

## 6. DYSOSMA Woodson, Ann. Missouri Bot. Gard. 15: 338, t. 46. 1928.

鬼白属 *gui jiu shu*

Ying Junsheng (应俊生 *Ying Tsun-shen*); David E. Boufford, Anthony R. Brach

Herbs, perennial. Rhizomes creeping, short, stout, with numerous fibrous roots; aerial stems erect, simple, glabrous, with large scales at base. Leaves peltate, large, 3–9-parted or lobed. Inflorescence of few fascicled flowers or a subumbel. Flowers perfect, nutant. Sepals 6, membranous, caducous. Petals 6, dark purplish red. Filaments decumbent, flat; anthers introrsely dehiscent; anther connective wide and usually prolonged; pollen grains 3-colpate, subspheroidal or suboblate, sexine thicker than nexine, foveolate. Pistils solitary; ovary 1-loculed; ovules numerous; stigma globose. Berry red or purplish red. Seeds numerous, without arils.  $2n = 12$ .

Between seven and ten species: China and N Vietnam; seven species (six endemic) in China; three additional species (all endemic, described under *Podophyllum*) are insufficiently known.

*Dysosma* was included within *Podophyllum* by Shaw (in Stearn, Gen. *Epimedium*, 269. 2002).

- 1a. Leaves opposite, flowers attached at base of petiole.
  - 2a. Lobes of leaf apically 3-fid; petals oblong, to 6 cm ..... 7. *D. delavayi*
  - 2b. Lobes of leaf apically not divided; petals obovate-elliptic, ca. 3 cm.
    - 3a. Leaf blade glabrous, palmately lobed, lobes triangular-ovate ..... 5. *D. pleiantha*
    - 3b. Leaf blade pubescent on both surfaces, palmately parted, lobes cuneate-oblong ..... 6. *D. tsayuensis*
- 1b. Leaves alternate, flowers attached near or far from base of blade.
  - 4a. Flowers attached far from base of blade; petals obovate, 1.4–1.6 cm ..... 4. *D. aurantiocaulis*
  - 4b. Flowers attached near base of blade; petals oblong, lanceolate, or obovate, 2.4–10 cm.
    - 5a. Leaf lobes apically 3-fid; petals elliptic-lanceolate ..... 1. *D. majoensis*
    - 5b. Leaf lobes apically not divided; petals spatulate-obovate or oblong-loriform.
      - 6a. Leaves 4–9-lobed or deeply divided; petals spatulate-obovate; berry ca. 4 cm, ellipsoid or ovoid ..... 2. *D. versipellis*
      - 6b. Leaves mostly undivided; petals oblong-loriform; berry 1.7–2.7 cm, globose ..... 3. *D. difformis*

1. *Dysosma majoensis* (Gagnepain) M. Hiroe, Pl. Basho's & Buson's Hokku Lit. 8(3): 328. 1973 [*"majoense"*].

贵州八角莲 *gui zhou ba jiao lian*

*Podophyllum majoense* Gagnepain, Bull. Soc. Bot. France 85: 167. 1938; *Dysosma guangxiensis* Y. S. Wang; *D. lichuanensis* Z. Zheng & Y. J. Su; *D. majoensis* var. *emeiensis* J. L. Wu & P. Zhuang; *P. guangxiense* (Y. S. Wang) J. M. H. Shaw.

Plants ca. 50 cm tall. Rhizomes brown, stout, nodose, fibrous roots numerous. Stems erect, angulate, puberulent. Leaves alternate; petiole 4–20 cm; leaf blade abaxially grayish purple, adaxially dark green, reniform-orbicular, 10–20 × ca. 20 cm, thinly papery, abaxially puberulent, deeply 4–6-divided, lobes 3-fid at apex, margin remotely serrulate. Inflorescence a fascicle or sometimes an umbel. Pedicel grayish white, 1–3 cm, long puberulent. Flowers 2–5, attached near base of blade, purple. Sepals pale green, elliptic, unequal in size, 7–15 mm, glabrous. Petals elliptic-lanceolate, ca. 9 × 1.5 cm. Stamens ca. 1.8 cm; filaments nearly as long as or sometimes shorter than anthers; anther connective conspicuously prolonged. Ovary oblong; stigmas shield-shaped, ca. 1.5 mm in diam. Berry red when mature, oblong. Fl. Apr–Jun, fr. Jun–Sep.

• Forests, bamboo forests; 1300–1800 m. Guangxi, Guizhou, Hubei, Sichuan, Yunnan.

The specific epithet is often misspelled "*majorensis*" in Chinese publications.

2. *Dysosma versipellis* (Hance) M. Cheng ex T. S. Ying, Acta Phytotax. Sin. 17(1): 18. 1979.

八角莲 *ba jiao lian*

*Podophyllum versipelle* Hance, J. Bot. 21: 362. 1883; *P. esquirolii* H. Léveillé.

Plants 40–150 cm tall. Rhizomes stout, with numerous fibrous roots; aerial stems erect, pale green, unbranched, glabrous. Leaves alternate; petiole of lower leaves 12–25 cm, petiole of upper leaves 1–3 cm; leaf blade suborbicular, to 30 cm in diam., thinly papery, abaxially pubescent, venation obviously raised, adaxially glabrous, palmately 4–9-lobed; lobes broadly triangular, ovate, or ovate-oblong, 2.5–4 cm, base 5–7 cm wide, margin remotely serrate, apex acute, not lobed. Inflorescence 5–8-fascicled flowers. Pedicel pendulous, slender, pubescent. Flowers attached near base of blade, red. Sepals oblong-elliptic, 0.6–1.8 cm × 3–8 mm, outside puberulent, inside glabrous, apex acute. Petals spatulate-obovate, ca. 2.5 × 0.8 cm, glabrous. Stamens ca. 1.8 cm; filaments shorter than anthers; anther connective slightly prolonged, glabrous, acute. Ovary ellipsoid, glabrous; style short; stigma shield-shaped. Berry ellipsoid or ovoid, ca. 4 × 3.5 cm. Seeds numerous. Fl. Mar–Jun, fr. May–Sep.  $2n = 12^*$ .

• Forests, thickets, shaded and wet places by streams, bamboo forests; 300–2400 m. Anhui, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shanxi, Yunnan, Zhejiang.

*Podophyllum versipelle* was treated by Shaw (in Stearn, Gen. *Epimedium*, 276–282. 2002) as comprising two subspecies: subsp. *versipelle* ("Leaf lobes elobulate, upper leaf with 4–7 lobes on one side, lobes shallow 1/5–1/3 of radius; inflorescence 4–9 flowered; pedicels with hairs") and subsp. *boreale* J. M. H. Shaw ("Leaf lobes often with lobules, upper leaf with 4 or 5 lobes on one side, lobes deep, 1/2–2/3 of

radius; inflorescence 4–10(–19) flowered; pedicels glabrous or rarely hairy”).

Within *Podophyllum versipelle* subsp. *boreale*, Shaw (loc. cit.) recognized two varieties: *P. versipelle* var. *boreale* (lobes of leaves with convex margins, lobes entire or trilobulate; pedicels and leaves abaxially glabrous) and *P. versipelle* var. *sichuanense* J. M. H. Shaw (lobes of leaves with concave margins, lobes usually trilobulate; pedicels and leaves abaxially hairy).

**3. *Dysosma difformis*** (Hemsley & E. H. Wilson) T. H. Wang ex T. S. Ying, Acta Phytotax. Sin. 17(1): 19. 1979.

小八角莲 xiao ba jiao lian

*Podophyllum difforme* Hemsley & E. H. Wilson, Bull. Misc. Inform. Kew 1906: 152. 1906; *Dysosma tonkinensis* (Gagnepain) Hiroe; *P. tonkinense* Gagnepain; *P. triangulum* Handel-Mazzetti.

Plants 15–30 cm tall. Rhizomes usually terete, slender, with numerous fibrous roots. Stems erect, sometimes purplish red, glabrous. Leaves alternate, obliquely peltate, unequal in size, sharply diversiform; petioles unequal in length, 3–11 cm, glabrous; leaf blade adaxially sometimes purplish red, 5–11 × 7–15 cm, thinly papery, both surfaces glabrous, base often rounded, entire or lobed, margin sparsely inconspicuously serrate. Inflorescence 2–5-fascicled flowers. Pedicel 1–2 cm, nodding, sparsely white pubescent. Flowers attached near base of blade. Sepals oblong-lanceolate, 2–2.5 cm × 2–5 mm, outside pubescent, inside glabrous, apically acuminate. Petals pale brownish red, oblong-loriform, 4–5 × 0.8–1 cm, glabrous, apex rounded. Stamens ca. 2 cm; filaments ca. 0.8 cm; anthers ca. 1.2 cm; anther connective conspicuously prolonged. Pistil ca. 0.9 cm; ovary urceolate; style ca. 2 mm; stigma shield-shaped. Berry globose, 1.7–2.7 cm. Fl. Apr–Jun, fr. Jun–Sep.

Dense forests; 700–1800 m. Guangxi, Guizhou, Hubei, Hunan, Sichuan [Vietnam].

Shaw (in Stearn, Gen. *Epimedium*, 280. 2002) treated *Podophyllum tonkinense* as a synonym of *P. versipelle* subsp. *versipelle*.

**4. *Dysosma aurantiocaulis*** (Handel-Mazzetti) Hu, Bull. Fan Mem. Inst. Biol., Bot. 8: 37. 1937.

云南八角莲 yun nan ba jiao lian

*Podophyllum aurantiocaulis* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 163. 1924; *Dysosma furfuracea* S. Y. Bao; *D. mairei* (Gagnepain) Hiroe; *P. aurantiocaulis* subsp. *furfuraceum* (S. Y. Bao) J. M. H. Shaw; *P. mairei* Gagnepain; *P. sikkimense* R. Chatterjee & Mukerjee; *P. sikkimense* var. *majus* R. Chatterjee & Mukerjee.

Plants 30–50 cm tall. Rhizomes brown, short, stout, with numerous fibrous roots. Stems erect, pale stramineous, 3–5 mm in diam., angulate, glabrous. Leaves alternate; petiole of lower leaves 12–22 cm, petiole of upper leaves 3–7 cm, all petioles angulate; leaf blade abaxially pale green, adaxially deep green, suborbicular or reniform in gross outline, sharply diversiform, 7–8 × 13–15 cm, thinly papery, abaxially on veins scurfy squamulate, sometimes mixed pubescent, adaxially glabrous, 5–8-lobed, lobe margin scarcely inconspicuously serrulate. Inflorescence 2–5-fascicled flowers. Pedicel nutant, 3–6 cm, gla-

brous. Flowers attached far from base of blade, purple or pink. Sepals narrowly oblong, 10–12 × 4–5 mm, glabrous. Petals obovate or suborbicular, 1.4–1.6 × 1–1.2 cm, apex rounded. Stamens ca. 8 mm; filaments flat, shorter than anthers; apex of anther connective not prolonged. Pistil ca. 8 mm; ovary subglobose; style ca. 1 mm; stigma disciform, margin rugosely undulate. Berry pale green (immature), subglobose, ca. 8 mm in diam. Seeds numerous. Fl. May–Jun, fr. Jun–Aug.

• Deciduous broad-leaved forests; 2800–3000 m. Yunnan [?Myanmar].

Shaw (in Stearn, Gen. *Epimedium*, 299–306. 2002) recognized two subspecies of *Podophyllum aurantiocaulis*, which he separated into subsp. *aurantiocalis* (“Leaf lobes long, obovate to lanceolate; sinuses deep, penetrating 1/2–2/3 of radius; flowers usually in petiole fork; anthers 5–7.5(–9) mm long”) and subsp. *furfuraceum* (“Leaf lobes short, triangular, sinuses shallow penetrating 1/4–1/3 of radius; flowers borne on petiole; anthers 3.5–4.5 mm”).

**5. *Dysosma pleiantha*** (Hance) Woodson, Ann. Missouri Bot. Gard. 15: 339. 1928.

六角莲 liu jiao lian

*Podophyllum pleianthum* Hance, J. Bot. 21: 175. 1883; *Dysosma chengii* (S. S. Chien) Hiroe; *D. hispida* (K. S. Hao) Hiroe; *P. chengii* S. S. Chien; *P. hispidum* K. S. Hao; *P. onzoi* Hayata; *P. pleianthum* var. *album* Masamune.

Plants 20–60(–80) cm tall. Rhizomes creeping, stout, nodose, with numerous fibrous roots; aerial stems erect, solitary, glabrous. Leaves opposite; petiole 10–28 cm, angulate, glabrous; leaf blade abaxially pale yellowish green, adaxially dark green, usually shiny, suborbicular in gross outline, 16–33 cm in diam., papery, both surfaces glabrous, 5–9-lobed; lobes broadly triangular-ovate, margin spinose-serrulate, apex acute. Inflorescence 5–8-fascicled flowers. Pedicel 2–4 cm, often nodding, glabrous. Flowers attached at base of petiole, purplish red. Sepals caducous, elliptic-oblong or ovate-oblong, 1–2 × ca. 0.8 cm. Petals 6–9, purplish red, obovate-oblong, 3–4 × 1–1.3 cm. Stamens falcate-inflexed, ca. 2.3 cm; filaments flat, 7–8 mm; anthers ca. 1.5 cm; anther connective prolonged. Ovary oblong, ca. 1.3 cm; ovules numerous; style ca. 3 mm. Berry purplish black, obovoid-oblong or ellipsoid, ca. 3 × 2 cm. Fl. Mar–Jun, fr. Jul–Sep.  $2n = 12^*$ .

• Forests, streamsides, grassy slopes in valleys; 400–1600 m. Anhui, Fujian, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Zhejiang.

Shaw (in Stearn, Gen. *Epimedium*, 279. 2002) treated *Podophyllum hispidum* as a synonym of *P. versipelle* subsp. *versipelle*, and, based on flower color, recognized two varieties of *P. pleianthum*: var. *pleianthum* (“petals dark maroon red”) and var. *album* (“petals white”).

**6. *Dysosma tsayuensis*** T. S. Ying, Acta Phytotax. Sin. 17(1): 20. 1979.

西藏八角莲 xi zang ba jiao lian

Plants 50–90 cm tall. Rhizomes creeping, stout, with numerous fibrous roots; aerial stems 35–55 cm high, unbranched, glabrous, angulate, scaly brown at base. Leaves opposite; petiole centrally attached, 11–25 cm; leaf blade abaxially pale yellowish green, adaxially deep green, orbicular or suborbicular in

gross outline, papery, both surfaces strigose, palmately 5–7-parted to ca. midway; lobes cuneate-oblong, 8–12 × 4–7 cm, margin spinose-serrulate, ciliolate, apex acute. Inflorescence 2–6-fascicled flowers. Pedicel 2–4 cm, glabrous. Flowers attached at base of petiole, large, 4–5 cm in diam. Sepals 6, caducous, elliptic, 1.3–1.5 cm × 5–6 mm. Petals 6, white, obovate-elliptic, 2.7–2.8 × 1–1.1 cm. Stamens ca. 1 cm; filaments flat, ca. 2 mm; anthers introrse; anther connective wide, not prolonged. Pistils nearly as long as stamens; ovary stipitate; ovules numerous; style ca. 2 mm; stigma inflated, rugosely undulate. Berry red, ovoid or ovoid-ellipsoid, ca. 3 cm; style ± persistent. Seeds numerous. Fl. May, fr. Jul.

• *Picea*, *Abies*, and *Pinus* forests and openings in forests; 2500–3500 m. Xizang.

Shaw (in Stearn, Gen. *Epimedium*, 304. 2002) treated *Dysosma tsayuensis* as a synonym of *Podophyllum aurantiocaulis* subsp. *aurantiocalis*.

**7. *Dysosma delavayi*** (Franchet) Hu, Bull. Fan Mem. Inst. Biol., Bot. 8: 37. 1937.

川八角莲 chuan ba jiao lian

*Podophyllum delavayi* Franchet, Bull. Mus. Hist. Nat. (Paris) 1: 63. 1895; *Dysosma veitchii* (Hemsley & E. H. Wilson) L. K. Fu ex T. S. Ying; *D. veitchii* var. *longipetala* J. L. Wu & P. Zhuang; *P. delavayi* var. *longipetalum* J. M. H. Shaw; *P. veitchii* Hemsley & E. H. Wilson.

Plants 20–50 cm tall. Rhizomes creeping, short, stout, fibrous roots slightly stout. Leaves opposite; petiole white, 7–10 cm, pubescent; leaf blade abaxially pale yellowish green or dark purplish red, adaxially dark green, sometimes purplish green, suborbicular in gross outline, to 22 cm in diam., papery, abaxially venation pubescent, often ultimately glabrous, adaxially glabrous, 4- or 5-parted to ca. midway; lobes cuneate-oblong, apex 3-lobed, lobules subtriangular, margin scarcely spinulose-subserulate, apex acuminate. Inflorescence 2–6-fascicled flowers, rarely umbellate. Pedicel nutant, 1.5–2.5 cm, densely white pubescent. Flowers large, attached at base of petiole, dark purplish red. Sepals caducous, oblong-obovate, ca. 2 cm, outside pubescent. Petals purplish red, oblong, 4–6 cm, apex rounded, obtuse. Stamens ca. 3 cm; filaments flat, shorter than anthers; anther connective conspicuously prolonged, to 9 mm. Pistils short, only ca. 1/2 as long as stamens; ovary ellipsoid; stigma large, rugosely undulate. Berry scarlet when mature, obovoid-ellipsoid, 3–5 × 3–3.5 cm. Seeds numerous, white. Fl. Apr–May, fr. Jun–Sep.  $2n = 12^*$ .

• Forests, streamsides, shaded wet places; 1200–2500 m. Guizhou, Sichuan, Yunnan.

Shaw (in Stearn, Gen. *Epimedium*, 294–295. 2002) reported *Podophyllum delavayi* from S Shaanxi and recognized two varieties of the species: var. *delavayi* (“petals 3.5–7 cm long, 3–5 mm wide”) and var. *longipetalum* (“petals 8–10 cm long, ca. 9 mm wide”).

#### Insufficiently known species

Shaw (in Stearn, Gen. *Epimedium*, 283, 285, 297. 2002) recognized three species of *Podophyllum*, below, that we have not seen, or for which we have seen inadequate material. The descriptions and key characters (in quotes) provided here are taken from Shaw’s treatment.

***Podophyllum glaucescens*** J. M. H. Shaw, New Plantsman 6(3): 162. 1999.

Plants to 40 cm tall. Mature leaves 2, glabrous, membranous, abaxially glaucescent, adaxially dark green, shiny; lower leaf trapezoid, 4-lobed, sinuses shallowly undulate, margin minutely toothed, apex of lobes shortly acuminate; upper leaf roughly pentagonal, with 4 obvious and 2 obscure lobes, ca. 20 cm across. Inflorescence inserted on petiole of upper leaf ca. 2 cm below blade, 7-flowered. Pedicel thin, 4–6 cm, swollen near apex, densely hairy. Sepals narrowly ovate, ca. 14 × 6 mm, margins membranous. Petals 6, reddish purple, ovate-lanceolate, 10–12 × 5–6 mm, apex acute or slightly toothed. Stamens 6, ca. 1 cm; filaments flattened, 2–3 mm; anthers 6–7 mm, apical mucro 1.5–2 mm. Ovary ovoid, ca. 5 × 3 mm; style 2–3 mm; stigma peltate, corrugated, ca. 3 mm in diam. Mature fruit and seeds unknown.

• Moist woodlands; ca. 1200 m. Guangxi.

On the basis of petal size and leaf blade color, Shaw (in Stearn, Gen. *Epimedium*, 285–286. 2002) distinguished *Podophyllum glaucescens* (“petals less than 1.2 cm; leaves abaxially glaucous”) from *P. difforme* and *P. versipelle* (“petals more than 1.5 cm; leaves abaxially pale green”). Shaw (loc. cit.) also speculated that *P. glaucescens* may be of hybrid origin from a cross between those two species, which he distinguished from each other by their leaf lobes and flower number (*P. difforme* with “upper leaf irregularly and indistinctly lobed; inflorescence 1–3-flowered” vs. *P. versipelle* with “upper leaf 4–7-lobed; inflorescence 4–9-flowered”).

***Podophyllum hemsleyi*** J. M. H. Shaw & Stearn, New Plantsman 6(3): 161. 1999.

Plants to 40 cm. Stems grooved. Leaves 2, abaxially glaucous green, adaxially dark green, to 35 cm in diam., lobed to 4/5 of radius, sinuses rounded, lobes spatulate-oblong, abaxially with prominent main veins, margin with fine teeth, apex of lobes rounded, tip acute to acuminate. Inflorescence inserted on petiole ca. 2 cm below blade, 4-flowered. Pedicel glabrous, 3–4 cm, dilated to 2 mm wide below receptacle. Sepals ovate-lanceolate, 14–16 mm, outer sepals 6–8 mm wide, inner sepals 3–4 mm wide, glabrous, entire, apex rounded. Petals dark red, 3–3.5 cm, oblong-spatulate, widest below apex, entire, apex rounded. Stamens 6; filaments flattened, 7–8 mm; anthers 9–10 mm. Ovary globose to pyriform, 6–7 × ca. 4 mm; style 2–3 × ca. 1 mm; stigma globose, corrugated, 3–5 mm across. Berry and seeds unknown.

• Forests; 1500–1800 m. W Hubei.

This is apparently known from only three collections made by E. H. Wilson between 1901 and 1909. It was reported by Shaw to be most similar to *Podophyllum versipelle* subsp. *boreale*. Shaw separated *P. hemsleyi* by its “lobes of leaves spatulate-oblong, to 4/5 of leaf radius; inflorescence 4-flowered, on petiole 2 cm below lamina” and *P. versipelle* by its “lobes of leaves obovate to oblong, 1/2–2/3 of leaf radius; inflorescence 4–19-flowered, on petiole just below upper leaf.”

***Podophyllum trilobulum*** J. M. H. Shaw, New Plantsman 7: 158. 2000 [“*trilobulus*”].

Plants 20–25(–40) cm tall. Stem and petioles with fine short linear hairs. Leaves 2, lobed, lobes trilobulate, margin finely toothed; lower leaf 18–28 cm wide, lobes 7, sinuses to 2/3 of radius, rounded, keyhole-shaped; upper leaf ca. 15 cm wide, lobes 5, strongly retarded on adaxial margin, reduced to few large teeth. Inflorescence inserted at or above midpoint on petiole of upper leaf, 2–5-flowered. Pedicel 2.2–2.5 cm, apically dilated, brown pilose, hairs linear. Petals purplish red, ovate-lanceolate, tapering gradually to acute apex, 4–5 × 8–10 mm. Anthers ca. 6 mm. Fruit unknown.

- Forests; ca. 1600 m. Sichuan (Emei Shan).

*Podophyllum trilobulum* is most similar to *Dysosma delavayi*. Shaw separated *P. delavayi* by its “inflorescence in fork of petioles” and *P. trilobulum* by its “inflorescence along petiole just below leaf, at or above midpoint of upper leaf or held above leaves on elongated peduncle.”

