

9. **SAPINDUS** Linnaeus, Sp. Pl. 1: 367. 1753, nom. cons.

无患子属 *wu huan zi shu*

*Dittelasma* J. D. Hooker.

Trees, rarely shrubs, monoecious. Leaves paripinnate, rarely simple, alternate, estipulate; leaflets entire, opposite or alternate. Thyrses large, many branched, terminal or fascicled at branchlet apices; bracts and bracteoles subulate, small. Flowers unisexual, actinomorphic or zygomorphic. Sepals 5 or sometimes 4, imbricate, outer 2 smaller. Petals 5, clawed, with 2 earlike scales at base or margin thickened adaxially, or 4 (*S. sect. Dittelasma*), without claw, with 1 large scale at base adaxially. Disk acetabuliform or semilunar, fleshy, sometimes lobed. Stamens (male flowers) 8, rarely more or fewer, exserted; filaments hairy below middle or at base. Ovary (female flowers) obovoid or turbinate, usually 3-lobed, 3-loculed; ovules 1 per locule, ascending; style terminal. Fruit parted into 3 schizocarps, usually 1 or 2 developed, developed schizocarps subglobose or obovoid, abaxially slightly flat, adaxially with 1 or 2 semilunar sterile schizocarps; schizocarps free when mature, broadly ellipsoid or subglobose; pericarp fleshy, containing abundant saponin, long sericeous at place bearing seed adaxially. Seeds black or pale brown, ellipsoid or subglobose; testa osseous, pseudotesta absent; hilum linear; embryo arched, cotyledons thick.  $2n = 22, 30$ .

About 13 species: warm regions of Asia, Australia, and North and South America; four species (one endemic) in China.

- 1a. Flowers actinomorphic; petals 5, basally long clawed, with 2 earlike scales at base adaxially ..... 1. *S. saponaria*
- 1b. Flowers zygomorphic; petals 4, not clawed, with 1 large scale at base adaxially.
  - 2a. Sepals and petals abaxially densely sericeous; flower buds broadly ovoid; leaflets 7–12 pairs, oblong-lanceolate ..... 2. *S. rarak*
  - 2b. Sepals and petals abaxially pilose; flower buds globose; leaflets ovate or ovate-oblong.
    - 3a. Leaflets 4–7 pairs, abaxially villous or subglabrous ..... 3. *S. delavayi*
    - 3b. Leaflets 3 or 4 pairs, abaxially tomentose ..... 4. *S. tomentosus*

1. **Sapindus saponaria** Linnaeus, Sp. Pl. 1: 367. 1753.

无患子 *wu huan zi*

*Sapindus abruptus* Loureiro; *S. mukorossi* Gaertner.

Trees, deciduous, to 20 m tall. Bark grayish brown or blackish brown; young branches green, glabrous. Leaves with petiole 25–45 cm or longer, axis slightly flat, grooved adaxially, glabrous or pilosulose; leaflets 5–8 pairs, usually subopposite; petiolule ca. 5 mm; blades adaxially shiny, narrowly elliptic-lanceolate or slightly falcate, 7–15 × 2–5 cm, thinly papery, abaxially glabrous or pilosulose, lateral veins 15–17 pairs, nearly parallel, dense, slender, base cuneate, slightly asymmetrical, apex acute or shortly acuminate. Inflorescences terminal, conical. Flowers actinomorphic, small. Pedicels very short. Sepals ovate or oblong-ovate, larger ones ca. 2 mm, abaxially pilose at base. Petals 5, lanceolate, ca. 2.5 mm, abaxially villous at base or subglabrous, long clawed; scales 2, earlike, at base adaxially. Disk acetabuliform, glabrous. Stamens 8, exserted; filaments ca. 3.5 mm, densely villous below middle. Ovary glabrous. Fertile schizocarps orange, black when dry, subglobose, 2–2.5 cm in diam. Fl. spring, fr. summer–autumn.

Usually cultivated by temples, in gardens, and alongside villages. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Myanmar, New Guinea, Thailand, N Vietnam].

This species is used medicinally.

2. **Sapindus rarak** Candolle, Prodr. 1: 608. 1824.

毛瓣无患子 *mao ban wu huan zi*

Trees, deciduous, ca. 20 m tall. Branches strong, stout,

grooved, grayish yellow pubescent when young. Leaves with petiole 25–40 cm or longer, axis terete, often red when dry; leaflets 7–12 pairs, subopposite; petiolules 5–8 mm; blades adaxially slightly shiny, oblong or ovate-lanceolate, sometimes falcate, 7–13 × 1.5–4 cm, usually thinly papery, glabrous or densely appressed villous, lateral veins very dense, slender, slightly prominent on both surfaces, base obtuse, apex acute or sometimes nearly acuminate. Inflorescences terminal, erect, tower-shaped, main rachis deeply grooved, shortly golden tomentose. Flowers zygomorphic, slightly large; buds broadly ovoid. Pedicels ca. 1.5 mm. Sepals 5, oblong or broadly ovate, larger ones ca. 3 mm, subleathery, abaxially golden sericeous-tomentose. Petals 4, oblanceolate, ca. 3.8 mm, tomentose; scales large, nearly as long as 2/3 of petals, margin densely villous. Disk semilunar, thick. Filaments densely shortly hispid. Fertile schizocarps dark red or orange-red, globose, ca. 2.5 cm in diam. Fl. summer, fr. early autumn.

Sparse forests; 500–2100 m. Taiwan, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, W Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

This species is used medicinally and for timber.

- 1a. Leaf axis and abaxial surface of leaflets glabrous ..... 2a. var. *rarak*
- 1b. Leaf axis and abaxial surface of leaflets densely appressed villous ..... 2b. var. *velutinus*

2a. **Sapindus rarak** var. *rarak*

毛瓣无患子(原变种) *mao ban wu huan zi* (*yuan bian zhong*)

*Dittelasma rarak* (Candolle) Hiern.

Leaf axis and abaxial surface of leaflets glabrous.

Sparse forests; 500–1700 m. Taiwan, Yunnan [Bhutan, Cambodia,

India, Indonesia, Laos, W Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam].

**2b. *Sapindus rarak* var. *velutinus*** C. Y. Wu & T. L. Ming, Fl. Yunnan. 1: 261. 1977 [“*velutina*”].

石屏无患子 shi ping wu huan zi

Leaf axis and abaxial surface of leaflets densely appressed villous.

- Sparse forests; 1600–2100 m. Yunnan (Shiping).

**3. *Sapindus delavayi*** (Franchet) Radlkofer, Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 20: 233. 1890.

川滇无患子 chuan dian wu huan zi

*Pancovia delavayi* Franchet, Bull. Soc. Bot. France 33: 461. 1886.

Trees, deciduous, ca. 10 m tall. Bark black-brown; branches pubescent. Leaves with petiole 25–35 cm or longer, axis pilose; leaflets 4–6(or 7) pairs, opposite or sometimes nearly alternate; petiolules usually less than 1 cm; blades ovate or ovate-oblong, bilaterally often asymmetrical, 6–14 × 2.5–5 cm, papery, slightly nitid, only villous on midvein and lateral veins, abaxially sparsely villous or subglabrous, rarely glabrous, lateral veins to 18 pairs, slender, base obtuse, apex acute. Inflorescences terminal, erect, often 3 × branched, main rachis and branches stronger, villous. Flowers zygomorphic; buds globose. Pedicels ca. 2 mm. Sepals 5, smaller ones broadly ovate, 2–2.5 mm, larger ones oblong, ca. 3.5 mm, base of abaxial surface and margin villous. Petals 4(5 or 6), narrowly lanceolate, ca. 5.5 mm; scales large, nearly as long as 2/3 of petals, margin densely tomentose. Disk semilunar, thick. Stamens 8, slightly exerted. Fertile schizocarps yellow, subglobose, ca. 2.2 cm in diam. Fl. early summer, fr. late autumn.

- Forests; 1200–2600 m. Guizhou, Hubei, Shaanxi, Sichuan, Yunnan.

This species is used medicinally and for timber.

**4. *Sapindus tomentosus*** Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 44: 204. 1875.

绒毛无患子 rong mao wu huan zi

*Pancovia tomentosa* (Kurz) Kurz.

?Trees. Branches terete, grooved, pale yellow pubescent, with scattered, glaucous lenticels. Leaves with petiole ca. 45 cm, axis pale yellow tomentose; leaflets 3 or 4 pairs, opposite or alternate; petiolules 8–10 mm, stout, tomentose; blades obliquely ovate-oblong, 10–16 × 5–6.5 cm, papery, abaxially densely shortly tomentose, adaxially hairy only on veins, lateral veins ascending, slightly prominent on both surfaces, reticulate veins visible, base rounded or sometimes those at lower part of axis subcordate, apex acuminate or acute, sometimes slightly obtuse. Inflorescences ca. 20 cm or longer, shortly tomentose. Flowers zygomorphic; buds globose. Sepals 5, oblong-lanceolate, abaxially pilose, apex acute. Petals 4, narrowly cuneate, with 2-lobed, densely villous scales at base adaxially. Disk semilunar. Filaments villous. Fertile schizocarps subglobose, slightly flat abaxially, ca. 2.5 cm wide, ca. 1.8 cm thick.

- S and W Yunnan [Myanmar].

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