

## 2. HOVENIA Thunberg, Nov. Gen. Pl. 7. 1781.

枳椇属 zhi ju shu

Deciduous trees or rarely shrubs, to 25 m tall. Young branches often pilose or tomentose. Leaves alternate, long petiolate, 3-veined from base, primary vein with 4–8 pairs of secondary veins, leaf base ± oblique, margin serrate. Flowers white or yellow-green, bisexual, 5-merous, in terminal or axillary, cymose panicles. Calyx tube hemispherical; lobes triangular, adaxially ± distinctly keeled. Petals elliptic to ovate, shortly clawed at base, rarely slightly emarginate apically, often ± completely enfolding stamens, ± widely reflexed during anthesis. Stamens enfolded by petals; filaments lanceolate-linear; anthers dorsifixed. Disk subrounded, thick, fleshy, often ± densely pubescent, rarely glabrous, filling calyx tube. Ovary semi-inferior, nearly completely immersed in disk, 3-loculed, with 1 ovule per locule; style 2- or 3-fid, ± deeply branched. Drupe subglobose, glabrous to densely hairy, base with persistent calyx tube, apex with rudimentary style; mesocarp leathery, often separating from membranous endocarp; peduncles and pedicels of infructescence becoming distinctly fleshy and juicy at fruit maturity. Seeds 3, brownish to blackish, shiny, obovate to orbicular, often spotted with minute pits.

Three species: Bhutan, China, India, Japan, Korea, Myanmar, Nepal; three species in China.

The hard timber with fine-grained wood is good for making furniture. The dilating peduncles of the infructescence are sweet and edible. The seeds are used medicinally.

- 1a. Sepals and fruit densely ferruginous tomentose ..... 3. *H. trichocarpa*
- 1b. Sepals and fruit glabrous, rarely pilose.
  - 2a. Flowers in terminal, or rarely axillary, asymmetrical cymose panicles; style undivided to shortly branched; fruit black at maturity, 6.5–7.5 mm in diam.; leaf margin irregularly or coarsely serrate ..... 1. *H. dulcis*
  - 2b. Flowers in terminal or axillary, symmetrical, dichasial cymose panicles; style deeply branched to at least half of its length; fruit yellow at maturity, 5–6.5 mm in diam.; leaf margin shallowly obtusely serrulate ..... 2. *H. acerba*

### 1. *Hovenia dulcis* Thunberg, Nov. Gen. Pl. 8. 1781.

北枳椇 bei zhi ju

*Hovenia dulcis* var. *glabra* Makino; *H. dulcis* var. *latifolia* Nakai ex Y. Kimura.

Trees, rarely shrubs, deciduous, to 10 m tall. Branchlets brown or black-purple, glabrous, with inconspicuous lenticels. Petiole 2–4.5 cm, glabrous; leaf blade ovate, broadly oblong, or elliptic-ovate, 7–17 × 4–11 cm, papery or thickly membranous, both surfaces glabrous or abaxially pilose on major veins, base truncate, rarely cordate or subrounded, margin irregularly serrate or coarsely serrate, rarely shallowly serrate, apex shortly acuminate or acuminate. Flowers yellow-green, 6–8 mm in diam., in terminal, or rarely axillary, asymmetrical cymose panicles; rachis and pedicels glabrous. Sepals ovate-triangular, 2.2–2.5 × 1.6–2 mm, glabrous. Petals clawed, obovate-spatulate, 2.4–2.6 × 1.8–2.1 mm. Disk sparsely pilose. Ovary globose; style shortly 3-fid, 2–2.2 mm, glabrous. Fruit a 3-seeded nut, black at maturity, subglobose, 6.5–7.5 mm in diam., glabrous; peduncles and pedicels becoming fleshy and juicy at fruit maturity. Seeds deep brown or black-purple, 5–5.5 mm in diam. Fl. May–Jul, fr. Aug–Oct.

Secondary forests, also cultivated in gardens; 200–1400 m. Anhui, Gansu, Hebei, Henan, NW Hubei, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, N Sichuan [Japan, Korea, Thailand].

The fleshy rachis of the infructescence is sweet and edible and is used for making wine and candy. The timber is fine and hard and is used for building construction and fine furniture.

### 2. *Hovenia acerba* Lindley, Bot. Reg. 6: t. 501. 1820.

枳椇 zhi ju

Trees large, 10–25 m tall. Branchlets brown or black-purple, brownish pilose or glabrous, with conspicuous white lenticels. Petiole 2–5 cm, glabrous; leaf blade broadly ovate, elliptic-ovate, or cordate, 8–17 × 6–12 cm, thickly papery to papery, abaxially glabrous or pilose on veins or in vein axils, adaxially glabrous, base truncate or cordate, rarely subrounded or broadly cuneate, margin finely serrulate, in upper or nearly terminal leaves ± conspicuously dentate, rarely subentire, apex acuminate. Inflorescences brownish pilose. Flowers 5–6.5 mm in diam., in terminal or axillary, symmetrical, dichasial cymose panicles. Sepals 1.9–2.2 × 1.3–2 mm, glabrous. Petals clawed, elliptic-spatulate, 2–2.2 × 1.6–2 mm. Disk pubescent. Style 1.7–2.1 mm, ± deeply branched, glabrous or pilose. Fruit yellow-brown or brown at maturity, subglobose, 5–6.5 mm in diam., glabrous or pilose; fruiting peduncles and pedicels dilated and ± fleshy. Seeds dark brown or blackish purple, 3.2–4.5 mm in diam. Fl. May–Jul, fr. Aug–Oct.

Forests, forest margins, slopes, open places, also often cultivated in gardens or by houses; below 2100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, SE Xizang, Yunnan [Bhutan, India, Myanmar, Nepal].

The fine, hard timber is good for building construction and making fine wood furniture. The fruiting rachis is thick, rich in sugar, and edible; it is used medicinally and for making wine and sugar.

- 1a. Fruit and style glabrous ..... 2a. var. *acerba*
- 1b. Fruit and style pilose ..... 2b. var. *kiukiangensis*

### 2a. *Hovenia acerba* var. *acerba*

枳椇(原变种) zhi ju (yuan bian zhong)

*Hovenia dulcis* Thunberg var. *acerba* (Lindley) Sengupta

& Safui; *H. inaequalis* Candolle; *H. parviflora* Nakai & Y. Kimura; *Ziziphus esquirolii* H. Léveillé.

Fruit and style glabrous.

Sparse forests, forest margins, slopes, open places, also often cultivated in gardens or by houses; below 2100 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Yunnan [Bhutan, India, Myanmar, Nepal].

**2b. *Hovenia acerba* var. *kiukiangensis*** (Hu & Cheng) C. Y. Wu ex Y. L. Chen & P. K. Chou, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 5: 87. 1979.

俄江枳椇 *qiu jiang zhi ju*

*Hovenia kiukiangensis* Hu & W. C. Cheng, Bull. Fan Mem. Inst. Biol., n.s., 1: 195. 1948.

Lower part of style and fruit pilose. Fl. Jun–Jul, fr. Sep–Oct.  $2n = 24^*$ .

• Evergreen forests, mixed forests; 600–1800 m. SE Xizang, NW and S Yunnan.

**3. *Hovenia trichocarpa*** Chun & Tsiang, Sunyatsenia 4: 16. 1939.

毛果枳椇 *mao guo zhi ju*

Trees, medium-sized to large, deciduous, to 18 m tall. Branchlets brownish or blackish purple, glabrous, with conspicuous lenticels. Petiole 2–4 cm, glabrous or pilose; leaf blade oblong-ovate, broadly elliptic-ovate, or oblong, rarely subrounded, 12–18 × 7–15 cm, papery, abaxially densely tomentose to pilose on major veins, adaxially glabrous, base truncate and subrounded, or cordate, margin crenate-serrate or obtusely serrate, rarely subentire, apex acuminate. Inflorescence densely ferruginous or yellow-brownish tomentose. Flowers yellow-green, 7.5–8.5 mm in diam., ferruginous pilose, in terminal or axillary dichasial cymes. Sepals 2.8–3 × 2.1–2.6 mm, conspicuously ferruginous pilose. Petals ovate-spatulate, 2.8–3 × 1.8–2 mm, clawed at base, claw 0.8–1.1 mm. Disk densely ferruginous villous. Styles 1–1.8 mm, villous basally, deeply divided up to base. Fruiting peduncles and pedicels dilating, ferruginous tomentose. Fruit yellow-brown or brown at maturity, subglobose. Seeds black, blackish purple, or brown, subglobose, 4–5.5 mm in diam. Fl. May–Jun, fr. Aug–Oct.

Mountain forests, dense forests on slopes; 600–1300 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang [Japan].

- 1a. Leaves densely yellow-brown or yellow-gray tomentose adaxially ..... 3a. var. *trichocarpa*  
1b. Leaves glabrous on both surfaces or pilose on veins adaxially ..... 3b. var. *robusta*

**3a. *Hovenia trichocarpa* var. *trichocarpa***

毛果枳椇(原变种) *mao guo zhi ju* (yuan bian zhong)

*Hovenia fulvotomentosa* Hu & F. H. Chen; *H. trichocarpa* var. *fulvotomentosa* (Hu & Cheng) Y. L. Chen & P. K. Chou.

Leaves densely yellow-brown or yellow-gray tomentose adaxially.

• Mountain forests; 600–1300 m. N Guangdong, Guizhou, Hubei, Hunan, Jiangxi.

**3b. *Hovenia trichocarpa* var. *robusta*** (Nakai & Y. Kimura) Y. L. Chen & P. K. Chou in Y. L. Chen, Fl. Reipubl. Popularis Sin. 48(1): 93. 1982.

光叶毛果枳椇 *guang ye mao guo zhi ju*

*Hovenia robusta* Nakai & Y. Kimura, Bot. Mag. (Tokyo) 53: 479. 1939.

Leaves glabrous on both surfaces or pilose on veins adaxially.

Dense forests on slopes; 600–1100 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Zhejiang [Japan].

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