

## 7. MACLURA Nuttall, Gen. N. Amer. Pl. 2: 233. 1818, nom. cons.

柘属 zhe shu

*Cudrania* Trécul, nom. cons.; *Ioxylon* Rafinesque, nom. rej.; *Vanieria* Loureiro, nom. rej.

Trees, small trees, shrubs, scandent shrubs, or woody vines, evergreen or deciduous, with latex; dioecious. Spines usually present at least on juvenile growth, axillary, straight or curved. Stipules free. Leaves spirally arranged or distichous; leaf blade margin entire, veins pinnate. Inflorescences axillary, globose, spicate, or racemose, without involucral bracts but often with many bracts at base of inflorescence; interfloral bracteoles adnate to calyx, 2–4 around each flower, each with 2 embedded yellow glands. Female inflorescences globose. Flowers free or connate. Male flowers: calyx lobes (3 or)4(or 5), imbricate, free or basally connate, each lobe with 2–7 embedded glands; stamens as many as calyx lobes, erect, straight in bud [or sometimes inflexed]; pistillode present or not. Female flowers: sessile; calyx peltate, fleshy, free or basally connate, apex thick; ovary free or immersed in a receptacle; style short; stigmas 1 or 2, unequal. Syncarp formed by laterally fused flowers and bracts, fleshy, globose or ± globose; calyx and interfloral bracteoles enlarged. Druplets ovoid, surface shell-like, enveloped by a fleshy calyx. Seed thin and fleshy, with endosperm; cotyledons broad, variously twisted, equal or unequal, folded around radicle.

About 12 species: Africa, Asia, Australia, North America, Pacific Islands, South America; five species in China.

Asian members of this genus have been segregated as *Cudrania* on the basis of the straight rather than inflexed stamens and shorter style arms, but it has been shown that these characters are unreliable and that *Cudrania* is best included within *Maclura*.

The North American tree *Maclura pomifera* (Rafinesque) C. K. Schneider is cultivated in Hebei.

*Cudrania bodinieri* H. Léveillé is *Capparis cantoniensis* Loureiro (Capparaceae).

### 1a. Stems pubescent.

2a. Young branchlets brown pubescent; leaf blade 12–16 × 6–7 cm; petiole 2–3 cm ..... 3. *M. amboinensis*

2b. Young branchlets densely yellowish brown pubescent; leaf blade 4–12 × 2.5–5.5 cm; petiole ca. 1.5 cm ..... 4. *M. pubescens*

### 1b. Stems glabrous or nearly so.

3a. Leaf blade 2–2.5 cm wide, base cuneate; secondary veins 7–10 on each side of midvein ..... 1. *M. cochinchinensis*

3b. Leaf blade 3–6 cm wide, base rounded or broadly cuneate, rarely cuneate; secondary veins 4–6 on each side of midvein.

4a. Woody vines; leaf blade broadly elliptic ..... 2. *M. fruticosa*

4b. Tree or shrub; leaf blade ovate to rhombic ..... 5. *M. tricuspidata*

**1. *Maclura cochinchinensis*** (Loureiro) Corner, Gard. Bull. Singapore 19: 239. 1962.

枸棘 gou ji

*Vanieria cochinchinensis* Loureiro, Fl. Cochinch. 2: 564. 1790; *Cudrania cochinchinensis* (Loureiro) Kudô & Masamune; *C. integra* F. T. Wang & T. Tang; *C. javanensis* Trécul; *C. obovata* Trécul; *C. rectispina* Hance; *Maclura gerontogea* Siebold & Zuccarini; *Trophis spinosa* Roxburgh ex Willdenow; *Vanieria cochinchinensis* var. *gerontogea* (Siebold & Zuccarini) Nakai.

Shrubs, erect or scandent. Branches glabrous; spines curved or straight, to ca. 2 cm, sometimes very inconspicuous. Petiole ca. 1 cm; leaf blade elliptic-lanceolate to oblong, 3–8 × 2–2.5 cm, papery to leathery, glabrous, base cuneate, margin entire, apex rounded to shortly acuminate; secondary veins 7–10 on each side of midvein, tertiary veins reticulate. Male inflorescences a capitulum, 6–10 mm in diam., pedunculate. Female inflorescences pubescent; peduncle to 1 cm. Male flowers: calyx lobes 4, unequal; anthers short; pistillode pyramidal or shield-shaped. Female flowers: calyx lobes free or basally connate, apex thick. Fruiting syncarp reddish orange when mature, 2–5 cm in diam., pubescent. Drupes brown when mature, ovoid, smooth. Fl. Apr–May, fr. Jun–Jul.

Near villages. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, SE Xizang, Yunnan,

Zhejiang [Bhutan, India, Indochina, Japan, Malaysia, Myanmar, Nepal, Philippines, Sikkim, Sri Lanka, Thailand, Vietnam; Australia, Pacific Islands].

This species is widespread and variable. The binomial has often been ascribed to Kudô & Masamune (Ann. Rep. Taihoku Bot. Gard. 2: 27. 1932.) but they mentioned only var. *gerontogea* and thus did not validate any new name as they ascribed the variety to a then non-existent binomial. The identity of *Cudrania chinensis* Loureiro, published simultaneously with *Maclura cochinchinensis* Loureiro, is uncertain as no type material has been found, but the most likely possibility is that it is a spineless form of this species.

**2. *Maclura fruticosa*** (Roxburgh) Corner, Gard. Bull. Singapore 19: 239. 1962.

柘藤 zhe teng

*Batis fruticosa* Roxburgh, Fl. Ind., ed. 1832, 3: 763. 1832; *Cudrania fruticosa* (Roxburgh) Wight ex Kurz; *Vanieria fruticosa* (Roxburgh) Chun.

Woody vines. Branchlets grayish white to pale brown, longitudinally ridged when dry, glabrous, lenticellate; spines curved, often absent on flowering shoots. Petiole 1–1.2 cm, glabrous; leaf blade broadly elliptic, 8–14 × 3.5–6 cm, membranous, abaxially pale green and pubescent sporadically along veins, adaxially dark green and glabrous, base rounded to broadly cuneate, margin entire, apex acute to caudate; basal lateral veins 2 and extending to 1/3 of leaf blade length, secondary

veins 4 or 5 on each side of midvein, abaxially conspicuous, and adaxially flat, tertiary veins  $\pm$  parallel. Inflorescences axillary, in pairs. Male inflorescences with a slender peduncle to 1.5 cm; capitulum ca. 1 cm in diam. Male flowers: calyx lobes fleshy, margin revolute, apex thick; filaments short; pistillode pyramidal. Female flowers: calyx lobes fleshy, basally connate, margin revolute, apically free and thick. Fruiting syncarp  $\pm$  globose, ca. 2 cm in diam. Mature drupes pealike, 5–6 mm in diam., enclosed by persistent calyx lobes. Fl. Apr–May, fr. Jul–Aug.

Monsoon forests; 1000–1700 m. S Yunnan [Bangladesh, NE India, Myanmar, Thailand, Vietnam].

**3. *Maclura amboinensis*** Blume, Mus. Bot. 2: 84. 1856.

景东柘 jing dong zhe

*Cudrania amboinensis* (Blume) Miquel; *C. grandifolia* Merrill; *C. jingdongensis* S. S. Chang.

Scandent shrubs. Branches cylindrical; densely brown pubescent; spines curved, 1–1.5 cm. Petiole 2–3 cm, sparsely pubescent; leaf blade narrowly oblong-elliptic, 12–16  $\times$  6–7 cm, papery, abaxially sparsely pubescent along midvein, adaxially green and glabrous, base rounded to broadly cuneate, apex acuminate to obtuse; midvein abaxially conspicuous and adaxially slightly impressed, secondary veins 6 or 7 on each side of midvein. Peduncle 4–5 mm. Fruiting syncarp solitary or in pairs, orange red when mature,  $\pm$  globose, 2–2.5 cm in diam.; persistent calyx lobes fleshy, shield-shaped. Drupes ovoid, smooth.

Forests; 1400–1600 m. Xizang (Médog), CS to S Yunnan [Indonesia, Malaysia, New Guinea, Thailand].

**4. *Maclura pubescens*** (Trécul) Z. K. Zhou & M. G. Gilbert, **comb. nov.**

毛柘藤 mao zhe teng

Basionym: *Cudrania pubescens* Trécul, Ann. Sci. Nat. Bot, sér. 3, 8: 125. 1847; *C. jinghongensis* S. S. Chang; *Maclura cochinchinensis* (Loureiro) Corner var. *pubescens* (Trécul) Corner; *Vanieria pubescens* (Trécul) Chun.

Woody vines. Branchlets pale brown, grayish green when older, cylindrical, striate when dry, densely yellow brown pubescent; lenticels elliptic; spines present on longer branches, often absent on flowering shoots. Petiole ca. 1.5 cm, densely yellow-

ish brown pubescent; leaf blade oblong-elliptic to obovate-elliptic, 4–12  $\times$  2.5–5.5 cm, abaxially densely yellowish brown long pubescent, adaxially subglabrous, base broadly cuneate to  $\pm$  rounded, margin entire, apex acuminate to shortly acuminate; midvein adaxially conspicuous, secondary veins 5 or 6 on each side of midvein, tertiary veins reticulate. Male inflorescences axillary, in pairs, capitulate, ca. 1 cm in diam.; peduncle shorter than capitulum. Male flowers: densely yellow brown pubescent; calyx lobes fleshy, basally connate, apically free; filaments short; pistillode conic. Fruiting syncarp orange red when mature,  $\pm$  globose, 1.5–2 cm in diam. Drupes ovoid.

Forest margins; 500–1100 m. N Guangdong, Guangxi, S Guizhou, S Yunnan [Indonesia, Malaysia, Myanmar].

**5. *Maclura tricuspidata*** Carrière, Rev. Hort. 1864: 390. 1864.

柘 zhe

*Cudrania tricuspidata* (Carrière) Bureau ex Lavallée; *C. triloba* Hance; *Morus integrifolia* H. Léveillé & Vaniot; *Vanieria tricuspidata* (Carrière) Hu; *V. triloba* (Hance) Satake.

Shrubs or small trees, 1–7 m tall, deciduous. Bark grayish brown. Branchlets slightly ridged, glabrous; spines 0.5–2 cm. Winter buds reddish brown. Petiole 1–2 cm, sparsely pubescent; leaf blade ovate to rhombic-ovate, occasionally 3-lobed, 5–14  $\times$  3–6 cm, abaxially greenish white and glabrous or sparsely pubescent, adaxially deep green and glabrous, base rounded to cuneate, margin entire, apex acuminate; secondary veins 4–6 on each side of midvein, tertiary veins reticulate. Inflorescences axillary, single or in pairs. Male inflorescences capitulate, ca. 5 mm in diam.; peduncle shorter than capitulum. Female inflorescences 1–1.5 cm in diam., axillary; peduncle short. Male flowers: calyx lobes fleshy, margin revolute, apex thick; pistillode pyramidal. Female flowers: calyx lobes with margin revolute, apically shield-shaped; ovary immersed in lower part of calyx. Fruiting syncarp orange red when mature,  $\pm$  globose, ca. 2.5 cm in diam. Fl. May–Jun, fr. Jun–Jul.

Sunny forest margins, mountain slopes; 500–2200 m. Anhui, Fujian, SE Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, S Shanxi, Sichuan, Yunnan, Zhejiang [Japan (cultivated), Korea].

The bark fibers are used for making paper, the leaves are used as food for silkworms, the fruit are edible, and the bark is used medicinally.

