at base, red, dark red, or dark purple-red, sometimes white, green-yellow, yellow with a red margin, or orange. Filaments yellow, pink-red, or dark purple-red; anthers yellow, pink, red, or dark purple-red. Disc yellow, red, or dark red, annular or shortly cylindric. Carpels 2–5(or 6–8); ovary usually green, sometimes purple. Stigmas green-yellow, yellow, red, or purple-red. Follicles brown at maturity, oblong-ovoid, 2–3.5 × 1–1.5 cm. Seeds brown-black. Fl. May–Jun, fr. Aug–Sep. $2n = 10^*$.

• Dry *Pinus* or *Quercus* woods, thickets, rarely grassy slopes or glades in virgin *Picea* forests; 2000–3600 m; W Sichuan, SE Xizang, C and N Yunnan.

8. *Paeonia ludlowii* (Stern & Taylor) D. Y. Hong, Novon 7: 157. 1997.

大花黄牡丹 da hua huang mu dan

Paeonia lutea Delavay ex Franchet var. *ludlowii* Stern & Taylor, J. Roy. Hort. Soc. 76: 217. 1951.

Shrubs caespitose, to 3.5 m tall, glabrous throughout. Roots attenuate toward tip. Turions absent. Stems gray, to 4 cm in diam. Proximal leaves 2-ternate; leaflets subsessile, 6–12 × 5–13 cm, usually 3-segmented almost to base, base often decurrent; segments 4–9 × 1.5–4 cm, mostly 3-lobed to middle; lobes 2–5 × 0.5–1.5 cm, margin entire or 1- or 2-toothed; segments, lobes, and teeth all acuminate at apex. Flowers 3 or 4 per shoot, axillary, ± pendulous, single, 10–12 cm wide; pedicel 5–9 cm. Bracts 4 or 5, lanceolate. Sepals 3–5, green, orbicular, 1.5–2.5 × 1.5–2.5 cm, apex rounded, acute, or caudate. Petals spreading, pure yellow, obovate, 5–5.5 × 2.5–3.5 cm, apex rounded. Filaments yellow, 1.1–1.5 cm; anthers yellow, ca. 4 mm. Disc yellow, ca. 1 mm high, dentate. Carpel 1(or 2), glabrous. Stigmas yellow. Follicles cylindric, 4.7–7 × 2–3.3 cm.

Seeds dark brown, globose, ca. 1.3 cm in diam. Fl. May, fr. Aug. $2n = 10^*$.

• Sparse forests, woods, thickets; 2900–3500 m. SE Xizang.

9. *Paeonia obovata* Maximowicz, Prim. Fl. Amur. 29. 1859.

草芍药 cao shao yao

Herbs perennial, 30–70 cm tall. Roots thick, attenuate toward tip. Stems glabrous. Proximal leaves spreading or ascending, 2-ternate; leaflets obovate, 5–14 × 4–10 cm, glabrous to densely pubescent or hirsute abaxially, glabrous adaxially, base cuneate, margin entire, apex rounded or acute. Flowers solitary, terminal, single, 7–12 cm wide. Bracts 1 or 2, unequal. Sepals (2 or)3(or 4), unequal, 1.5–3 × 1.5–2 cm, apex mostly rounded. Petals 4–7, spreading or incurved, white, rose, pink-red, red, purple-red, or rarely white with a pinkish base or margin, obovate, 3–5.5 × 1.8–2.8 cm. Filaments white, green-yellow, or purple proximally and white distally to wholly purple; anthers yellow, orange-red, or dark purple. Disc yellow, annular. Carpels (1 or)2 or 3(–5), glabrous; ovary green. Stigmas red. Follicles gradually recurved, ellipsoid, 2–3 cm. Seeds black, glossy. Fl. May–Jun, fr. Sep.

Deciduous broad-leaved, mixed broad-leaved, and coniferous forests; 200–2800 m. Anhui, SE Gansu, N Guizhou, Hebei, Heilongjiang, SE and W Henan, W Hubei, NW Hunan, N Jiangxi, E Jilin, Liaoning, SE Nei Mongol, S Ningxia, E Qinghai, S Shaanxi, Shanxi, Sichuan, NW Zhejiang [Japan, Korea, Russia (Far East)].

1a. Leaves abaxially usually glabrous or sparsely (rarely densely) pubescent or hirsute 9a. subsp. *obovata*

1b. Leaves abaxially usually densely (rarely sparsely) pubescent or hirsute 9b. subsp. *willmottiae*

9a. *Paeonia obovata* subsp. *obovata*

草芍药(原亚种) cao shao yao (yuan ya zhong)

Paeonia japonica (Makino) Miyabe & Takeda; *P.*

obovata var. *glabra* Makino; *P. obovata* subsp.

japonica (Makino) Halda; *P. obovata* var. *japonica*

Makino; *P. obovata* f. *oreogeton* (S. Moore) Kitagawa;

P. oreogeton S. Moore.

Leaves abaxially usually glabrous or sparsely (rarely densely) pubescent or hirsute. $2n = 10^*$, (20*).

Deciduous broad-leaved, mixed broad-leaved, and coniferous forests; 200–2000 m. Anhui, N Guizhou, Hebei, Heilongjiang, SE Henan, NW Hunan, N Jiangxi, E Jilin, Liaoning, SE Nei Mongol, S Sichuan, NW Zhejiang [Japan, Korea, Russia (Far East)].

9b. *Paeonia obovata* subsp. *willmottiae* (Stapf) D. Y. Hong & K. Y. Pan, Pl. Syst. Evol. 227: 134. 2001.

拟草芍药 ni cao shao yao

Paeonia willmottiae Stapf, Bot. Mag. 142: t. 8667.

1916; *P. obovata* var. *willmottiae* (Stapf) Stern.

Leaves abaxially usually densely (rarely sparsely) pubescent or hirsute. $2n = (10^*)$, 20*.

• Deciduous broad-leaved forests; 800–2800 m. SE Gansu, W Henan, W Hubei, S Ningxia, E Qinghai, S Shaanxi, Shanxi, E and N Sichuan.

10. *Paeonia mairei* H. Léveillé, Bull. Acad. Int. Géogr. Bot. 25: 42. 1915.

美丽芍药 mei li shao yao

Paeonia bifurcata Schipczinsky; *P. mairei* f. *oxypetala* (Handel-Mazzetti) W. P. Fang; *P. oxypetala* Handel-Mazzetti.

Herbs perennial, to 1 m tall. Roots thick, attenuate toward tip. Rhizomes ca. 2 cm in diam. Stems glabrous. Proximal leaves 2-ternate; some leaflets segmented; leaflets and segments up to 19, oblong-ovate or oblong-lanceolate, 6–16.5 × 1.8–7 cm, glabrous, base cuneate, apex usually acuminate.

Flowers solitary, terminal, single, 7.5–14 cm wide.

Bracts 1–3, leaflike or linear, to 9 cm. Sepals 3–5, green, broadly ovate, 1–1.5 × 0.9–1.2 cm. Petals 7–9, pink to red, obovate, 3.5–7 × 2–4.5 cm, apex usually rounded.

Filaments purple-red; anthers yellow. Disc yellow, annular. Carpels 2 or 3, sparsely to densely yellow shortly hirsute, sometimes glabrous. Styles to 4 mm; stigmas red. Follicles 3–3.5 × 1–1.2 cm. Fl. Apr–May, fr. Aug. $2n = 20^*$.

• Deciduous broad-leaved forests; 1500–2700 m. SE Gansu, NW Guizhou, SW Hubei, S Shaanxi, C and S Sichuan, NE Yunnan.

11. *Paeonia lactiflora* Pallas, Reise Russ. Reich. 3: 286. 1776.

芍药 shao yao

Paeonia albiflora Pallas; *P. albiflora* Pallas var. *trichocarpa* Bunge; *P. chinensis* Vilmorin (1870), not Oken (1841); *P. lactiflora* var. *trichocarpa* (Bunge) Stern; *P. lactiflora* var. *villosa* M. S. Yan & K. Sun; *P. sinensis* Steudel; *P. yui* W. P. Fang.

Herbs perennial, to 70 cm tall. Roots thick, attenuate toward tip, to 1.3 cm in diam. Stems glabrous. Proximal leaves 2-ternate; all leaflets decurrent at base, terminal ones often 2- or 3-segmented; leaflets and segments up to 15, lanceolate or ovate-lanceolate, 4.5–16 × 1.5–4.8 cm, sparsely pubescent abaxially, bristly along veins adaxially, margin white cartilaginous denticulate, apex acuminate. Flowers usually several per shoot, both terminal and axillary, sometimes only terminal one developed, single (in wild plants) or double (in cultivated plants), 8–13 cm wide. Bracts 4 or 5, lanceolate, unequal. Sepals 3 or 4, broadly ovate or suborbicular, 1–1.5 × 1–1.7 cm. Petals 9–13, white or pink (in wild plants), or varying in color (in cultivated plants), obovate, 3.5–6 × 1.5–4.5 cm. Filaments yellow, 0.7–1.2 cm; anthers yellow. Disc yellow, annular. Carpels 2–5, green or purple, glabrous or rarely tomentose. Follicles oblong-ellipsoid, 2.5–3 × 1.2–1.5 cm. Fl. May–Jun, fr. Aug. $2n = 10$.

Woods, grasslands; 400–2300 m. S Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, S Ningxia, Shaanxi, Shanxi [Japan, Korea, Mongolia, Russia (Far East, Siberia)].

This species is widely cultivated as an ornamental and for medicinal use.

12. *Paeonia emodi* Wallich ex Royle, Ill. Bot. Himal. Mts. 1: 57. 1834.
多花芍药 duo hua shao yao

Paeonia emodi f. *glabrata* (J. D. Hooker & Thomson) H. Hara; *P. emodi* var. *glabrata* J. D. Hooker & Thomson.

Herbs perennial, to 70 cm tall. Stems glabrous. Proximal leaves 2-ternate; some leaflets segmented; leaflets and segments up to 15, oblong-elliptic or oblong-lanceolate, 9–13 × 2–3.5 cm, both surfaces glabrous, base cuneate, decurrent, apex acuminate. Flowers 2–4 per shoot, both terminal and axillary, single, 8–12 cm wide, all or only terminal one fully developed. Bracts 3–6, leaflike, lanceolate. Sepals ca. 3, suborbicular, ca. 1.5 × 1.5 cm, apex caudate. Petals white, obovate, ca. 4.5 × 2.4 cm. Filaments 1.5–2 cm. Disc annular. Carpel 1 (or 2), pale yellow tomentose, rarely glabrous. Follicles ovoid, 2–3.5 × 1–2 cm. Seeds black, globose. Fl. May–Jun, fr. Aug–Sep.

Thickets; 2300–2800 m. S Xizang (Gyirong Xian) [NW India, Kashmir, W Nepal, N Pakistan].

13. *Paeonia sterniana* H. R. Fletcher, J. Roy. Hort. Soc. 84: 327. 1959.

白花芍药 bai hua shao yao

Paeonia emodi Wallich ex Royle subsp. *sterniana* (H. R. Fletcher) Halda.

Herbs perennial, to 90 cm tall, glabrous throughout. Roots thick, attenuate toward tip, to 30 × 1.4 cm. Proximal leaves 2-ternate; leaflets decurrent at base; terminal leaflets segmented, segments again segmented; lateral leaflets unequally 2-segmented, segments linear-oblong or lanceolate, 5–12 × 1–2.5 cm, base cuneate, margin entire or often lobed, apex acuminate; segments and lobes up to 40. Flowers solitary, terminal, single, 8–10 cm wide, sometimes underdeveloped flower buds also present in axils of distal leaves. Bracts 3 or 4, leaflike, unequal. Sepals 3 or 4, ovate-orbicular or orbicular, 2–2.5 × 1.5–2 cm, apex mostly caudate. Petals white or pale pink, obovate, ca. 3.5 × 2 cm. Filaments yellow. Disc yellow, annular. Carpels 2–4, green, glabrous. Stigmas red-purple. Follicles ovoid, 2.5–3 × ca. 1 cm. Fl. May, fr. Sep.

• Woods; 2800–3500 m. SE Xizang.

14. *Paeonia anomala* Linnaeus, Mant. Pl. 2: 247. 1771.

新疆芍药 xin jiang shao yao

Herbs perennial, to 1 m tall. Roots thick, attenuate toward tip, to 50 × 1.5 cm. Stems glabrous. Proximal leaves 2-ternate; leaflets pinnately segmented, base ± decurrent; segments sometimes lobed; segments and lobes linear to linear-lanceolate, 3.5–10 × 0.4–2.1 cm, abaxially usually glabrous, rarely hispid or hirsute along veins and at margin, adaxially hispid or hirsute along veins, apex acuminate. Flowers solitary and terminal, or 2–4 per shoot and both terminal and axillary, single, 7–14 cm wide, sometimes 1–3

underdeveloped flower buds also present in axils of distal leaves. Bracts 2–5, leaflike, unequal. Sepals 3 or 4, ovate-orbicular, 2–2.5 × 1.5–2 cm, apex always or mostly caudate. Petals 6–9, rose to red, very occasionally nearly white, oblong, 3–6.5 × 1.5–3 cm. Filaments 5–10 mm. Disc yellow, annular. Carpels 2–5, sparsely to densely brown-yellow hispid or hirsute, rarely glabrous. Stigma red. Follicles ovoid-ellipsoid, ca. 2–3.1 × 1–1.5 cm. Seeds black, glossy, oblong, ca. 6 × 4 mm. Fl. Apr–Jul, fr. Aug–Sep.

Forests, forest margin grasslands, scrub, subalpine and alpine meadows with shrubs; 1200–3900 m. C and S Gansu, S Ningxia, E Qinghai, S Shaanxi, N Shanxi, W Sichuan, N Xinjiang, E Xizang, Yunnan [NE Kazakhstan, N Mongolia, Russia (NE European part, Siberia)].

Hong et al. (Acta Phytotax. Sin. 32: 349–355. 1994) recognized two species of *Paeonia* in Xinjiang: *P. anomala* (including in synonymy *P. intermedia*) and *P. sinjiangensis* (including in synonymy *P. altaica*).

In fact, *P. sinjiangensis* and *P. altaica* are both synonyms of *P. anomala*, whereas *P. intermedia* is a distinct species.

- 1a. Flowers solitary, terminal, rarely 1 or 2 underdeveloped flower buds also present in axils of distal leaves 14a. subsp. *anomala*
- 1b. Flowers (1 or)2–4 per shoot, both terminal and axillary, usually 1–3 underdeveloped flower buds also present in axils of distal leaves 14b. subsp. *veitchii*

14a. *Paeonia anomala* subsp. *anomala*

新疆芍药(原亚种) xin jiang shao yao (yuan ya zhong)

Paeonia altaica K. M. Dai & T. H. Ying; *P. anomala* var. *nudicarpa* Huth; *P. sinjiangensis* K. Y. Pan; *P. veitchii* subsp. *altaica* (K. M. Dai & T. H. Ying) Halda.

Flowers solitary, terminal, rarely 1 or 2 underdeveloped flower buds also present in axils of distal leaves. Fl. Jun–Jul, fr. Sep. $2n = 10$.

Populus or coniferous forests in valleys; 1200–1800 m. N Xinjiang [NE Kazakhstan, N Mongolia, Russia (NE European part, Siberia)].

14b. *Paeonia anomala* subsp. *veitchii* (Lynch) D. Y. Hong & K. Y. Pan, Novon 11: 317. 2001.

川赤芍 chuan chi shao

Paeonia veitchii Lynch, Gard. Chron, ser. 3, 46: 2.

1909; *P. beresowskii* Komarov; *P. veitchii* var. *beresowskii* (Komarov) Schipczinsky; *P. veitchii* var. *leiocarpa* W. T. Wang & S. H. Wang ex K. Y. Pan; *P. veitchii* var. *uniflora* K. Y. Pan; *P. veitchii* var. *woodwardii* (Stern & Cox) Stern; *P. woodwardii* Stern & Cox.

Flowers (1 or)2–4 per shoot, both terminal and axillary, usually 1–3 underdeveloped flower buds also present in axils of distal leaves. Fl. Apr–Jul, fr. Aug–Sep. $2n = 10^*$.

• Forests, forest margin grasslands, scrub, subalpine and alpine meadows with shrubs, sunny slopes; 1800–3900 m. C and S Gansu, S Ningxia (Liupan Shan), E Qinghai, S Shaanxi (Qin Ling), N Shanxi (Wutai Shan), W Sichuan, E Xizang, Yunnan.

15. *Paeonia intermedia* C. A. Meyer in Ledebour, Fl. Altaic. 2: 277. 1830.

块根芍药 kuai gen shao yao

Paeonia anomala Linnaeus var. *intermedia* (C. A. Meyer) O. Fedtschenko & B. Fedtschenko.

Herbs perennial, to 70 cm tall. Roots cylindric, to 2.5 cm in diam., woody when old; fibrous roots thickened, tuberous. Proximal leaves 2-ternate; leaflets several times segmented, \pm decurrent at base; segments sometimes lobed; segments and lobes linear, 6–16 \times 0.4–1.5 cm, glabrous abaxially, bristly along veins adaxially, apex acuminate. Flowers solitary, terminal, single, 6.5–12 cm wide. Bracts 3, leaflike, unequal.

Sepals 3–5, often red-purple, ovate-orbicular, 1.5–2.5 \times 1–2 cm, apex mostly rounded (at least 2 sepals not caudate). Petals 7–9, purple-red, obovate, 3.5–5.5 \times 1.5–3 cm, apex irregularly incised. Filaments 4–5 mm; anthers yellow, oblong. Disc annular. Carpels (1 or) 2 or 3(–5), glabrous to densely shortly hirsute. Follicles 2–2.5 \times 1.1–1.3 cm, usually yellow shortly hirsute, less frequently glabrous. Seeds black, glossy, oblong, ca. 5 \times 3 mm. Fl. May–Jun, fr. Aug–Sep.

Sparse woods, scrub slopes, grassy slopes; 1100–3000 m. N Xinjiang [Kazakhstan, Kyrgyzstan, Russia (SW Siberia), Tajikistan, Uzbekistan].

