
桑 屬 sang shu

Trees or shrubs, deciduous with latex; monoecious or dioecious. Winter buds with 3–6 bud scales; scales imbricate. Stipules free, sublateral, caducous. Leaves alternate; leaf blade simple to deeply palmately lobed, margin toothed; primary veins 3–5 from base, secondary veins pinnate. Male inflorescences axillary, spicate, many-flowered, shortly pedunculate. Female inflorescences shortly spicate to capitulate. Male flowers: calyx lobes 4, imbricate; stamens inflexed in bud; pistillode top-shaped. Female flowers: sessile; calyx lobes 4, imbricate, fleshy in fruit; ovary 1-loculed; style present or not; stigma 2-branched, abaxially pubescent or papillose. Fruit with enlarged, succulent calyx usually aggregated into juicy syncarp. Syncarp with achenes enclosed by enlarged and succulent calyx; endocarp shell-like; exocarp fleshy. Seed ± globose; endosperm fleshy; embryo incurved; cotyledon elliptic.

About 16 species: widespread in all temperate areas, also in the mountains of tropical Africa, Indonesia, and South America; 11 species (five endemic, one introduced) in China.

Morus species are cultivated in many temperate and tropical countries. The leaves are used as food for silkworms and the fruit for human consumption. Male material is often very difficult to name.

Morus calva H. Léveillé is Coriaria sinica Maximowicz (Coriariaceae) and M. mairei H. Léveillé is Acalypha mairei (H. Léveillé) Schneider (Euphorbiaceae).

1a. Female flowers with style long and conspicuous.
2a. Leaf blade marginal teeth each with subulate apiculum or seta; stigmas with a nipple-like protuberance ........ 10. M. mongolica
2b. Leaf blade marginal teeth without subulate apiculum or seta; stigmas without a nipple-like protuberance.
3a. Syncarp less than 2.5 cm ......................................................................................................................... 11. M. australis
3b. Syncarp 3–6 cm.
   4a. Leaf blade not lobed, veins abaxially prominent; stigmas glabrous ..................................................... 8. M. notabilis
   4b. Leaf blade deeply 3–5-lobed, veins abaxially not prominent; stigmas abaxially pubescent ................. 9. M. trilobata
1b. Female flowers with style very short or absent.
5a. Infructescences longer than 2.5 cm.
6a. Infructescences with fruit joined into a syncarp, 2.5–3.7 cm; leaf blades elliptic to narrowly elliptic ....... 5. M. liboensis
6b. Infructescences with fruit ± free, 6–16 cm; leaf blade ovate, broadly ovate, or broadly elliptic.
7a. Leaf blade oblong to broadly elliptic, margin subentire or toothed toward apex only; infructescences 10–16 cm, apparently not fleshy ....................................................................................................................... 6. M. wittiorum
7b. Leaf blade ovate to broadly ovate, margin minutely and densely serrate; infructescences 6–12 cm, fleshy ....................................................................................................................... 7. M. macroura
5b. Infructescences usually shorter than 2.5 cm.
8a. Leaf blade sparsely pubescent along midvein or in tufts in axil of midvein and primary lateral veins; stigmas with mastoidlike protuberance ................................................................. 1. M. alba
8b. Leaf blade pubescent not as above; stigmas without mastoidlike protuberance.
   9a. Leaves irregularly toothed ............................................................................................................... 2. M. serrata
   9b. Leaves regularly toothed.
10a. Syncarp 1.5–2.5 cm in diam.; stigma long pubescent ................................................................. 3. M. nigra
10b. Syncarp less than 1 cm in diam.; stigma shortly pubescent ......................................................... 4. M. cathayana


桑 屬 sang

Shrubs or trees, 3–10 m tall. Bark gray, shallowly furrowed. Branches finely hairy. Winter buds reddish brown, ovoid, finely hairy. Stipules lanceolate, 2–3.5 cm, densely covered with short pubescence. Petiole 1.5–5.5 cm, pubescent; leaf blade ovate to broadly ovate, irregularly lobed, 5–30 × 5–12 cm, abaxially sparsely pubescent along midvein or in tufts in axil of midvein and primary lateral veins, adaxially bright green and glabrous, base rounded to ± cordate, margin coarsely serrate to crenate, apex acute, acuminate, or obtuse. Male catkins pendulous, 2–3.5 cm, densely white hairy. Female catkins 1–2 cm, pubescent; peduncle 5–10 mm, pubescent. Male flowers: calyx lobes pale green, broadly elliptic; filaments inflexed in bud; anthers 2-loculed, globose to reniform. Female flowers: sessile; calyx lobes ovoid, ± compressed, with marginal hairs; ovary sessile, ovoid; style absent; stigmas with mastoidlike protuberance, branches divergent, papillose. Syncarp red when immature, blackish purple, purple, or greenish white when mature, ovoid, ellipsoid, or cylindric, 1–2.5 cm. Fl. Apr–May, fr. May–Aug.

- Originally endemic to C and N China, now cultivated throughout China [widely cultivated throughout the world].
- The leaves provide food for silkworms, the bark fiber is used for textiles and paper, and the bark is also used for medicine.

1a. Leaf blade thin, 5–15 cm; syncarp blackish purple when mature, ovoid to ellipsoid ........ 1a. var. alba
1b. Leaf blade thick, to 30 cm; syncarp greenish white to purple when mature, cylindric ........................................... 1b. var. multicaulis

1. Morus alba var. alba

\textbf{3a. Morus nigra} var. atropurpurea (Roxburgh) Bureau; \textit{M. alba} var. bungeana Bureau; \textit{M. atropurpurea} Roxburgh.

Leaf blade 5--15 cm, thin, flat. Syncarp blackish purple when mature, ovoid to ellipsoid, 1--2.5 cm.

\begin{itemize}
  \item Originally endemic to C and N China, now cultivated throughout China [widely cultivated throughout the world].
\end{itemize}


\textbf{鲁桑} lu sang


Leaf blade ca. 30 cm, thick, wrinkled. Syncarp greenish white to purple when mature.

\begin{itemize}
  \item Cultivated. Jiangsu, Shaanxi, Sichuan, Zhejiang.
\end{itemize}


\textbf{吉隆桑} ji long sang

\textit{Morus alba} Linnaeus var. \textit{serrata} (Roxburgh) Bureau; \textit{M. gyirongensis} S. S. Chang; \textit{M. pabularia} Decaisne.

Trees to 15 m tall. Branchlets densely pubescent. Stipules lanceolate-ovate, 1.5--2 cm. Petiole 4--6 cm, densely white pubescent; leaf blade broadly ovate, unlobed, 10--14 × 6--10 cm, abaxially densely white pubescent along midvein and basal lateral veins, adaxially glabrous, base cordate, margin toothed with teeth triangular and apically shortly acuminate, apex acuminate to caudate; basal lateral veins 2, extending to basal half. Female inflorescences axillary, single; peduncle 0.5--1.5 cm. Male flowers: calyx lobes obovate, apically pubescent; styles absent; stigmas without mastoidlike protuberance, 2-branched, pubescent. Syncarp red when mature, shortly cylindric. Achenes ovoid, ± compressed, glabrous. Fl. and fr. May--Jun.

Mountain forests; ca. 2300 m. S Xizang (Gyirong) [NW India, Nepal].


\textbf{3b. Morus nigra} var. \textit{multicaulis} (Roxburgh) Bureau; \textit{M. alba} var. \textit{latifolia} (Poiret) Bureau; \textit{M. chinensis} Loddiges ex Loudon; \textit{M. latifolia} Poiret.

Leaf blade abaxially yellowish gray, margin basally entire and apically shallowly serrate, apex acute to shortly acuminate. Male catkins 3--5 cm. Female catkins 1--3 cm. Male flowers: calyx lobes yellowish green, narrowly ovate, adaxially pubescent; stamens 4; pistillode small. Female flowers: calyx lobes obovate, apically pubescent; styles short; stigmas without mastoidlike protuberance, 2-branched, abaxially pubescent. Syncarp white, or dark purple when mature, cylindric, 2--3 cm. Fl. Apr--May, fr. May--Jun.

Sunny slopes or valleys, high mountains; 900--1300 m. Anhui, N Fujian, N Guangdong, Hebei, Henan, Hunan, Hunan, S Jiangsu, S Shaanxi, Sichuan, NW Yunnan, Zhejiang [Japan, Korea].

\begin{itemize}
  \item Cultivated. Hebei, Shandong, Xingjiang (mainly) [native to W Iran; widely cultivated elsewhere].
\end{itemize}

This species is a valuable fruit tree in some countries.


\textbf{华桑} hua sang

Small trees or shrubs; monoecious. Bark grayish white, smooth. Branchlets pubescent when young, glabrescent, conspicuously lenticellate. Stipules lanceolate. Petiole 2--5 cm, pubescent; leaf blade broadly ovate to ± orbicular, sometimes lobed, 8--20 × 6--13 cm, thick papery, abaxially densely white or yellowish gray pubescent, adaxially scabrous, sparsely covered with short hairs, and basally pubescent along veins, base cordate to truncate and ± oblique, margin shallowly to coarsely serrate or basally entire and apically shallowly serrate, apex acute to shortly acuminate. Male catkins 3--5 cm. Female catkins 1--3 cm. Male flowers: calyx lobes yellowish green, narrowly ovate, adaxially pubescent; stamens 4; pistillode small. Female flowers: calyx lobes obovate, apically pubescent; styles short; stigmas without mastoidlike protuberance, 2-branched, abaxially pubescent. Syncarp white, or dark purple when mature, cylindric, 2--3 cm. Fl. Apr--May, fr. May--Jun.

Sunny slopes or valleys, high mountains; 900--1300 m. Anhui, N Fujian, N Guangdong, Hebei, Henan, Hunan, Hunan, S Jiangsu, S Shaanxi, Sichuan, NW Yunnan, Zhejiang [Japan, Korea].

\begin{itemize}
  \item Cultivated. Jiangsu, Shaanxi, Sichuan, Zhejiang.
\end{itemize}

\begin{itemize}
  \item High mountains. NW Yunnan.
\end{itemize}


\textbf{荔波桑} li bo sang
Trees 6–15 m tall, d.b.h. 16–20 cm. Branches gray-brown, cylindric. Winter buds ovoid, ca. 3 mm, sparingly pubescent. Stipules pubescent. Petiole 2–3 cm, sparingly pubescent; leaf blade elliptic to narrowly elliptic, 6–12 × 4–8 cm, papery, abaxially whitish green and basally sparingly white pubescent, adaxially dark green, densely white pubescent, and with pointed cystoliths, base cordate to rounded, margin crenate on apical 1/3, apex acute to shortly acuminate with a 7–10 mm acumen; midvein abaxially prominent and adaxially impressed, basal lateral veins extending to 2/3 of leaf blade length, secondary veins 3 or 4 on each side of midvein. Peduncle ca. 1 cm, pubescent. Female flowers: calyx lobes broadly ovate, margined pubescent; stigma 2-branched, abaxially papillose. Syncarp white when mature, 3.5–4 cm. Fl. Apr–May, fr. May–Jun.


Trees or shrubs, 4–12 m tall, deciduous; dioecious. Bark grayish white, smooth. Branchlets pale brown, conspicuously lenticellate. Winter buds ovoid. Stipules narrowly ovate, ca. 4 mm. Petiole 1.5–3.5 cm, shallowly grooved; leaf blade oblong to broadly elliptic, 8–12 × 5–9 cm, papery, glabrous or young leaves abaxially with short soft hairs along midvein and lateral veins, abaxially pale green, adaxially green, base rounded to broadly truncate, margin subentire or toothed toward apex only, apex acuminate; basal lateral veins 3 pairs, extending to 1/2 of leaf blade length, secondary veins 3 or 4 on each side of midvein. Male catkins axillary; peduncle short. Female catkins 9–15 cm; peduncle 2–3 cm. Male flowers: calyx lobes green, ± orbicular. Female flowers: sessile; calyx lobes yellowish green, imbricate; ovary 1-loculed; style very short; stigma 2-branched. Syncarp cylindric, 10–16 cm; achenes ovoid. Fl. Apr–May, fr. May–Jun.

- Limestone areas; ca. 700 m. Guizhou (Libo).


Trees 7–12 m tall, d.b.h. 10–20 cm; dioecious. Branchlets pubescent when young. Winter buds ovoid-ellipsoid to ovoid, white pubescent. Stipules small. Petiole 2–4 cm; leaf blade ovate to broadly ovate, 5–15 × 5–9 cm, membranous, abaxially pale green and with short soft hairs along midvein and lateral veins when young, adaxially dark green and with soft hairs along veins, base rounded, ± cordate, or truncate, margin minutely and densely serrate, apex acuminate to shortly acuminate; secondary veins 4–6 on each side of midvein. Male catkins axillary, paired, 4–8 cm; peduncle 1–1.5 cm. Female inflorescences cylindric, 6–12 cm; peduncle 1–1.5 cm. Male flowers: calyx lobes ovate, adaxially pubescent; filament ca. 2.5 mm; anther globose. Female flowers: calyx lobes pubescent; ovary ovoid, declinate, ± compressed, pubescent; style absent; stigma 2-branched, papillose. Syncarp yellowish white when mature, 6–12 cm; achenes ovoid. Fl. Mar–Apr, fr. Apr–May.

Mountain forests, tropical forests; (300–)1000–1300(–2200) m. E Xizang, S Yunnan [Bhutan, Indochina, Malaysia, Myanmar, Sikkim, Thailand].

This species is used for paper making and the wood and leaves are used in dyeing.


Trees 9–15 m tall; dioecious. Bark grayish brown. Branches spreading, subglabrous. Winter buds ovoid, ca. 8 mm, subglabrous. Petiole 2–3 cm, glabrous; leaf blade ± orbicular, 7–15 × 6–12 cm, adaxially pale green and glabrous or pubescent along midvein and lateral veins, adaxially dark green, glabrous, and slightly coarse, base ± cordate, margin narrowly triangular serrate and without subulate apiculum or seta, apex shortly acuminate to obtuse; basal lateral veins 2 and extending to 2/3 of leaf blade length, secondary veins 4–6 on each side of midvein and joined together near margin. Inflorescences axillary. Male catkins green, paired, 4–5 cm. Female inflorescences cylindric, 3–4 cm, densely flowered; peduncle 3–4.5 cm. Female flowers: calyx lobes glabrous or adaxially sparsely pubescent, margin membranous; ovary ovoid, declinate, ± compressed, pubescent; style long; stigma abaxially papillose. Syncarp white when mature, 3.5–4 cm. Fl. Apr–May, fr. May–Jun.

- Evergreen broad-leaved forests. Sichuan, Yunnan.
Morus alba Linnaeus var. mongolica Bureau in Candolle, Prodr. 17: 241. 1873; M. barkamensis S. S. Chang; M. deqimensis S. S. Chang; M. mongolica var. barkamensis (S. S. Chang) C. Y. Wu & Z. Y. Cao; M. mongolica var. diabolica Koidzumi; M. mongolica var. hopeiensis S. S. Chang & Y. P. Wu; M. mongolica var. longicaudata Z. Y. Cao; M. mongolica var. rotundifolia Y. B. Wu; M. mongolica var. vestita Rehder; M. mongolica var. yunnanensis (Koidzumi) C. Y. Wu & Z. Y. Cao; M. yunnanensis Koidzumi.

Small trees or shrubs; dioecious. Bark grayish brown, furrowed. Old branches grayish black; branchlets dark red. Winter buds grayish brown, ovoid. Stipules 2.5–3.5 cm. Leaf blade elliptic-ovate, 8–15 × 5–8 cm, papery, glabrous, base cordate, margin triangular serrate with a few teeth double serrate, each tooth with subulate apiculum or seta, and apical serrations with long spines, apex shortly acuminate. Male catkins ca. 3 cm. Female inflorescences shortly cylindric, 1–1.5 cm; peduncle 1–1.5 cm. Male flowers: calyx lobes dark yellow, margin adaxially hairy; anthers 2-loculed, longitudinally dehiscent. Female flowers: calyx lobes glabrous or adaxially sparsely pubescent; style long; stigma with a nipple-like protuberance, 2-branched, abaxially densely papillate. Syncarp red to purple when mature, ca. 1.5 cm. Fl. Mar–Apr, fr. Apr–May.

Mountain slopes, high mountains, forests; 500–3500 m. N Anhui, NE Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, NW Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, SE Xizang, Yunnan [Japan, Korea, Mongolia].

The very distinctive leaf margin makes this species easy to recognize, in contrast to the varieties that have been proposed within it. Formal recognition of these varieties does not seem justified because they are based on features of indumentum and leaf shape, which vary more or less continuously.

11. Morus australis Poiret in Desrousseaux et al., Encycl. 4: 380. 1797.

鸡桑 ji sang

Morus acidosa Griffith; M. alba Linnaeus var. indica Bureau; M. alba var. nigriformis Bureau; M. alba var. stylosa Bureau; M. australis var. hastifolia (F. T. Wang & T. Tang ex Z. Y. Cao) Z. Y. Cao; M. australis var. incisa C. Y. Wu; M. australis var. inusitata (H. Léveillé) C. Y. Wu; M. australis var. linearipartita Z. Y. Cao; M. australis var. oblongifolia Z. Y. Cao; M. bombycis Koidzumi; M. bombycis var. angustifolia Koidzumi; M. bombycis var. bifida Koidzumi; M. bombycis var. longistyla Koidzumi; M. bombycis var. tiliifolia Koidzumi; M. cavaleriei H. Léveillé; M. formosensis Hotta; M. hastifolia F. T. Wang & T. Tang ex Z. Y. Cao; M. inusitata H. Léveillé; M. longistyla Diels; M. nigriformis (Bureau) Koidzumi; M. stylosa Seringe var. ovalifolia Seringe.

Small trees or shrubs. Bark grayish brown. Winter buds conic to ovoid, large. Stipules linear-lanceolate. Petiole 1–1.5 cm, pubescent; leaf blade lanceolate to broadly ovate, simple or (2 or)3–5-lobed, lobes rounded to linear, 5–14 × 1–12 cm, abaxially sparsely covered with thick hairs, adaxially scabrous and densely covered with short hairs, base cuneate to cordate, margin serrate or entire and without subulate apiculum or seta, apex acute to caudate. Male catkins 1–1.5 cm, pubescent. Female inflorescences globose, ca. 1 cm, densely white pubescent;

Limestone areas, forest margins, mountain slopes, fallow land, scrub in valleys; 500–2000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Hainan, Hebei, Henan, Hunan, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Korea, Myanmar, Nepal, Sikkim].

This species is closely related to *Morus indica* Linnaeus, and some authors have considered them conspecific. Varieties have been recognized on the basis of differences in leaf form, particularly the degree of division. Deeply divided leaves are characteristic of juvenile growth in a number of genera in the Moraceae and other families, and it does not seem advisable to give such material formal names, at least without more detailed population studies.

The bark fibers are used for making paper and the fruit are edible.